

## PROVISIONAL LOCAL VESSELS ADVISORY COMMITTEE

### **Draft Mainland Trade Certificates of Competency for Deck Officers Determinations and Draft Mainland Trade Certificates of Competency for Marine Engineer Officers Determinations**

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#### **Purpose**

1. This paper is a follow-up of the previous Paper No. 2/2001 - “The Development of Legislation for Coastal Trade Vessels”, to brief members on the developments of the relevant applicable requirements and seeks members’ endorsement.
2. This paper gives a briefing on “Draft Mainland Trade Certificates of Competency for Deck Officers” Determinations” (DO Determinations) (*Attachment-1*) and “Draft Mainland Trade Certificates of Competency for Marine Engineer Officers Determinations” (MEO Determinations) (*Attachment-2*) for certificated officers working on board coastal cargo vessels.

#### **Background**

3. Merchant Shipping (Coastal Vessels) (Safety Survey) Regulation and Merchant Shipping (Coastal Vessels) (Certification of Officers) Regulation (tentative titles only) are proposed to be made under the new Merchant Shipping (Local Vessels) Ordinance (LVO).
4. The LVO stipulates that, inter alia, the Director of Marine has power to make determinations in writing specifying the standards of competency to be attained and conditions to be satisfied by a person to qualify for service as officers on coastal trade vessels specified by the Authority.

#### **Setting the Standards**

5. The standards in the draft documents are set out to achieve a common standard between Hong Kong and Mainland coastal cargo vessels trading between Hong Kong and Mainland China so as to facilitate the maritime authorities of both sides to exercise better control over the safety of these vessels. The following principles are adopted on the consideration of the standards for Hong Kong coastal cargo vessels:

- (a) a normal practice for ship construction and operation, i.e. vessels' operational risk factors such as type of cargo, operating areas, manning and crew competency, etc.;
  - (b) a standard comparable to those of the Chinese coastal vessels operating in the same areas.
6. The main points on the Draft “Mainland Trade Certificates of Competency for Deck Officers Determinations” (DO Determinations) are as follows:-
- (a) There are 3 classes of certificates of competency as follows:
    - (i) Certificate of Competency (Deck Officer)(Mainland Trade) Class 1;
    - (ii) Certificate of Competency (Deck Officer)(Mainland Trade) Class 2; and
    - (iii) Certificate of Competency (Deck Officer)(Mainland Trade) Class 3.
  - (b) Bridging arrangement for officers' competency:
    - (i) Candidate holding a Hong Kong Local or River Trade Class 3 Certificate of Competency will be exempted from Mainland Trade Class 3 Certificate of Competency examination upon completion and passing an approved course.
    - (ii) Candidate holding a Hong Kong River Trade Class 2 Certificate of Competency will be exempted from Mainland Trade Class 2 Certificate of Competency examination upon completion and passing an approved course. A Hong Kong Seagoing Class 3 Certificate of Competency will be recognized as equivalent to a Mainland Trade Class 2 Certificate of Competency <sup>(Note )</sup>.
    - (iii) Candidate holding a Hong Kong River Trade Class 1 Certificate of Competency will be exempted from Mainland Trade Class 1 Certificate of Competency examination upon completion and passing an approved course. A Hong Kong Seagoing Class 2 Certificate of Competency will be recognized as equivalent to a Mainland Trade Class 1 Certificate of Competency <sup>(Note )</sup>.

Note: Those recognitions will be specified in the legislation
7. The main points on the “Draft Mainland Trade Certificates of Competency for Marine Engineer Officers Determinations” (MEO Determinations) are as follows:-
- (a) There are 3 classes of certificates of competency as follows:
    - (i) Certificate of Competency (Marine Engineer Officer)(Mainland Trade) Class 1;

- (ii) Certificate of Competency (Marine Engineer Officer)(Mainland Trade) Class 2; and
  - (iii) Certificate of Competency (Marine Engineer Officer)(Mainland Trade) Class 3.
- (b) Bridging arrangement for Marine Engineer Officers' competency is similar to the above 6(b).

### **Implications**

8. The Determinations are only applicable for the issue of Certificate of Competency of officers for coastal vessels trading between Hong Kong and Mainland China. Competency of the crew serving on coastal vessels, i.e. STCW basic safety training, will be specified in the relevant subsidiary legislation for coastal vessels under LVO.

### **Consultation**

9. The draft documents had been studied and supported by the Technical Sub-committee of PLVAC.

### **Application**

10. The Determinations will come into operation by notice in the Gazette after the relevant subsidiary legislation for coastal vessels under LVO comes into force.

### **Amendment of Determinations**

11. The Director may from time to time approve, revise or withdraw his approval of the whole or any part of any Determinations upon the advice of the LVAC and such other interested persons as he thinks fit.

### **Advice Sought**

12. Members are invited to give comments/views and endorse the "DO Determinations", "MEO Determinations" that will apply certificated officers working on board the Hong Kong coastal cargo vessels.

*Marine Department, Multi-lateral Policy Division  
December 2004*



MARINE DEPARTMENT  
GOVERNMENT OF THE HONG KONG  
SPECIAL ADMINISTRATIVE REGION

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# **Mainland Trade Certificates of Competency for Deck Officers Determinations**

**(200x Edition)**

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Made under Regulations [                      ] of the  
Merchant Shipping (Local Vessels)(Mainland Trade Vessels) Regulation

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## CHAPTER 1

### COMMENCEMENT, INTERPRETATION & GENERAL REQUIREMENTS

#### 1.1 Commencement

- 1.1.1 These Determinations are made by the Director of Marine under powers granted by the Merchant Shipping (Local Vessels) (Mainland Trade Vessels) Regulation and shall come into operation on \_\_\_\_\_.

#### 1.2 Interpretation

- 1.2.1 In these Determinations, unless the context otherwise requires:

**"approved"** means approved or recognized by the Director of Marine;

**"certificate of competency"** means a certificate of competency issued by the Director under the Merchant Shipping (Local Vessels)(Mainland Trade Vessels) Regulation or its equivalent recognized by that regulation as having the same force;

**"Director"** means the Director of Marine;

**"examiner"** in these Determinations means a person appointed by the Director to be an Examiner of Masters and Deck Officers;

**"mainland trade"** means \_\_\_\_\_

**"oil tanker"** means a ship constructed and used for the carriage of petroleum and petroleum products in bulk.

**"petroleum products"** means fuels, lubricants, bitumen, wax, industrial spirits, and any substance having a final boiling point at normal atmospheric pressure of more than 50 degrees Centigrade higher than its initial boiling point, produced directly or indirectly from crude petroleum, except liquefied gas;

**"river trade"** means within the limits of the River Trade area as defined in the Shipping and Port Control Ordinance;

#### 1.3 General Requirements

- 1.3.1 The subsequent chapters of these Determinations set out the training and qualification requirements for deck officers and the conditions to be satisfied by any person to qualify for a certificate of competency as a deck officer, or an extension of the validity of such a certificate, or an endorsement to such a certificate, the manner in which the attainment of such standards or the satisfaction of such conditions is to be established, the procedure for the conduct of examinations, and the subjects and syllabuses for those examinations.



- 1.3.2 The officers manning the stations of Master and Chief Mate, and any other person having an immediate responsibility for the cargo in an oil tanker shall hold certificates of competency that bear endorsements to the effect that the holders have satisfied the Director in regard to the requirements for training and service set out in Chapter 9 of these Determinations.
- 1.3.3 Any candidate who feels aggrieved by any decision of the examiner may appeal to the Director within 30 days of being informed of such decision.
- 1.3.4 The Director may, at his discretion, permit exemption from any or all of the provisions of these Determinations.

## **CHAPTER 2**

### **GENERAL PROVISIONS**

#### **2.1 Classes of Certificate and their Validity**

2.1.1 There are the following classes of certificates of competency:

Certificate of Competency (Deck Officer)(Mainland Trade) Class 1  
Certificate of Competency (Deck Officer)(Mainland Trade) Class 2  
Certificate of Competency (Deck Officer)(Mainland Trade) Class 3

2.1.2 Mainland trade classes of certificates are only valid for service on vessels trading wholly within the limits of the mainland trade areas

2.1.3 Mainland trade classes of certificates are valid for sea service for a period of not more than 5 years and fall due for revalidation on the expiry date shown on the certificate.

2.1.4 In order to revalidate a certificate the holder must show evidence of meeting the conditions for revalidation which are set out in Chapter 10.

#### **2.2 Proof of Nationality**

2.2.1 All candidates for examination for a certificate of competency will be required to produce proof of name, nationality and date of birth.

#### **2.3 Date and Place of Examinations**

2.3.1 The dates upon which written examinations are to be held in the following year will be published annually in a Gazette Notice issued by the Director.

2.3.2 Candidates for examination will be informed, at the time of making application, of the place at which the examination will be held.

2.3.3 Candidates who are making application for only the oral part of any examination should follow the procedure set out in paragraph 2.4, ensuring that their application is lodged at least one month before the date upon which they wish to be examined. The time and date of the oral examination appointment will then be advised.

#### **2.4 Application**

2.4.1 Intending candidates for either a part, or for the whole, of any certificate of competency examination must complete an application form which may be obtained from the Marine Department, Seafarers' Certification Section, or by post from:

Marine Department  
Seafarers' Certification Section  
3/F, Harbour Building  
38, Pier Road  
Central  
Hong Kong

- 2.4.2 Applicants should return the completed form to the Seafarers' Certification Section at least one month before the intended date of examination, together with:
- (a) the examination fee
  - (b) two passport type photographs (50mm x 40mm)
  - (c) their existing certificates of competency (if any)
  - (d) sea service testimonials, Employment Registration Book, Seaman's Discharge Book or Certificates of Discharge, where applicable
  - (e) Watchkeeping Certificates (if required)
  - (f) proof of nationality, name and date of birth
  - (g) appropriate subsidiary course certificates
  - (h) training record books (if appropriate)
- 2.4.3 Candidates who have made a previous attempt at the same examination, when making application for re-examination, must also submit their copy of the record of results, issued by the examiner following their previous attempt.
- 2.4.4 It is important that the correct procedure for application is followed as the sea service testimonials, Employment Registration Book, Seaman's Discharge Book or Certificates of Discharge, where applicable may have to be forwarded for verification which can take time, and in the absence of such verification the candidate cannot be accepted for examination.
- 2.4.5 Applications from candidates abroad may be made by post to the Seafarers' Certification Section, accompanied by the examination fee and copies of the relevant supporting documents. Original documents should not be sent through the post in such cases, but should be presented to the examiner on the applicant's next return to Hong Kong prior to the date of examination. Notification by the examiner of acceptance for the examination will be given as soon as possible after receipt of the application.
- 2.4.6 Candidates who fail in all, or in a part, of an examination may attend for the next scheduled examination for the relevant certificate provided that accommodation is available in the examination hall, even if this means that they are unable to give the full one month notice required by paragraph 2.4.2. In order to take advantage of this facility candidates must submit written application to resit the examination, or part of examination, together with the appropriate fee, immediately upon receiving notification of the examination results.

## 2.5 **Enquiries**

- 2.5.1 Candidates may make enquiries about examinations and when doing so, should ensure that the point on which information is sought is clearly stated. Enquiries should be addressed to:

The Examiner of Masters and Mates  
Marine Department  
3/F, Harbour Building  
38 Pier Road  
Central  
Hong Kong

Tel. No. : (852) 2852 4362  
Fax No. : (852) 2541 6754  
E-mail : snexam@mardep.gov.hk

2.5.2 Candidates writing to request a provisional estimate of their sea service should include a detailed summary of their service with the enquiry but should not include original documents.

## 2.6 **Particulars of Sea Service**

2.6.1 A candidate's digibility for examination will depend, amongst other factors, on the amount of sea service performed and upon the seagoing ranks in which the candidate has served. It is, therefore, imperative that the particulars which candidates record on the application form are accurately stated.

2.6.2 The amount of sea service set down in these Determinations for each class of certificate is the **absolute minimum** that can be accepted. Unless candidates can prove the full amount they will not be admitted to the examination.

## 2.7 **Testimonials and Watchkeeping Certificates**

2.7.1 Testimonials as to character, sobriety, experience and ability on board ship, and good conduct for the full period of sea service covered by the application will be required of all candidates. Such testimonials must, except in special cases, be signed by the Master(s) of the vessel(s) in which the candidate has served.

2.7.2 Candidates for those certificates of competency for which service as a watchkeeping officer is a requirement must also produce Certificates of Watchkeeping Service signed by the Master(s) of the vessel(s) in which they have served. A specimen form of certificate, recommended for the purpose, is shown in Appendix.

## 2.8 **Use of Information**

2.8.1 Information required by the application form will be used by Marine Department for process of application for examination and issue of certificate. This information may be divulged to other departments and agencies authorised to process the information for the mentioned purposes as well as for verification of certificates.

2.8.2 The supply of information is obligatory. A candidate should ensure that all the information filled in the application form is accurate. Failure to do so may, besides subject to paragraph 2.9, result in an unsuccessful application.

2.8.3 For making correction and access to personal data after submission of application form, a candidate may contact the following subject officer :

Officer-in-charge  
Marine Department  
Seafarers' Certification Section  
Harbour Building  
38 Pier Road  
Central  
HONG KONG

## 2.9 **Fraud or Misrepresentation**

2.9.1 Candidates are reminded that any person who, in connection with an application for the issue of a certificate of competency, or in connection with the endorsement to, or extension of validity of, a certificate of competency:

- (a) makes a false pretence; or
- (b) supplies false information,

knowing it to be false, or not believing it to be true, commits an offence and is liable, amongst other things, to a fine and to imprisonment.

## 2.10 **Attempted Bribery**

2.10.1 Any candidate who offers an advantage to any officer of the Marine Department shall be guilty of an offence under the Prevention of Bribery Ordinance and shall be liable on summary conviction to a fine and to imprisonment. Such a candidate will not be re-examined for such a period as may be decided by the Director.

## 2.11 **Unsatisfactory Conduct**

2.11.1 Candidates who have neglected to join their vessels after signing the employment contracts or crew agreements (where applicable), or who have left their vessels after joining, other than upon discharge, or who have committed misconduct on board, will be required to produce satisfactory proof of two years subsequent service at sea with good conduct unless the Director, after investigation, should see fit to reduce this period.

## 2.12 **Deafness and other Physical or Mental Handicaps**

2.12.1 If, in the course of any examination, the examiner finds that a candidate is afflicted with deafness, an impediment in speech, or with some other physical or mental handicap which he considers sufficient to render the candidate incapable of discharging adequately the ordinary seagoing duties of the holder of a certificate of competency, he will not allow the candidate to complete the examination and the candidate will be refunded of the examination fee.

2.12.2 If such a candidate subsequently produces a medical certificate to the effect that the particular handicap has been overcome or has improved or that the candidate's condition is now normal, the Director will reconsider the candidate for examination.

## 2.13 **Knowledge of English and Chinese for Examinations**

2.13.1 All candidates for mainland trade classes of certificates must demonstrate to the satisfaction of the examiner that they can master English, Putonghua and Cantonese sufficiently well to perform the duties required of them on board a mainland trade ship.

2.13.2 The oral/practical examinations for class 1 mainland trade certificates will always be conducted in English, but candidates for the oral/practical examination for a mainland trade class 2 and class 3 certificate may elect to have their oral/practical examination partly conducted in English and Chinese. Such candidates must indicate their preference at the time of making application.

- 2.13.3 Written examinations for mainland trade classes of certificates may be conducted in either Chinese or English.
- 2.13.4 Candidates for written examinations which are conducted in English will be expected to demonstrate a reasonable standard of grammar, spelling and composition in their answers.
- 2.13.5 Candidates for written examinations which are conducted in Chinese will be expected to demonstrate a reasonable standard of grammar, fluency, accuracy and the comprehensive ability in the use of Chinese language.

## 2.14 **Quality Standards**

- 2.14.1 The education and training courses which a candidate attends to satisfy the training requirements for the issue of a certificate of competency shall generally follow a quality standards system or an alternative system acceptable to the Director.

## 2.15 **Issue of Certificates**

- 2.15.1 Candidates who are successful in all parts of an examination, and who meet all the requirements for the issue of a certificate of competency of the class applied for, will be issued with a certificate of competency. When the certificate is ready it will be forwarded by registered post to the candidate's address as given on the application form, unless the candidate wishes to collect in person or to make other arrangements.
- 2.15.2 To avoid unnecessary delays in the issue of certificates, it is important that candidates should inform the examiner promptly of any change in the address given on the application form.
- 2.15.3 A candidate who is partially successful, or unsuccessful, in the examination will receive from the examiner a record of results form stating the results of the examination. This form must be retained by the candidate and produced whenever any subsequent attempt is made at the examination.
- 2.15.4 A candidate who has passed all parts of the examination but who has not yet obtained the subsidiary qualifications necessary to become eligible for the issue of a certificate will be issued with a record of results form. Upon production of this form and proof that the requisite subsidiary qualifications have been obtained the candidate will be issued with a certificate of competency in the normal manner.

## 2.16 **Insufficient Service**

- 2.16.1 If, after a candidate has passed the examination, it is discovered that his sea service is insufficient to entitle him to receive a certificate of the class for which he has been examined, he will not receive such a certificate. If, however, the Director is satisfied that the error in the calculation of sea service did not occur through any fault or misrepresentation on the part of the candidate, the appropriate certificate will be granted when he has made up the deficiency in sea service.

## 2.17 **Fees**

- 2.17.1 Applicants for examination will be required to pay the examination fee before any steps are taken to verify their eligibility for examination. Candidates who are found to be ineligible will have their fees returned.

- 2.17.2 The fee paid for examination for a certificate of competency is not refundable in the event of failure to pass any part of the examination.
- 2.17.3 A candidate who fails to appear for any part of any examination at the appointed time may be regarded as having failed by default in that part of the examination and the examination fee will be forfeited unless the candidate produces reasonable proof that failure to attend was unavoidable.
- 2.17.4 The fee for a sight test is included in the fee for an examination for a certificate of competency in cases where the sight test is conducted as part of the examination. In the event of a candidate failing the sight test, the balance of the relevant fees paid for the examination, less the fee for sight test, will be refunded to the candidate.
- 2.17.5 Details of the current scale of fees may be obtained from the Seafarers' Certification Section.
- 2.17.6 A candidate who, due to circumstances beyond the candidate's control, has to postpone an examination for which the candidate has already made application, may do so for a maximum period of one year beyond the date of the examination applied for. The candidate should apply in writing for the postponement of examination at least 3 days in advance. On subsequently appearing to sit the postponed examination the candidate will be required to pay the balance of any statutory increase in fees which may have come into force since the candidate's original application.
- 2.17.7 A candidate who wishes to postpone an examination, for which the candidate has already made application, beyond one year from the date of the examination will forfeit the examination fee and will be required to resubmit the candidate's application and pay the fee as if it were a new application.

## 2.18 **Replacement Certificate**

- 2.18.1 In the event that a certificate of competency is lost, the holder may apply to the Seafarers' Certification Section for a replacement certificate. A fee will be charged for the provision of such a copy unless the holder can show that the loss was as a result of shipwreck or fire. An applicant for a replacement certificate will be required to make a declaration to the examiner regarding the circumstances in which the certificate was lost.

## CHAPTER 3

### SEA SERVICE

#### 3.1 **General**

- 3.1.1 The qualifying sea service for any certificate of competency must be performed in the deck department within a period of 10 years preceding the date upon which a first attempt is made at the examination, subject to the discretion of the examiner in individual cases.
- 3.1.2 Except where otherwise specified, the qualifying sea service required for any certificate of competency is service performed in ships which proceed to sea and which are actively engaged in commercial trading. The Director may, at his discretion, accept a proportion of non-trading service in lieu of some service in trading vessels but, in general, non-trading service not specifically provided for in these Determinations will not be accepted.
- 3.1.3 Qualifying sea service means time spent on board ship reckoned from the date of engagement to the date of discharge. Subject to verification, as and when necessary, certificates of discharge will be accepted as proof of sea service. Where watchkeeping service is also a requirement, candidates must produce Certificates of Watchkeeping Service in addition to proof of sea service.
- 3.1.4 Proof of sea service for candidates serving in mainland trade ships can be verified by the Hong Kong Mercantile Marine Office or Certificates of Discharge, where applicable. Sea service in other ships must be confirmed by the Master(s) of the ship(s) concerned, or by the Consul or other recognized authority of the flag state. However, such confirmation will not necessarily be deemed sufficient.
- 3.1.5 Calculations of voyage length for the purpose of establishing sea service should be made in calendar months and days. When it happens that a candidate has signed off and signed on again on the same day then that day may only be counted once. To calculate total sea service the lengths of each voyage should be added together in months and days. The total of days should then be divided by 30 to give months, and residual days. The months should then be added to the total months.
- 3.1.6 Notwithstanding any provisions in Chapter 6 and Chapter 7 of these Determinations relating to qualifying service for mainland trade classes of certificates, any candidate who has qualified for entry to the examinations for Class 3 or Class 2 of seagoing certificate shall also be deemed to have met the requirements for examination for the Class 2 or Class 1 of mainland trade certificate respectively.

#### 3.2 **Non-Trading Service and Local Service in Hong Kong**

- 3.2.1 Service in marine craft belonging to the armed forces which regularly proceed to sea may be counted in full towards the requisite service for any Class 3 certificate provided that adequate evidence of sea going service is produced. Candidates claiming such service must, in addition, have served for at least 12 months in trading vessels.
- 3.2.2 Service in cable ships, sail training vessels, fishery cruisers, research vessels, salvage vessels, navigational aids tenders, oil rig supply vessels, oil rig standby



vessels, and other vessels engaged in similar activities will be counted in full only if the time actually spent at sea constitutes at least two thirds of the total time spent on board. If the actual time spent at sea falls below this proportion then the qualifying sea service shall be calculated as 1.5 times the period actually spent at sea. Candidates claiming this type of service will be required to produce a statement, or certificate, from the owners of the vessel(s) showing the amount of time actually spent at sea.

3.2.3 Service in storage tankers or laid up vessels, in river trade passenger vessels which are registered vessels, and in hovercraft, hydrofoils, and other craft of novel construction which proceed beyond the limits of any harbour will be accepted in full up to a maximum amount of 3 months when applying for mainland trade classes of certificates.

### 3.3 **Remission of Sea Service**

3.3.1 Candidates for mainland trade classes of certificate only may have the required periods of sea service reduced by remissions granted in respect of attendance at approved courses of training and in respect of service in certain ranks as detailed in the following paragraphs.

3.3.2 Remission may be granted under more than one heading but in no case will the total period of remission exceed the maximum allowances stated below:

Class 3	maximum remission 24 months
Class 2	no remission
Class 1	maximum remission 12 months

3.3.3 Candidates for Class 1 certificates may be granted remission in respect of periods of approved service as Chief Mate as described in paragraph 3.3.4, subject to the provision that the total remission does not exceed that specified in paragraph 3.3.2.

3.3.4 Candidates for Class 1 certificates may be granted remission of sea service equivalent to 100% of any time served in the rank of Chief Mate on mainland trade ships while holding a Class 2 certificate, up to a maximum of 12 months actual service in that rank.

3.3.5 No remission will be granted from the period of 6 months which candidates for a Class 3 certificate are required to spend on duties associated with bridge watchkeeping during the final 12 months of sea service for that certificate.

3.3.6 Candidates for a Class 3 certificate who have satisfactorily completed a recognized Diploma Course in Maritime Studies at the Vocational Training Council and been successful in the final examinations may be granted 12 months remission from the sea service requirement for that certificate. Remission will only be granted subject to proof of satisfactory attendance.

3.3.7 Candidates for a Class 3 certificate who hold a Degree in Shipping Technology and Management or International Shipping and Transport Logistics, or a Higher Diploma in International Transport Logistics granted by the Hong Kong Polytechnic University will be granted 12 months remission from the sea service requirement for that certificate. Additional remission may be granted subject to the number of fully relevant electives the candidates have selected and successfully completed during the course.

- 3.3.8 Candidates for a Class 3 certificate who have satisfactorily completed either Part A, or Part B, of a recognized Post-experience Certificate in Navigational Watchkeeping and been successful in the final examinations for that part, may be granted ½ months remission from the sea service requirement for that certificate. Candidates who have obtained a recognized Post-experience Certificate in Navigational Watchkeeping after satisfactorily completing the course may be granted 3 months remission of sea service from the requirement for a Class 3 certificate. Remission in either case will only be granted subject to proof of satisfactory attendance.
- 3.3.9 Candidates for a Class 3 certificate who hold a Diploma in Maritime Science granted by the Hong Kong Polytechnic may be granted a maximum of 18 months remission from the qualifying sea service requirements for that certificate.
- 3.3.10 Candidates for a Class 3 certificate who have failed to obtain a Diploma in Maritime Science from the Hong Kong Polytechnic but who have satisfactorily attended Phase I without passing the examination and have satisfactorily completed Phase II, and candidates who have been successful in Phase I but who have not satisfactorily completed Phase II, may be granted a maximum of 12 months remission from the qualifying sea service requirements for that certificate.
- 3.3.11 Candidates for a Class 3 certificate who have failed to obtain a Diploma in Maritime Science from the Hong Kong Polytechnic but who have satisfactorily attended Phase I of the Diploma course and not been successful in the examination and who have not completed Phase II of the course, may be granted a maximum of 6 months remission from the qualifying sea service requirements for that certificate.
- 3.3.12 Candidates for a Class 3 certificate who have obtained a Certificate of Attendance issued by the Maritime Services Training Institute (the then Seamen's Training Centre) and have completed the 46 week pre-sea Deck Cadet Officer Course are granted 23 weeks of remission from the qualifying sea service requirements for that certificate.
- 3.3.13 The Director may consider granting remission with regard to Class 3 certificate of competency sea service requirements in respect of an extended period of shore based training other than those held in Hong Kong. All such applications will be assessed on their merits and in general any remission granted will be a maximum of half the training time up to an overall maximum of 24 months. Candidates must produce proof of satisfactory attendance when claiming remission for one of these courses.
- 3.3.14 Remission of sea service from the sea service requirements for a Class 3 certificate may be granted in respect of minimum periods of service in cadet training ships which have been approved for the purpose by the Director. The maximum remission of sea service that will be granted in respect of such service will be fixed at the time that the Director's approval is granted. Candidates seeking to claim remission for service in approved training ships must produce a certificate signed by the Master(s) of the training ship attesting to satisfactory conduct and proficiency.

## **CHAPTER 4**

### **PARTICULARS OF ADDITIONAL AND SUBSIDIARY QUALIFICATIONS**

#### **4.1 Sight Test Certificate**

4.1.1 A sight test certificate is an essential requirement for entry to all certificate of competency examinations and is valid for a period of two years from the date of the test. No candidate will be accepted, except in exceptional circumstances, for any part of any examination unless he is in possession of a valid sight test certificate. On any occasion when a candidate is accepted without production of a valid sight test certificate the examination will be cancelled if the candidate subsequently fails to pass the sight test. In such a case no refund of the examination fee will be made.

4.1.2 It is important that every person who contemplates a career at sea as a deck officer is aware that an ability to reach the required standard in the sight test when he first commences a career does not guarantee success in subsequent sight tests whenever he applies for examination for a certificate of competency. It is possible for there to be certain latent defects of eyesight which may cause that person's standard of vision to fall as they grow older. These defects can only be discovered by a more searching examination and it is, therefore, very desirable that anyone embarking on a career at sea as a deck officer should first undergo a thorough examination of their sight by an ophthalmologist.

4.1.3 Details of the procedure for sight tests and the standards to be met by applicants are available from the Seafarers' Certification Section.

#### **4.2 Medical Fitness Certificate**

4.2.1 Proof of medical fitness is an essential requirement for the issue of any mainland trade certificates of competency or for their revalidation. Medical fitness may be proven by the production of a certificate of medical fitness issued not more than two years beforehand by a recognized medical practitioner. No mainland trade certificate or revalidation will be issued until a valid medical fitness certificate is presented.

4.2.2 In view of the importance attached to medical fitness at sea and the fact that a certificate of competency or a licence will neither be issued nor revalidated without a valid medical fitness certificate, candidates for examination and persons contemplating a career at sea are strongly advised, in their own interests, to ensure that they will be able to meet the medical fitness standards before they embark on training or courses of study leading to examination.

4.2.3 Candidates in Hong Kong may obtain a list of medical practitioners who are approved by the Director to issue medical fitness certificates from the Seafarers' Certification Section. Certificate holders or candidates abroad who are unable to attend at one of the approved practitioners in Hong Kong and who require a medical fitness certificate for revalidation or the issue of certificate should, if they are in a country which is a signatory to the STCW Convention, obtain the form of certificate approved by the Administration of that country. In other cases they should refer to the Seafarers' Certification Section for guidance.

#### 4.3 **Electronic Navigation Systems Certificate (ENS)**

4.3.1 An ENS certificate has no limiting period of validity but is only valid if obtained after at least 12 months service at sea in the deck department.

4.3.2 A Radar Observer certificate and an Electronic Navigational Aids (Operation) certificate together, both issued prior to 1st January 1982, will be accepted in lieu of an ENS certificate.

4.3.3 The elements of an approved ENS certificate shall include radar, ARPA, echo sounder, hyperbolic navigation systems, gyro-compasses, speed and distance measuring instruments and satellite navigation system. Details of syllabus and course arrangement shall be subject to the approval of the Director.

#### 4.4 **Advanced Fire-Fighting Certificate**

4.4.1 Approved advanced fire-fighting courses are of at least 4 days duration and certificates which are issued on the completion of such courses are not subject to a limiting period of validity.

#### 4.5 **Medical First Aid or First Aid at Sea Certificate**

4.5.1 There is no limiting period of validity for this certificate. Attendance at an approved course of instruction is a requirement for admission to the examination for this certificate.

#### 4.6 **Medical Care or Ship Captain's Medical Certificate (SCMC)**

4.6.1 There is no limiting period of validity for this certificate.

4.6.2 Possession of an Elementary First Aid and Medical First Aid or First Aid at Sea certificate and attendance at an approved course of instruction are essential requirements for admission to the Medical Care or Ship Captain's Medical certificate examination or the equivalent approved certificate examinations.

#### 4.7 **Efficient Deck Hand Certificate (EDH)**

4.7.1 There is no limiting period of validity for this certificate.

4.7.2 Candidates for mainland trade classes of certificate who are unable to comply with the sea service requirements for the issue of an EDH certificate will be permitted to attend for the appropriate mainland trade certificate examination provided that they produce a letter testifying to their success in the EDH examination in lieu of an EDH certificate.

4.8 **Proficiency in Survival Craft and Rescue Boats Certificate**

4.8.1 There is no limiting period of validity for this certificate.

4.8.2 A Certificate of Competency as Lifeboatman for which examinations were held before 1st September 1984 will be accepted in lieu of a Proficiency in Survival Craft and Rescue Boats certificate.

4.9 **Restricted Certificate of Competency in Radiotelephony (RT) -Long Range (LR) or Short Range (SR)**

4.9.1 This certificate is issued by the Director-General of Telecommunications and is not subject to a limiting period of validity. An Authority to Operate (ATO) is issued to each certificate authorizing the holder to operate the ship radio station. The ATO has a period of validity of five years.

4.10 **Navigation Control Course Certificate (NCC)**

4.10.1 This certificate has no limiting period of validity

4.10.2 A Radar Simulator course attendance certificate issued before 1st October 1984 will be accepted in lieu of an NCC certificate.

4.10.3 The elements of an approved NCC Certificate shall include training and simulator exercises on the navigational and collision avoidance techniques including the search and rescue operation. Details of syllabus and course arrangement shall be subject to the approval of the Director.

4.11 **Short Course Certificates obtained outside Hong Kong**

4.11.1 Equivalent certificates to those listed in this chapter issued by any other country on the "White List" and the certificates are confirmed to have complied with the STCW95 requirements will be accepted as meeting the requirements of these Determinations. In all cases evidences are required where appropriate to certify that training in the particular subjects has been performed in accordance with the requirements.

- 4.11.2 Any certificate(s) containing the elements of ENS certificate or NCC certificate issued by any country in paragraph 4.13.1 will be accepted in lieu of a ENS or NCC certificate.
- 4.11.3 Candidates who require a NCC certificate and who do hold an ENS or equivalent certificate(s) issued by a country which was a signatory to the STCW Convention at the time of issue, will be eligible to attend the Navigation Control Course in Hong Kong.

## CHAPTER 5

### QUALIFYING REQUIREMENTS

#### 5.1 **Class 3 Certificate**

5.1.1 To qualify for the issue of a Mainland Trade Class 3 certificate a candidate must:

- (a) be not less than 18 years of age.
- (b) have completed an education to the standard of Form 3 or equivalent level.
- (c) have served not less than 36 months of qualifying sea service;
- or hold a Hong Kong Local Certificate of Competency as Master (up to 300 tons) or equivalent certificate issued by the Marine Department.
- or hold a Certificate of Competency (Deck Officer) (River Trade) Class 3.
- (d) have spent not less than 6 out of the final 12 months of sea service engaged on duties associated with bridge watchkeeping under the supervision of a certificated officer and be able to produce a certificate to that effect signed by the Master(s) under whom he has sailed. Duties associated with bridge watchkeeping may include the duties of a lookout but not those of a helmsman.
- (e) pass the examination specified in Chapter 7 unless holding valid exemptions from that examination or from parts of it. A candidate holding a Hong Kong Local Certificate of Competency as Master (up to 300 tons) or Coxswain Grade 1 certificate or a Certificate of Competency (Deck Officer) (River Trade) Class 3 shall be deemed to have passed the examination if he/she has satisfactorily completed and passed an approved course.
- (f) hold the following subsidiary and additional certificates or acceptable alternatives as specified in Chapter 4:
  - (i) Medical Fitness
  - (ii) Sight Test
  - (iii) Medical First Aid or First Aid At Sea
  - (iv) Advanced Fire-Fighting
  - (v) Efficient Deck Hand
  - (vi) Proficiency in Survival Craft & Rescue Boats
  - (vii) Proficiency in Communications
  - (viii) Approved Radar Operators Course or ENS.
  - (ix) Restricted Certificate of Competency in Radiotelephony (RT)-Long Range (LR) or Short Range (SR)

5.1.2 A maximum period of remission of sea service of 24 months in respect of approved training course/programme may be granted from the sea service requirement stated in paragraph 5.1.1. Such approved training programme shall include an on-board training period to be documented in an approved training record book. The on-board training period will also be reckoned as requisite qualifying sea service mentioned in paragraph 5.1.1. Details of other courses which are approved for remission and the remission available from each are contained at Chapter 3 of these Determinations.

5.1.3 Sea service as a General Purpose rating will count at two thirds of the full rate until the first year of qualifying service is completed (i.e. for a maximum of 18 months actual service in that capacity), thereafter such service will count in full.

## 5.2 **Class 2 Certificate**

5.2.1 To qualify for the issue of a Mainland Trade Class 2 certificate a candidate must:

(a) have served not less than 12 months of qualifying sea service as a watchkeeping officer on vessels employed in the mainland trade area while holding a Mainland Trade Class 3 certificate, or a certificate specified as equivalent to this certificate.

or hold a Certificate of Competency (Deck Officer) (River Trade) Class 2.

(b) pass the examination specified in Chapter 7 unless holding a valid exemption from that examination or from a part of it. A candidate holding a Certificate of Competency (Deck Officer) (River Trade) Class 2 shall be deemed to have passed the examination if he/she has satisfactorily completed and passed an approved course.

(c) hold the following subsidiary and additional certificates or their acceptable alternatives as specified in Chapter 4 :

- (i) Medical Fitness
- (ii) Sight Test
- (iii) NCC or approved Radar Simulator course.
- (iv) Medical Care or Ship Captain's Medical Certificate.

## 5.3 **Class 1 Certificate**

5.3.1 To qualify for the issue of a Mainland Trade Class 1 certificate a candidate must:

(a) have served for not less than 36 months of qualifying sea service on vessels sailing in the mainland trade area as a watchkeeping officer while holding a Mainland Trade Class 3 certificate, or a certificate specified as equivalent to this certificates.

or have served for not less than 24 months of qualifying sea service as a watchkeeping officer on vessels employed in the mainland trade area while holding a seagoing Class 3 certificate, or a certificate specified as equivalent to this certificate.

or hold a Certificate of Competency (Deck Officer) (River Trade) Class 1.

(b) pass the examination specified in Chapter 7 unless holding a valid exemption from that examination or from a part of it. A candidate holding a Certificate of Competency (Deck Officer) (River Trade) Class 1 shall be deemed to have passed the examination if he/she has satisfactorily completed and passed an approved course.



- (c) hold the following subsidiary and additional certificates or their acceptable alternatives as specified in Chapter 4 :
  - (i) Medical Fitness
  - (ii) Sight Test
  - (iii) Medical Care or Ship Captain's Medical Certificate
  - (iv) NCC or Approved Radar Simulator

5.3.2 At least 6 months of the qualifying period of sea service specified in paragraph 6.3.1 must have been spent either as officer in sole charge of a watch, or as the second of two or more officers keeping a watch at the same time.

#### 5.4 **Mainland Trade Eligibility - General**

5.4.1 Notwithstanding any other requirement of this Chapter, any candidate who has qualified for entry into the examinations for any class of seagoing certificate will also be deemed to have met the requirements for examination for the corresponding class of Mainland Trade certificate.

#### 5.5 **Equivalent Certificates**

5.5.1 Candidate who holds a certificate of competency issued by another Authority and if such certificate is considered by the Director as equivalent and appropriate, then the candidate can be issued with an equivalent class of mainland trade certificate of competency subject to the condition set forth by the Director.

## CHAPTER 6

### EXAMINATION PROCEDURES

#### 6.1 **General**

- 6.1.1 Examinations will begin each day at a time appointed by the examiner.
- 6.1.2 No persons will be allowed into the examination room other than candidates and those whose duties require them to be present.
- 6.1.3 Total silence must be maintained in the examination room.
- 6.1.4 The following publications and tables are specified by the Director and copies of them are available for the use of candidates in the examination room:

Norries Nautical Tables (full edition)  
Burtons Nautical Tables  
Admiralty Tide Tables Volumes I and III  
Nautical Almanac (NP 314)

- 6.1.5 Candidates who wish to use their own copies of the above tables, or who wish to use tables other than those above, may bring such tables into the examination room on condition that they submit them to the examiner for scrutiny and approval before the examination begins.
- 6.1.6 Subject to the examiner's approval no restriction will be placed on the use of any tables, but candidates should understand the theory on which such tables are based and the tables used should be capable of giving an answer within the required limits of accuracy as stated in paragraph 8.3. When tables other than those specified by the Director are used in answering a question the name of the tables should be stated on the candidate's answer paper.
- 6.1.7 Candidates may use their own drawing instruments and non-programmed calculators provided that the examiner's approval is obtained before the examination begins. In examination papers on Navigation and Chartwork electronic calculators should only be used as a check. Candidates, in these papers particularly, are required to produce fully worked out calculations with the use of appropriate navigation tables. Answers where the process of calculation is not shown may be subject to a deduction of marks.
- 6.1.8 Other than Nautical Tables which have been approved by the examiner, no books or papers of any kind whatsoever may be brought into the examination room. Any candidate infringing this rule will be regarded as having failed the examination and will not be accepted for re-examination for a period of 6 months.
- 6.1.9 Candidates who deface, or otherwise injure or damage, any property of the Marine Department will have their service papers, (certificates, testimonials etc.) retained until such time as they have replaced the damaged items.
- 6.1.10 No candidate is permitted to leave the examination room without permission and without giving up the paper on which he is engaged. A candidate who does so will be regarded as having failed in that paper.

- 6.1.11 All work must be shown and any rough work which is done on scrap paper supplied for the purpose must be handed in at the end of each examination.
- 6.1.12 During the course of an examination any candidate who is found to be:
- referring to an unauthorised book or paper;
  - copying from another candidate;
  - affording assistance or information to another candidate;
  - accepting assistance or information from another candidate;
  - communicating in any way with another candidate;
  - copying any part of the questions or answers for the purpose of taking them from the examination room;
  - guilty of insolence to the examiner; or
  - guilty of disorderly or improper conduct in the examination room;
- will be regarded as having failed the examination as a whole and will not be accepted for re-examination for such period as may be decided by the Director.

## 6.2 **Written Examinations**

- 6.2.1 Candidates will be provided with as many sheets of ruled paper as are necessary for them to complete the written work, all of which, except for sketches, must be completed in ink. Each answer should be started by writing in the margin the number of the question to which it relates. Candidates should, in their own interests, write in a clear and legible hand.
- 6.2.2 Unless a question specifies the required method of solution, candidates will be allowed to solve problems by any method, provided that the method used is correct in principle, affords the required degree of precision, and is clearly shown on the answer paper.
- 6.2.3 Answer scripts from written examinations, including charts used should be retained for a period of not less than 30 days following an examination in case a candidate wishes to appeal to the Director against the decision of an examiner.

## 6.3 **Degree of Precision Required**

- 6.3.1 Candidates should work to a degree of precision consistent with the data supplied in the question and the problem concerned. Information from tables should be extracted as accurately as possible consistent with the inherent accuracy of the tables, and final answers should be given to the best degree of precision which is justified, and no more.
- 6.3.2 When making calculations to obtain a ship's position, candidates are expected to work to 0.2 of a minute of arc, and to the nearest second of time.

- 6.3.3 Any method of calculation which is used to obtain a position line should be capable of providing an answer correct to within one nautical mile.
- 6.3.4 Answers to calculations of compass errors, bearings and courses, should be worked to within 0.5 degrees of arc.
- 6.3.5 Tidal calculations should be worked to provide an answer which is within 15 cm of a precise result.

#### 6.4 **Exemptions**

- 6.4.1 A candidate who has obtained a Diploma in Maritime Science from the Hong Kong Polytechnic will be exempt from the requirement to take the written examination in Meteorology questions of the written examination in Watchkeeping and Meteorology in Part B of the same examination.
- 6.4.2 The exemptions from parts, or all, of the written examinations for a certificate of competency which are specified in the following paragraphs will have a period of validity of 2 years. Candidates appearing for examination on a date more than 2 years after obtaining a qualification will not be granted any exemption based on that qualification. The 2 year limit in validity shall be subject to the discretion of the examiner in both of these cases.
- 6.4.3. A candidate who has satisfactorily completed either Part A or Part B of a recognized Post-experience Certificate in Navigational Watchkeeping course, and who has been successful in the final examinations for that part, will be exempt from the requirement to take the corresponding part of the written examinations for a Mainland Trade Class 3 certificate.
- 6.4.4 A candidate who has satisfactorily completed either Part A or Part B of a recognized Post-experience Diploma in Ship Command course and been successful in the final examinations for that Part will be exempt from the requirement to take the corresponding part of the written examinations for a Mainland Trade Class 1 or a Class 2 certificate.
- 6.4.5 Candidates for mainland trade certificates who have obtained passes in either Part A or Part B of either the Post-experience Certificate in Navigational Watchkeeping, or the Post-experience Diploma in Ship Command, or who hold valid passes in either Part A or Part B of the Marine Department examinations for a seagoing certificate, may be granted exemption from those written examination papers in the corresponding mainland trade class of examination for subjects in which the candidate has already been examined in passing the appropriate Part A or B.

#### 6.5 **Validity of Partial Passes**

- 6.5.1 Except as provided elsewhere in this section, a pass in any part of the examinations for a certificate of competency will remain valid for 2 years from the date of examination subject to the discretion of the examiner in individual cases.

#### 6.6 **Resits**

- 6.6.1 A candidate who fails only in one paper of a part of the written examination may, at the discretion of the examiner, be permitted to resit that paper provided the candidate

obtains at least 75% of the required pass mark for that subject in the original examination. This resit facility will be available only at the next scheduled examination for that class of certificate and at no other examination. A failure at the resit, or a failure to attend at the next scheduled examination for that class of certificate, will mean that the candidate is deemed to have failed that part of the examination. A pass in the resit will mean that the candidate is deemed to have passed that part of the examination.

## **6.7 Oral and Practical Examinations**

- 6.7.1 The oral/practical part of each examination is intended to ascertain the candidate's competency in the practical aspects of an officer's duties.
- 6.7.2 During the course of the examination the examiner will test candidates', among other things, knowledge of the sense and the intention of the International Regulations for Preventing Collisions at Sea. A mere ability to recite the regulations word for word will not suffice to ensure a candidate's passing, nor will a lack of such ability necessarily result in failure, provided that the candidate is able to satisfy the examiner that he grasps the full significance, content, and practical application of the regulations. Examiners will not ask for the content of the regulations by number, but by the subject with which they deal. The use of verses as aids to memorizing the regulations will be discouraged.
- 6.7.3 Examiners will not place candidates in the position of handling a sailing vessel, but will test the candidate's ability to recognize the lights and signals of a sailing vessel and the candidate's understanding of a sailing vessel's possible manoeuvres according to the direction of the wind.
- 6.7.4 A candidate who fails in an oral/practical examination through serious weakness in practical knowledge may, at the examiner's discretion be given a time penalty which may include a requirement to perform further sea service before being re-examined. Such sea service will not exceed 6 months and may be performed in any deck capacity in any mainland trade ship.

## CHAPTER 7

### EXAMINATION STRUCTURE AND MARKING

#### 7.1 **Mainland Trade Class 3 Certificate**

7.1.1 The examination for this certificate is in three parts as follows. The three parts may be taken together or separately.

##### Part A

Coastal Navigation;                      2½-hour written paper,                      Pass mark 70%

##### Part B

General Ship Knowledge;                      3-hour written paper,                      Pass mark 50%  
Watchkeeping &                      2½-hour written paper,                      Pass mark 60%  
Meteorology;

##### Part C

Seamanship & Safety;                      Oral and Practical examination.

Note : Proficiency in                      1-hour written paper                      Pass mark 70%  
Communication                      Oral / Practical                      Pass mark 90%  
certificate;

#### 7.2 **Mainland Trade Class 2 Certificate**

7.2.1 The examination for this certificate is in three parts as follows. The three parts may be taken together or separately.

##### Part A

Navigation;                      3-hour written paper,                      Pass mark 60%  
Passage Planning;                      3-hour written paper,                      Pass mark 60%

##### Part B

Ship Technology;                      3-hour written paper,                      Pass mark 50%  
Shipboard Operations;                      3-hour written paper,                      Pass mark 60%  
Commerce and Law;                      3-hour written paper,                      Pass mark 50%

##### Part C

Seamanship & Safety;                      Oral and Practical examination.

### 7.3 **Mainland Trade Class 1 Certificate**

- 7.3.1 For candidates who have passed Parts A and B of the Class 2 examination at the Marine Department, the examination for a Class 1 certificate will be solely an oral/practical examination. Candidates for Class 1 who do not hold a Class 2 certificate issued by the Marine Department or a Class 2 certificate issued by other Administration, will be required to pass Part A and Part B of the Class 2 examination in addition to the Class 1 oral/practical examination.

## CHAPTER 8

### MAINLAND TRADE CERTIFICATES

#### EXAMINATION SYLLABUSES

#### 8.1 Introduction

- 8.1.1 The examinations set under these syllabuses will use the SI system of units, or where this is impractical, the appropriate and accepted nautical units.
- 8.1.2 The syllabuses are intended to be progressive from class to class and the syllabus for a higher class in any examination is always presumed to include the syllabus for the corresponding subject, if any, in the preceding class of certificate. Examination questions may be set which combine more than one paragraph in the syllabus.
- 8.1.3 A candidate may be asked questions arising out of the written work in the oral and practical examination if the examiner deems it necessary on account of any weakness shown by the candidate.

#### 8.2 Proficiency in Communications Certificate (1-hour)

*Function* : *Navigation at the operational level*

*Competence (i)* : *Use the Standard Marine Navigational Vocabulary as replaced by the IMO Standard Marine Communication Phrases and use English in written and oral form.*

<p><i>Criteria</i> : <i>English language navigational publications and messages relevant to the safety of the ship are correctly interpreted or drafted. Communications are clear and understood.</i></p>
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#### ***English Language***

- (a) Adequate knowledge of English language to use charts and nautical publications, to understand meteorological information and messages concerning ship's safety and operation, to communicate with other ships and coast stations.
- (b) The use of phrases from the "IMO Standard Marine Communication Phrases" to cover shipboard terms and operations to do with mooring and anchoring, deck work and cargo work; bridge watchkeeping, instructions from pilots, and instructions to ratings; emergency situations, safety of life at sea, and fire fighting.
- (c) Radio Telephony, simple operation of VHF and R/T sets.
- (d) Procedures in handling messages to do with entering and leaving port and structured according to the principles of "Seaspeak" reference manual "Recommendations for Maritime Communications Principally by VHF".
- (e) Procedures for the handling of distress traffic, urgency, safety messages and navigational messages.



*Competence (ii) : Transmit and receive information by visual signalling*

*Criteria : Communications within the operator's area of responsibility are consistently successful.*

***Visual Signalling***

- (f) The ability to recognize Morse Code symbols for letters and numerals and procedural symbols when made by any method.
- (g) The ability to transmit and receive Morse Code by flashing lamp at up to four words per minute.
- (h) The ability to recognize flags of the International Code of Signals and to know their single letter meanings.
- (i) The ability to use the International Code of Signals.

**8.3 Mainland Trade Class 3 Certificate**

**PART A**

***Paper 1 Coastal Navigation (2½-hour)***

*Function : Navigation at the operational level*

*Competence : Plan and conduct a passage and determine position*

*Criteria : The primary method of fixing the ships position is the most appropriate to the prevailing circumstances and conditions. Information obtained from charts and publications is correctly interpreted and applied.*

***Terrestrial and Coastal Navigation***

- (a) The ability to determine the ships position and to properly monitor a coastal passage using the following types of information or any combination thereof:

DR position and estimated position.

Positions fixed using position lines obtained visually or by radar as bearings or ranges from shore land-marks, lighthouses, beacons and buoys.

Position lines and fixes by Electronic Navigational Instruments.

Information obtained from log, propeller revolutions, soundings, winds, tides, currents and estimated speed.

Parallel indexing by radar.

Transit bearings and single bearings used as clearing and leading lines.

Horizontal and vertical angles.

Transferred position lines, single position lines.

- (b) A thorough knowledge of navigational charts, light lists and sailing directions and their correction using Notices to Mariners and navigational warnings by radio and NAVTEX and ship's routing information.
- (c) Basic knowledge of the principles of passage planning, and the watchkeeper's duties in implementing a passage plan.
- (d) The ability to lay off suitable courses and prepare charts and information for a coastal passage, and to calculate an ETA.
- (e) A thorough knowledge of navigational procedures in connection with traffic separation schemes and other routing schemes, coastal ship reporting schemes and VTS.
- (f) The correction of courses for compass error. A knowledge of the separate effects of variation and deviation on compass headings.
- (g) The ability to assess and compare the accuracies and reliabilities of the types of information as in (a).
- (h) The ability to adjust course, amend the allowance for tidal stream, set, and/or leeway and amend ETA as a result of information obtained as in (a).
- (i) Landfalls and approaching harbours and anchorages. The use of visual indications, radar and appropriate instruments in making landfall and during an approach.
- (j) The use of Admiralty Tide Tables.
- (k) Ability to calculate tidal conditions. To use tide tables in conjunction with Tidal Stream Atlas and charted information to obtain tidal stream predictions.
- (l) Reckoning tidal current during sailing according to Chinese tidal tables and charted information.

Note : ECDIS systems are considered to be included under the term "Charts".

## Part B

### ***Paper 1 General Ship Knowledge (3-hour)***

*Function (1) : Controlling the operation of the ship and care for persons on board at the operational level*

*Competence : Maintain seaworthiness of the ship*

<p><i>Criteria : Actions to ensure and maintain the watertight integrity of the ship are in accordance with accepted practice.</i></p>
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<p><i>Stability conditions comply with the IMO intact stability criteria under all conditions of loading.</i></p>
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### ***Ship Construction***

- (a) General knowledge of the principal structural members of a ship and the proper name for the various parts.
- (b) Basic ship types. Ship propulsion systems.
- (c) Hull nomenclature, main dimensions and tonnages, on-board plans and drawings.

### ***Ship Stability***

- (d) Working knowledge and application of stability, trim, stress tables, diagrams and stress calculating equipment.
- (e) Understanding of the fundamentals of watertight integrity.
- (f) Stability criteria. Hull form Coefficients, displacement, deadweight, lightweight. Curves and tables of displacement and TPC. Load Line markings. Density, Relative Density, Archimedes principle, flotation. Effects of density of water on draught and freeboard. FWA, DWA. The marine hydrometer and its uses. Buoyancy, reserve buoyancy, partial loss of intact buoyancy.
- (g) Transverse stability; Definitions of 'G', 'B', and 'M'. Equilibrium positions of 'G', 'B', and 'M'. Righting lever and righting moment.
- (h) Stability information; Stability information supplied to ships. Uses of hydrostatic data for stability, draught and trim. Adding and removing weights. Free surface effect, danger of slack tanks.

*Function (2) : Cargo handling and stowage at the operational level*

*Competence : Monitor the loading, stowage, securing and unloading of cargoes and their care during the voyage*

*Criteria : Cargo operations are carried out in accordance with the cargo plan or other document and established safety rules and regulations, equipment operating instructions and shipboard stowage limitations.*

### ***Cargo handling and stowage***

- (a) Cargo handling, stowage & securing.
- (b) Knowledge of the effect of cargo including heavy lifts on the seaworthiness and stability of the ship.
- (c) Knowledge of safe handling, stowage and securing of cargoes including dangerous, hazardous and harmful cargoes and their effect on the safety of life and of the ship.
- (d) Definitions of the various terms used in the carriage of goods, i.e. bale capacity, grain capacity, stowage factors, broken stowage, measurement cargoes, deadweight cargoes.

- (e) Cargo handling equipment. The meaning of Safe Working Load. The correct rigging and safe operation of derricks, cranes, stores hoists, etc.
- (f) Types of hatch covers in general use and their safe opening, closing, sealing and securing. Tank lids, trunkway doors, ventilation systems, hatches and other openings to cargo spaces.
- (g) The stowage of general and mixed or unitised types of cargoes in general cargo ships. The making and use of cargo plans. Preparation of holds. Use of dunnage. Separation of cargoes. Loading and discharging processes and the securing of different types of cargo including heavy items. How to prevent or minimise cargo damage due to sweat and pilferage.
- (h) The stowage of dry cargoes in bulk carriers. Loading and discharging methods. Action to be taken in the case of grab damage. The preparation of holds for the more common types of bulk cargoes. The principal hazards to ship and crew associated with the carriage of solid bulk cargoes, and how the effects of these may be minimised.
- (i) The handling, stowage, securing and carriage of deck cargoes.
- (j) Containerised and Ro-Ro cargoes. Methods of handling and securing in fully specialised or partly conventional ships. Principal hazards to be avoided during loading, carriage and discharge. Checks to be made to ensure correct out-turn. Main container types.
- (k) Liquid cargoes. Loading and discharging processes in tankers and OBO's. The hazards associated with petroleum, liquefied gases and bulk chemical cargoes and general safety precautions and measures. Gas testing instruments. Gauging and venting systems. Cargo pipeline systems. Tank cleaning and gas freeing processes.
- (l) Salt water ballast. The requirement to ballast in light ship condition. The control of ballast operations simultaneously with loading and discharging. Filling, discharging and stripping methods. Reasons for the avoidance of overflowing ballast on deck. The hazards of excessive free surface or stress produced by the combination of ballast and cargo operations. Checks to be made on the integrity of ballast tanks.

***Paper 2 Watchkeeping and Meteorology (2½-hour)***

*Function (1) : Navigation at the operational level*

*Competence (i) : Maintain a safe navigational watch*

*Criteria : The conduct, hand over and relief of the watch conforms with accepted principles and procedures.*

***Watchkeeping***

- (a) Thorough knowledge of effective bridge team work procedures. The use of routeing in accordance with the General Provisions on Ships' Routeing.
- (b) Operation and care of gyro-compasses and systems under the control of the master gyro including automatic pilot systems.

- (c) A knowledge of the principles of magnetic and gyro-compasses including errors and their correction.
- (d) A knowledge of the operation and use of bridge instrumentation.

*Competence (ii) : Plan and conduct a passage and determine position*

*Criteria : Performance checks and tests to navigation systems comply with manufacturer's recommendations and good navigational practice. The selection of the mode of steering is the most suitable for the prevailing weather, sea and traffic conditions and intended manoeuvres. Measurement and observation of weather conditions are accurate and appropriate to the passage. Meteorological information is correctly interpreted and applied.*

***Electronic systems of position fixing and navigation***

- (e) Ability to determine the ship's position by use of Global Positioning System and the knowledge on its principles of operation and associated errors.

***Echo sounders***

- (f) Ability to operate the equipment and apply the information correctly, and the knowledge on their principles of operation and associated errors.

***Compass - magnetic and gyro***

- (g) Knowledge of the principles of magnetic and gyro compasses

Ability to determine errors of the magnetic and gyro compasses, using celestial and terrestrial means, and to allow for such errors.

***Speed and distance measuring instrument***

- (h) Knowledge of the principles of log and speed measuring equipment and associated errors.

***Steering control systems***

- (i) Knowledge of steering control systems, operational procedures and change-over from manual to automatic control and vice-versa. Adjustment of control for optimum performance.

***Meteorology***

- (j) Ability to use and interpret information obtained from meteorological instruments and the ability to apply the meteorological information available.
- (k) Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems.
- (l) General structure of the atmosphere and the significance of variations in sea surface atmospheric pressure; simple relationship between pressure gradient, wind speed and direction.

- (m) A knowledge of global mean pressure distribution. Daily and seasonal variations. Prevailing winds, land and sea breezes. Monsoons.
- (n) The Beaufort wind scale. Water vapour in the atmosphere. Evaporation, condensation, precipitation. Meaning of saturation, relative humidity and dew point.
- (o) Formation and classification of clouds. Fog, mist and haze.
- (p) Synoptic and prognostic charts. Types of weather charts received by FAX.
- (q) The structure of weather reporting by shore and ship stations.
- (r) Basic element of wave, definition of wave and swell and their observational characteristics, definition of effective wave height and composed wave height.
- (s) Definition and influence of on-shore wave and stormy tide.
- (t) General situation of stormy wave and icing in China coastal waters.

*Competence (iii) : Respond to a distress signal at sea*

*Criteria : The distress or emergency signal is immediately recognized. Contingency plans and instructions in standing orders are implemented and complied with.*

***Search and rescue***

- (r) A knowledge of the contents of the IMO Merchant Ship Search and Rescue Manual (MERSAR).

*Function (2) : Controlling the operation of the ship and care for persons on board at the operational level*

*Competence (i) : Ensure compliance with pollution prevention requirements*

*Criteria : Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed.*

***Prevention of pollution of the marine environment and anti-pollution procedures***

- (a) Knowledge of the precautions to be taken to prevent pollution of the marine environment. Emergency action to be taken in case of spillage.
- (b) Anti-pollution procedures and all associated equipment.
- (c) Marine pollution by ships, likely causes, e.g. leakage during transfer of oil cargo or fuel, discharges during cleaning of holds or tanks, contamination of ballast.

*Competence (ii) : Monitor compliance with legislative requirements*

*Criteria : Legislative requirements relating to safety of life at sea and protection of the marine environment are correctly identified.*

- (d) Basic working knowledge of the relevant IMO conventions and national legislation concerning safety of life at sea and protection of the marine environment.

*Competence (iii) : Others*

<i>Criteria : Duties of watch and shipboard operations are complied with proper procedures to ensure safety of ship and persons on board.</i>
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- (e) Duties of an officer in charge of mooring operations, stationed forward or aft. Securing tugs. Securing alongside and to buoys. Entering and leaving docks and drydocks. Preparation for getting under way. Embarkation and disembarkation of pilots.
- (f) Anchors and cables and the usual arrangements for their handling, stowage and securing. Procedure of coming to a single anchor. Duties of an officer in charge of anchor handling operations. Use of an anchor when approaching or leaving a berth.
- (g) Duties of a deck officer on watch in port, during cargo work in various types of vessels, and in drydock or repair yard. The contents of relevant Merchant Shipping Notices / Information Notes and their application, with special attention to the following:
- Access to the vessel and holds etc.
  - Lighting on deck, in holds, and overside.
  - The covering or fencing of hazardous openings.
  - Procedures to be followed for entry into enclosed spaces or prior to commencing hot work.
  - Safety precautions which may be required for work processes.
- (h) A knowledge of the various items of Life-saving equipment and Fire-fighting equipment which are provided in cargo and passenger vessels, and their maintenance.
- (i) A knowledge of the requirements for emergency organisation and training. The duties of an officer in organising and taking part in drills dealing with fire fighting and other emergencies and abandon ship. The organisation of emergency parties.
- (j) A knowledge of the contents and application of the relevant sections of the "Code of Safe Working Practices for Merchant Seamen" and Merchant Shipping Notices / Information Notes.

### Part C

#### **Oral and Practical Examination - Seamanship and Safety**

*Function : Navigation at the operational level*

*Competence (i) : Maintain a safe navigational watch*

<b>Content of Examination</b>	<b>Criteria for Satisfactory Examination</b>
<p><b><i>Watchkeeping</i></b></p> <p>A knowledge of the content of STCW 1995, "Principles to be Observed in Keeping a Navigational Watch" and "Watchkeeping in Port".</p> <p>A thorough knowledge of the content and application of the International Regulations for Preventing Collisions at Sea.</p> <p>A knowledge of Hong Kong and China maritime buoyage systems.</p> <p>A local knowledge of the ports of Hong Kong and China.</p> <p>To demonstrate the ability to use a sextant, chronometer and azimuth mirror.</p>	<p>The conduct, hand over and relief of the watch conforms with accepted principles and procedures.</p> <p>A proper look-out is maintained at all times to accepted principles and procedures.</p> <p>Lights, shapes and sound signals conform with requirements are correctly recognized.</p> <p>Proficiency in the practical use of sextant, Chronometer and azimuth mirror</p>

*Competence (ii) : Manoeuvre the ship*

<b>Content of Examination</b>	<b>Criteria for Satisfactory Examination</b>
<p><b><i>Ship manoeuvring and handling</i></b></p> <p>The effects of deadweight, draught, trim, speed and under keel clearance on turning circles and stopping distances.</p> <p>The effects of wind and current on ship handling.</p> <p>Manoeuvres and procedures for the rescue of person overboard.</p> <p>Squat, shallow water and similar effects.</p> <p>Proper procedures for anchoring and mooring.</p> <p>Helm orders. Conning the ship. Engine orders and controls. Basic ideas about manoeuvring. The effects of rudder and propellers.</p>	<p>Safe operating limits of ship propulsions, steering and power systems are not exceeded in normal manoeuvre. Adjustments made to the ship's course and speed to maintain safety of navigation.</p>



*Competence (iii) : Respond to emergencies*

<b>Content of Examination</b>	<b>Criteria for Satisfactory Examination</b>
<p><b><i>Emergency procedures</i></b></p> <p>Precautions for the protection and safety of passengers in emergency situations.</p> <p>Initial action to be taken following a collision or a grounding; initial damage assessment and control.</p> <p>Appreciation of the procedures to be followed for rescuing persons from the sea, assisting a ship in distress, responding to emergencies which arise in port.</p> <p>Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy.</p> <p>Action required in emergency situations such as man-overboard, engine or steering failures, stopping the ship. Knowledge of items listed in IMO/ILO "Document of Guidance, 1985", Section 12 Appendix I, as applicable to deck watchkeepers.</p> <p>Survival at sea. Knowledge required by an officer in charge of a survival craft. Procedure on abandoning ship. Survival techniques. Life-Saving signals and rescue methods.</p>	<p>The type and scale of the emergency is promptly identified, and initial action and, if appropriate, manoeuvring of the ship are in accordance with contingency plans and are appropriate to the urgency of the situations and nature of emergency.</p>

8.4 **Mainland Trade Class 2 Certificate**

Part A

***Paper 1 Navigation (3-hour)***

*Function* : *Navigation at the management level*

*Competence (i) : Establish watchkeeping arrangements and procedures*

*Criteria : Watchkeeping arrangements and procedures are established and maintained in compliance with international regulations and guidelines so as to ensure the safety of navigation, protection of the marine environment and safety of the ship and persons on board.*

(a) Effective bridge teamwork procedures.

- (b) Bridge watchkeeping arrangements for all conditions. Standing orders. IMO requirements for navigational instruments, charts and publications.
- (c) Pilots; watchkeeping duties and bridge procedures with a pilot embarked. The Master/Pilot relationship. Exchange of information.
- (d) Practice in sending and replying to messages by voice using the principle of "Seaspeak"
- (e) Compiling distress, urgency, safety and navigational messages for transmission by telex.
- (f) Compiling messages and replies in appropriate forms to and from pilot stations, harbour control, VTS, agents, owners and charterers etc.
- (g) Knowledge of how to obtain navigational warnings and weather information.
- (h) Contents, use and updating of relevant Lists of Radio Signals.
- (i) Procedures concerning medical advice by radio.
- (j) The Master's responsibilities with regard to radio communications.

*Competence (ii) : Forecast weather and oceanographic conditions*

*Criteria : The likely weather conditions predicted for a determined period are based on all available information and actions to be taken.*

- (k) Ability to understand and interpret Synoptic and Prognostic charts and their use in forecasting area weather taking into account the local weather conditions and information provided by FAX transmissions as applicable to surface navigation. Ice reports.
- (l) Knowledge of the characteristics of various weather systems, including tropical revolving storms and avoidance of storm centres and the dangerous quadrants. Ocean currents, ice regions and areas of persistent fog.
- (m) Use all appropriate navigational publications on tides and currents. The principles and practice of climatic routeing and weather routeing.
- (n) Meteorology and maritime climatology; air masses and their typical characteristics. The significance of lapse rates. Polar and inter-tropical fronts. The principal pressure systems and associated weather. Thunderstorms and line squalls.

*Competence (iii) : Determine position and the accuracy of resultant position fix by any means*

*Criteria : The primary method chosen for fixing the ship's position is the most appropriate to the prevailing circumstances and conditions. The accuracy of fixes is within accepted levels.*

***Position Determination in all conditions***

- (o) Error theory as applied to navigation in practice in the appreciation of the accuracy of position fix.
- (p) Position finding by all methods in current use. Considerations underlying the choice of navigational systems for different trades and geographical regions.

*Competence (iv) : Determine and allow for compass errors*

<i>Criteria : The method and frequency of checks for errors of magnetic and gyro-compasses ensures accuracy of information.</i>
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- (q) Knowledge of the principles of magnetic and gyro-compasses.
- (r) An understanding of systems under the control of the master gyro and a knowledge of the operation and care of the main types of gyro-compass.
- (s) The magnetic compass; its use, construction, care and maintenance. The Earth's magnetic field. Directive force. Forces in a ship causing deviation and usual means of compensation. An appreciation of the separate effects of "hard" and "soft" iron. The recording of deviations and means of obtaining a table or curve of deviations. Occasions on which compass adjustment is required.

*Competence (v) : Manoeuvre and handle a ship in all conditions*

<i>Criteria : All decisions concerning berthing, unberthing, manoeuvring and anchoring are based on a proper assessment of the ship's manoeuvring and engine characteristics and the forces and external factors to be expected.</i>
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- (t) The principles of ship handling; ship handling and manoeuvring. Stopping distances and turning circles. The use of manoeuvring data to plan turns and determine wheel-over points. Monitoring of turns. The effects of shallow water, squat and interaction. The effects of bow and stern thrusters and stabilisers.

*Competence (vi) : Co-ordinate search and rescue operations*

<i>Criteria : The plan for co-ordinating search and rescue operations is in accordance with international guidelines and standards.</i>
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- (u) A thorough knowledge of and ability to apply the procedures contained in the IMO Merchant Ship Search and Rescue Manual (MERSAR). Rendezvous navigation. The GMDSS and other shore-based SAR organisations and reporting systems.

**Paper 2 Passage Planning (3-hour)**

*Function* : *Navigation at the management level*

*Competence* : *Plan a voyage and conduct navigation*

*Criteria* : *The reasons for the planned route are supported by facts and statistical data obtained from relevant sources and publications.*

- (a) Voyage and passage planning and navigation for all stages; i.e. coastal, landfall, pilotage, and for all conditions and constraints such as restricted waters, meteorological conditions, restricted visibility, Traffic Separation Schemes and areas of extensive tidal effects.
- (b) Routeing in accordance with the general principles on ship's routeing.
- (c) Reporting in accordance with the Guidelines and Criteria for Ship Reporting Systems.
- (d) The proper application of all navigational precautions; procedures required for the preparation and execution of a passage plan.

**PART B**

**Paper 1 Ship Technology (3-hour)**

*Function (1)* : *Controlling the operation of the ship and care for persons on board at the management level*

*Competence (i)* : *Control trim, stability and stress*

*Criteria* : *Stability and stress conditions are maintained within safe limits at all times.*

- (a) Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability; knowledge of the principal structural members of a ship and how they function to resist stresses. Methods of compensating for discontinuity of strength. Local and special stiffening.
- (b) Specialist ship types; typical sections and layout of compartments and special structural requirements. The use of special steels, aluminium and fire-resistant materials in ship construction.
- (c) Means of closing openings including hull doors, ramps etc. General ideas of subdivision requirements.
- (d) Properties of paints and coatings. Modern methods of combating corrosion.
- (e) General ideas on welding processes in construction and repair work. Types of weld, common faults and visual examination of welding.
- (f) Testing of tanks and other watertight work. The preparation of damage reports

and repair lists. A knowledge and use of on-board ship plans.

- (g) Procedures in dry docks and repair yards with regard to the ordering and checking of repairs and maintenance. Main points for attention in dry dock.

*Competence (ii) : Maintain safety and security of the ship's crew and passengers and the operational conditions of life-saving and fire-fighting and other safety systems*

*Criteria : Procedures for monitoring fire detection and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established emergency procedures.*

- (h) Maintenance of operational conditions of life-saving and fire-fighting systems and emergency equipment required by SOLAS for passenger ships and cargo ships.
- (i) A thorough knowledge of life-saving appliance regulations (SOLAS)
- (j) Main contents of the Maritime Code of the PRC.

*Competence (iii) : Develop emergency and damage control plans and handle emergency situations*

*Criteria : Emergency procedures are in accordance with the established plans for emergency situations.*

- (k) Preparation of contingency plans for response to emergencies.
- (l) Ship construction, including damage control.
- (m) Methods and aids for fire prevention, detection and extinction.
- (n) Functions and use of life-saving appliances.

*Function (2) : Navigation at the management level*

*Competence : Operate remote control of propulsion plant and engineering systems and services*

*Criteria : Plant, auxiliary machinery and equipment is operated in accordance with technical specifications and within safe operating limits at all times.*

- (o) Operating principles and characteristics of the major types of marine power plants. General knowledge of marine engineering terms.
- (p) Ship's auxiliary machinery including pumps, winches, windlasses, hatches, derricks, cranes and other equipment.
- (q) Propulsion; main methods, bow and stern thrusters and stabilisers. Factors affecting performance, manoeuvring, power and economy.

- (r) Ship's electrical generation and distribution, the more common systems and methods. Typical emergency generators and emergency electrical supply systems.
- (s) The principles of refrigeration and its shipboard applications.
- (t) Steering gear, main and emergency. Principles of operation and control of the main types, automatic and manual. Tests and checks. Change over procedures.
- (u) Control systems; remote control and monitoring systems and methods for main and auxiliary machinery, pumps, valves etc. Simple knowledge of different types of sensors and transducers and the general electronic, hydraulic etc. principles which are employed in control systems.
- (v) General ship maintenance; planning and recording of maintenance work. Maintenance of hatches, watertight doors, ventilators and other closing arrangements, and cargo handling equipment etc. Replacement and lubrication schedules.

***Paper 2 Shipboard Operations (3-hour)***

*Function (1) : Controlling the operation of the ship and care for persons on board at the management level*

*Competence : Control trim, stability and stress*

*Criteria : Stability and stress conditions are maintained within safe limits at all times.*

- (a) Knowledge of IMO recommendations concerning ship stability. A full knowledge of the use of stability and hydrostatic information carried on board ships.
- (b) Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and counter measures to be taken.
- (c) Changes in trim, draught and heel due to loading, discharging and shifting weights and floating in water of different densities. The requirement for the ship to be upright with a safe trim.
- (d) The effect of list and trim on stability, including the effect of change of waterplane in heavy weather.
- (e) The angle of loll. Correction of a heavy list.
- (f) The use and measurement of Load Lines and freeboard as applied to loading calculations. The effects of hog, sag, water density and temperature. Draught surveys.
- (g) An understanding of those aspects of the conditions of assignment which affect the stability and seaworthiness of a ship.
- (h) The effects of variations in centre of gravity, righting lever and freeboard on the value and range of stability. The concept of dynamical stability. Wind and

wave excitation.

- (i) Trim and stability requirements and calculations applied to dry docking.
- (j) Stability requirements for special cargoes; e.g. grain, concentrates, deck cargoes.
- (k) Shearing forces and bending moments, their nature and the significance of values and curves. How to plan cargo and ballast operations to minimise stresses.

*Function (2) : Cargo handling and stowage at the management level*

*Competence (i) : Plan and ensure safe loading, stowage, securing, care during the voyage and unloading of cargoes*

*Criteria : Cargo operations are planned and executed in accordance with established procedures and legislative requirements. Stowage and securing of cargoes ensures that stability and stress conditions remain within safe limits at all times during the voyage.*

- (l) Knowledge of and ability to apply relevant international regulations, codes and standards and recommendations relating to the safe handling, securing, stowage and transport of cargoes.
- (m) Knowledge of the effect on trim and stability of cargoes and cargo operations.
- (n) Use of stability and trim diagrams and stress calculating equipment, including automatic data-based (ADB) equipment and knowledge of loading cargoes and ballasting in order to keep hull stress within acceptable limits.
- (o) Stowage and securing of cargoes on board ships including cargo handling gear, securing and lashing equipment.
- (p) Loading and unloading operations with special regard to the transport of cargoes identified in the Code of Safe Practice for Cargo Stowage and Securing.
- (q) General knowledge of tankers and tanker operations.
- (r) Planning, loading, discharging, stowing and securing with particular regard to heavy weights.
- (s) The correct use of cargo gear with special attention to lifting appliances. Safe working loads and associated limits. Proof loads. Calculations of approximate stresses on parts of cargo lifting gear. Equipment tests.
- (t) Certificates and records to be kept on board ship.
- (u) Preparation of holds for general and dry bulk cargoes. Loading port surveys.
- (v) Containers; their stowage and securing in holds and on deck in specialised and conventional ships. Planning and stability considerations.
- (w) National legislation for carriage of cargo in coastal waters.

*Competence (ii) : Carriage of dangerous cargoes*

*Criteria : Planned distribution and hazards of cargo are based on reliable information and is in accordance with established guidelines and legislative requirements.*

- (x) International regulations, standards, codes and recommendations on the carriage of dangerous cargoes, including the International Maritime Dangerous Goods (IMDG) Code and IMO "Emergency Procedures for Ships Carrying Dangerous Goods".
- (y) Carriage of dangerous, hazardous and harmful cargoes; precautions during loading and unloading and care during the voyage.
- (z) Bulk cargoes; coal, grain, ores etc. Their tendency to shift. The influence of stowage and distribution on stress and stability. Pulsing effects with ore concentrates. Moisture content limits for safe carriage. International regulations, standard, codes and recommendation on the carriage of dangerous cargoes including the IMO "Code of Safe Practice for Bulk Cargoes (BC Code)".
- (aa) Petroleum cargoes; IMO requirements as from SOLAS and MARPOL. Tanker and OBO layout and equipment. Tanker operations including safety and pollution avoidance.

***Paper 3 Commerce and Law (3-hour)***

*Function : Controlling the operation of the ship and care for persons on board at the management level*

*Competence (i) : Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea and the protection of the marine environment*

*Criteria : Procedures for monitoring operations and maintenance comply with legislative requirements. Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment.*

- (a) Knowledge of international and national maritime law embodied in international agreements and conventions and national legislation, including UNCLOS, ISM Code and their applications.
- (b) Certificates and other documents required to be carried on board ships by international conventions. Their period of validity and how they may be obtained and extended. The Master's responsibility concerning damage and repair to ship's structure or equipment.
- (c) Responsibilities under the relevant requirements of International Convention on Load Lines. Load line zones and seasonal areas; their significance in planning for cargoes and voyages. The requirements for load line surveys and inspections.



- (d) Responsibilities under the requirement of the International Convention for the Safety of Life at Sea. Safety Equipment, Safety Construction, Safety Radio.
- (e) Responsibilities under the International Convention and national legislation for the Prevention of Pollution from Ships and surveys and their requirements. Methods and aids to prevent pollution of the marine environment by ships.
- (f) Maritime declarations of health and the requirements of the International Health Regulations.
- (g) Responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo.
- (h) An outline knowledge of the legislation concerning marine accident, dispute and arbitration.
- (i) The Master's responsibility with regard to:
  - i. rendering assistance to vessels in distress.
  - ii. the reporting of tropical storms, ice, derelicts and other dangers to navigation.
  - iii. the reporting of marine casualties and pollution incidents.
- (j) Registration of ships; the certificate of registry and its legal significance.
- (k) The classification of ships; Classification Societies and the requirements for surveys.
- (l) An outline knowledge of the Tonnage Rules. Tonnage measurement, tonnage certificate.
- (m) Certification of officers and ratings. Manning and watch-keeping requirements.
- (n) The Law of Pilotage.
- (o) Port entry and clearance; documents required by Customs, Immigration, Port Health and other authorities. The functions of ship's agents.
- (p) Carriage of goods; delineation of responsibilities for the carriage of cargo. Cargo documentation. Relationship between owners, Master, shipper and charterer.
- (q) Charter parties; terms, conditions and responsibilities. Deviation, laydays, demurrage, and despatch.
- (r) Cargo insurance. Particular average, general average.
- (s) Functions of P&I Clubs. Statements of Facts. Noting protest, Notice of Readiness, Cargo surveys.
- (t) Hull insurance. Damage reports and surveys. Certificate of Seaworthiness. Port of Refuge.
- (u) Towing and salvage agreements.
- (v) Ship's accounts; disbursements and accounts of wages.

- (w) Crew; engagement and discharge. Victualling and accommodation rules and requirements. Injured and deceased seamen, action to be taken. Engagement of substitutes and repatriation.
- (x) Fumigation of ships and cargoes with reference to the IMO "Recommendations on the Safe use of Pesticides in Ships."
- (y) Official Log Book; entries to be made therein.

*Competence (ii) : organize and manage the crew*

*Criteria : The crew are allocated duties and informed of expected standards of work and behaviour. Training objectives are activities are based on an assessment of current competence and capabilities and operational requirements.*

- (aa) A knowledge of personnel management, organisation and training aboard ships. Knowledge of related international maritime conventions, recommendation and local legislation. Disciplinary procedures. Procedures for settling grievances.

*Competence (iii) : Maintain safety and security of the ship's crew and passengers and the operational condition of life-saving, fire-fighting and other safety systems*

*Criteria : Procedures for monitoring fire detection and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established emergency procedures.*

- (bb) Actions to be taken to protect and safeguard all persons on board in emergencies.
- (cc) Actions to limit damage and save the ship following a fire, explosion, collision or grounding.
- (dd) The organisation of musters, training and drills for emergencies.
- (ee) Safety Committees, Safety Officers and Representatives. Reporting of accidents and dangerous occurrences.

Part C

**Oral and Practical Examination - Seamanship and Safety**

*Function : Navigation at the management level*

*Competence (i) : Manoeuvre and handle a ship in all conditions*

<b>Content of Examination</b>	<b>Criteria for Satisfactory Examination</b>
Manoeuvring and handling a ship in all conditions, including :  1 manoeuvres when approaching pilot stations and embarking or disembarking pilots with due regard to weather, tide, headreach and stopping distances	All decisions concerning berthing, unberthing, anchoring and ship's manoeuvres are based on proper assessments of ship's manoeuvring, engine characterises and the forces and external factors to be expected.

<p>2 handling ship in rivers, estuaries and restricted waters, having regard to the effects of current, wind and restricted water on helm response</p> <p>3 application of constant rate of turn techniques</p> <p>4 manoeuvring in shallow water, including the reduction in under-keel clearance caused by squat, rolling and pitching</p> <p>5 interaction between passing ships and between own ship and nearby banks (canal effect)</p> <p>6 berthing and unberthing under various conditions of wind, tide and current with and without tugs</p> <p>7 ship and tug interaction</p> <p>8 use of propulsion and manoeuvring systems</p> <p>9 choice of anchorage; anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used</p> <p>10 dragging anchor, clearing fouled anchors</p> <p>11 dry-docking, both with and without damage</p> <p>12 management and handling of ships in heavy weather, including assisting a ship or aircraft in distress, towing operations; means of keeping an unmanageable ship out of trough of the sea, lessening drift and use of oil. Preparation for heavy weather.</p> <p>13 precautions in manoeuvring to launch rescue boats or survival craft in bad weather</p> <p>14 methods of taking on board survivors from rescue boats and survival craft</p>	
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<p>15 ability to determine the manoeuvring and propulsion characteristics of common types of ships with special reference to stopping distances and turning circles at various draughts and speeds</p> <p>16 importance of navigating at reduced speed to avoid damage caused by own ship's bow wave and stern wave</p> <p>17 practical measures to be taken when navigating in or near ice or in conditions of ice accumulation on board</p> <p>18 use of, and manoeuvring in and near, traffic separation schemes and in vessel traffic service (VTS) areas</p>	
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*Competence (ii) : Establish watchkeeping arrangements and procedures*

<b>Content of Examination</b>	<b>Criteria for Satisfactory Examination</b>
<p>Collision avoidance; a thorough knowledge of the International Regulations and appropriate Annexes and their application. Knowledge of the IALA buoyage systems.</p> <p>A local knowledge of the ports of Hong Kong and China.</p> <p>Thorough knowledge of the content, application and intent of the Basic Principles to be observed in Keeping a Navigational watch.</p>	<p>Watchkeeping arrangement and procedures are established and maintained in compliance with international regulations and guidelines so as to ensure safety of navigation, protection of marine environment and safety of ship and persons on board.</p>

*Competence (iii) : Respond to navigational emergencies*

<b>Content of Examination</b>	<b>Criteria for Satisfactory Examination</b>
<p>Action in an emergency, including:</p> <ol style="list-style-type: none"> <li>1 When grounding is imminent and after grounding</li> <li>2 Beaching and floating a grounded ship with or without assistance</li> <li>3 Collision is imminent and after collision or impairment of the watertight integrity of the hull by any cause</li> <li>4 Limiting damage and salvaging the ship following a fire, explosion, collision or grounding</li> </ol>	<p>The type and scale of any problem is promptly identified and decisions and actions maximise the safety of persons on board and minimise the effects of any malfunction of the ships systems.</p>

<p>5 Protection and safeguard of all persons on board in emergencies</p> <p>6 Dealing with major leaks by emergency pumping, temporary plugging or intentional beaching</p> <p>7 Man overboard</p> <p>8 Recovering persons from the water</p> <p>9 Rescue from rescue boats, survival craft, wreck etc.</p> <p>10 Emergency use of anchors</p> <p>11 Piracy</p> <p>Assessment of damage control</p> <p>Emergency steering</p> <p>Emergency towing arrangement and towing procedures</p> <p>Abandon ship</p> <p>Rescue from an enclosed space</p> <p>Oil spillage</p> <p>Emergencies in port. The use of shore services and co-operation with shore personnel</p> <p>Helicopter operations, embarking and disembarking personnel</p> <p>Emergency communications</p>	
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## 8.5 Mainland Trade Class 1 Certificate

### *Oral / Practical Examination*

The syllabus for this examination is the same as that for the oral/practical examination at **Part C** of the Class 2 examination. For Class 1, however, the candidate will be expected to answer in depth and from the perspective that would be expected of a candidate for command.

## **CHAPTER 9**

### **DANGEROUS CARGO ENDORSEMENTS**

#### **9.1 General**

9.1.1 The officers manning the stations of master and chief mate, and any other person having an immediate responsibility for the cargo, in a ship carrying a cargo of oil are required to hold certificates of competency that carry endorsements to the effect that they have satisfied the Director with regard to the requirements for specialized training and service set out in this chapter.

9.1.2 The dangerous cargo endorsements is Dangerous Cargo Endorsement (oil tanker).

9.1.3 In order to qualify for the issue of a dangerous cargo endorsement applicants must pay the appropriate fee and have completed, within the six years before the date of application, an approved specialized training course on the carriage of the relevant petroleum cargo and a period of shipboard training or service as specified in paragraph 9.1.4.

9.1.4 The period of shipboard training or service required may be any one of the following:

- (a) 14 days shipboard training in a supernumerary capacity in a ship carrying cargoes of the type for which the endorsement is sought, or on a ballast passage between carrying such cargoes, and a further 3 months credited shipboard service; or
- (b) 6 months credited shipboard service; or
- (c) 28 days approved intensive shipboard training.

9.1.5 The credited shipboard service referred to in paragraph 9.1.4 is service in ships carrying oil.

9.1.6 In order for officers, other than master or chief mate or any other person with immediate responsibility for the cargo on board oil tanker, assigned specific duties and responsibilities related to cargo or cargo equipment on tankers to qualify for the issue of a dangerous cargo endorsement applicants must pay the appropriate fee and have completed, within six years before the date of application, an approved oil tanker familiarisation course or at least three months of supervised shipboard service in an oil tanker.

9.1.7 All applicants for dangerous cargo endorsements are required to produce reports from the master(s) of the ship(s) in which they have performed their shipboard training or shipboard service, and a certificate from a training establishment attesting to satisfactory completion of the training course. A specimen form of certificate for the Master(s) report is included in Appendix I of these Determinations.

#### **9.2 Revalidation of Dangerous Cargo Endorsements (Oil)**

9.2.1 A dangerous cargo endorsement is valid for a period of not more than 5 years from the date issued.

9.2.2 Certificate holders and licence holders who wish to have their dangerous cargo endorsements revalidated must:

- (a) produce evidence of at least 3 months service in a tanker of any type during the preceding 5 years; or at least 6 months on a storage tanker, barge or terminal in operations involving loading or discharging of tankers during the preceding 5 years.
- (b) produce a valid certificate of medical fitness which includes the results of a blood test (including a plate count).
- (c) pay the appropriate fee.

9.2.3 Failure to meet the requirements of paragraph 9.2.2 will result in an unsuccessful revalidation of the dangerous cargo endorsement. A dangerous cargo endorsement which has been failed in the revalidation will only be re-issued after the holder has either:

- (a) satisfactorily completed an approved shore based oil tanker safety course; or
- (b) satisfactorily completed 14 days supervised shipboard training in an oil tanker.

9.2.4 The holder of a dangerous cargo endorsement may opt to have that endorsement revalidated concurrently with the revalidation of his certificate of competency. Such applicants must meet the requirements of paragraph 9.2.2 in addition to the requirements of Chapter 12. Provided the necessary criteria are met the endorsement will be revalidated for a period of not more than 5 years concurrent with the validity of the certificate of competency.

## CHAPTER 10

### REVALIDATION OF CERTIFICATES

#### 10.1 **Introduction**

10.1.1 Mainland trade certificates of competency will fall due for revalidation on the expiry date stated on the certificate. Once a certificate has been revalidated it will thereafter fall due for further revalidation upon expiry of the extended validity.

#### 10.2 **Conditions to be satisfied for revalidation**

10.2.1 A certificate holder who wishes to revalidate his certificate must pay the appropriate fee and must :

- (a) meet the medical fitness requirements by producing a certificate of medical fitness signed by an approved medical practitioner not more than 6 months prior to the date of application for revalidation;
- (b)
  - (i) have served as a master or deck officer in any seagoing ship, other than a pleasure vessel or a fishing vessel, for at least 12 months during the preceding 5 years; or
  - (ii) have satisfactorily completed an approved shore based updating course; or
  - (iii) have completed approved seagoing service, for a period of not less than three months in a supernumerary capacity, or in a lower officer rank than that for which the certificate held is valid immediately prior to taking up the rank for which it is valid; or
  - (iv) have performed functions relating to the duties appropriate to the class of certificate held which are considered to be at least equivalent to the 12 months sea service specified above. A list of appropriate functions is contained in paragraph 10.2.2.

10.2.2 Applications for revalidation of certificates may be made by holders who have been engaged in the following duties for at least half of the preceding 5 years period :

- (a) licensed pilots
- (b) pilot superintendents
- (c) marine department surveyors and examiners
- (d) lecturers in nautical studies at nautical colleges
- (e) marine superintendents
- (f) harbour masters
- (g) dock masters and berthing officers
- (h) marine officers
- (i) dredging superintendents
- (j) hydrographic surveyors
- (k) ship and cargo surveyors

10.2.3 The list of alternative occupations in paragraph 10.2.2 is not exhaustive and application for revalidation from certificate holders who have been engaged in other activities will be considered by the Director on their merits.



- 10.2.4 Certificate holders who also have a dangerous cargo endorsement to their certificates and who wish their dangerous cargo endorsement to be revalidated at the same time as their certificate must, in addition to the basic requirements outlined in paragraph 10.2.1, satisfy the requirements for revalidation of a dangerous cargo endorsement, outlined in Chapter 9.
- 10.2.5 Additional information concerning the procedure for revalidation may be obtained from the Seafarers' Certification Section.
- 10.2.6 Applications for revalidation from certificate holders abroad may be made by post to the Seafarers' Certificate Section and should include the following :
- (a) Certificate of competency
  - (b) Medical fitness certificate
  - (c) Fee
  - (d) Records of sea service or shore employment as appropriate
  - (e) Records of appropriate tanker service if revalidation of a dangerous cargo endorsement is also sought.

**Appendix**

**STANDARD FORM OF DOCUMENTS AND CERTIFICATES**

**FORM 1**

**CERTIFICATE OF WATCHKEEPING SERVICE**

**PART 1**

This is to certify that M ..... Has served on MV/SS ..... from ..... to ..... In the capacity of (1st) (2nd) (3rd) (4th) watchkeeping officer under my command. During this period the above-named officer was in full charge of a watch for not less than ..... hours out of every 24 hours while the vessel was at sea.

\* In addition he has regularly carried out other duties in connection with the routine and maintenance of the ship.

\* Bridge watches were doubled during the following periods and at no other time; ..... During these periods the above named officer served as the \*Senior/Junior of two watchkeeping officers.

During the period of engagement stated above-named officer:

- \*(a) was granted no leave of absence,
- \*(b) was granted leave of absence as follows;

.....

which period(s) was/were deducted from his total leave entitlement.

Signature of Master .....

Date .....

**PART 2**

During the period ..... the vessel was in the final stages of construction and the above-named officer served on board.

Signature of \*Company Superintendent/Master .....

Date .....

\* delete as appropriate

(Reverse of Certificate of Watchkeeping Service)

M. .... has served as .....  
in MV/SS ..... under  
my command for the periods stated :

His conduct during the period stated has been

His ability has been

His sobriety has been

(Chop)

Master .....

Date .....

**FORM 2**

**REPORT OF SHIPBOARD SERVICE OR TRAINING FOR  
DANGEROUS CARGO ENDORSEMENT**

The report of the Master or Chief Engineer Officer should be headed by the full name, certificate number and discharge book number of the subject officer, and should include a statement along the lines of the specimens below, as appropriate. The description of type of cargo carried during the period need not be exhaustive, but must be more than simply "petroleum". For example: "crude oil", "gas oil, motor spirit and other products", etc.

**Report of service**

M ..... has served as .....  
(Rank) in MV/SS ..... between the following  
dates ..... and ..... During this time the ship carried  
the following types of cargo:

I consider M ..... To be competent to carry out safely  
cargo handling duties in a petroleum tanker (to be signed by the Master)

**Report of ship-board training as a supernumerary**

M ..... Has served in a supernumerary  
capacity in MV/SS ..... between the following  
dates ..... and ....., and during this time has undergone  
a course of 14 days ship-board training in cargo operations. The ship was carrying the  
following types of cargo, or was on ballast voyages between carrying such cargoes:

I consider that M ..... now has an over all  
appreciation of petroleum cargo operations.  
(to be signed by the Chief Officer or Cargo Officer and countersigned by the Master).



MARINE DEPARTMENT  
GOVERNMENT OF THE HONG KONG  
SPECIAL ADMINISTRATIVE REGION

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# **Mainland Trade Certificates of Competency for Marine Engineer Officers Determinations**

**(200x Edition)**

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Made under Regulations , and of the  
Merchant Shipping (Local Vessels)(Mainland Trade Vessels) Regulation

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## CHAPTER 1

### COMMENCEMENT, INTERPRETATION AND GENERAL REQUIREMENTS

#### 1.1 Commencement

- 1.1.1 These Determinations are made by the Director of Marine under powers granted by the Merchant Shipping (Local Vessels) (Mainland Trade Vessels) Regulation and shall come into operation on .....

#### 1.2 Interpretation

- 1.2.1 In these Determinations, unless the context otherwise requires:

**"approved"** means approved or recognized by the Director of Marine;

**"certificate of competency"** means a certificate of competency issued by the Director under the Merchant Shipping (Local Vessels)(Mainland Trade Vessels) Regulation or its equivalent recognized by that regulation as having the same force;

**"Director"** means the Director of Marine;

**"examiner"** in these Determinations means a person appointed by the Director to be an Examiner of Marine Engineers;

**"mainland trade"** means .....

**"oil tanker"** means a ship constructed and used for the carriage of petroleum and petroleum products in bulk.

**"petroleum products"** means fuels, lubricants, bitumen, wax, industrial spirits, and any substance having a final boiling point at normal atmospheric pressure of more than 50°C higher than its initial boiling point, produced directly or indirectly from crude petroleum, except liquefied gas;

**"river trade"** means within the limit of the River Trade area as defined in the Shipping and Port Control Ordinance;

### 1.3 **General Requirements**

- 1.3.1 The subsequent chapters of these Determinations set out the training and qualification requirements for marine engineer officers and the conditions to be satisfied by any person to qualify for a certificate of competency (mainland trade) as a marine engineer officer, or an extension of the validity of such a certificate, or an endorsement to such a certificate, the manner in which the attainment of such standards or the satisfaction of such conditions is to be established, the procedure for the conduct of examinations, and the subjects and syllabuses for those examinations.
  
- 1.3.2 The officers manning the stations of Chief Engineer and Second Engineer, and any other person having an immediate responsibility for the cargo in an oil tanker shall hold certificates of competency that bear endorsements to the effect that the holders have satisfied the Director in regard to the requirements for training and service set out in Part IV of Chapter 3 of these Determinations.
  
- 1.3.3 Any candidate who considers himself/herself to be aggrieved by any decision of the examiner may appeal to the Director within 30 days of being informed of such decision.
  
- 1.3.4 The Director may, at his discretion, permit exemption from all or any provision of these Determinations.



## CHAPTER 2

### GENERAL PROVISIONS

#### 2.1 **Classes of Certificates and their Validity**

##### 2.1.1 There are the following classes of certificates:

Certificate of Competency (Marine Engineer Officer)(Mainland Trade) Class 1  
Certificate of Competency (Marine Engineer Officer)(Mainland Trade) Class 2  
Certificate of Competency (Marine Engineer Officer)(Mainland Trade) Class 3

2.1.2 Mainland trade classes of certificates are only valid on ships trading within the mainland trade limits. All classes of certificates are valid for a period of not more than 5 years and fall due for revalidation on the expiry date shown on the certificate.

2.1.3 In order to revalidate a certificate the holder must show that he meets the conditions for revalidation which are set out in Part III of Chapter 3.

#### 2.2 **Proof of Nationality**

2.2.1 All candidates for examination for a certificate of competency will be required to produce proof of name, nationality and date of birth.

#### 2.3 **Certificate of Medical Fitness**

2.3.1 All candidates for any certificate of competency will be required to produce a valid certificate of medical fitness issued by an approved medical practitioner. A certificate of medical fitness is not to be valid for more than two years from the date of issue.

#### 2.4 **Date and Place of Examination**

2.4.1 The dates upon which examinations are to be held in the following year will be published annually in a Gazette Notice issued by the Director.

2.4.2 Candidates for examination will be informed, at the time of making application, of the place at which the examination will be held.

2.4.3 Candidates who are making application for any examination should follow the procedure set out under paragraph 2.5, ensuring that their application is lodged at least one month before the date upon which they wish to be examined. The time and date of the examination will then be advised.

#### 2.5 **Application**

2.5.1 Candidates for either a part, or for the whole, of any certificate of competency examination must complete an application form which may be obtained from the Marine Department, Seafarers' Certification Section, or by post from:

Marine Department,  
Seafarers' Certification Section,  
3/F., Harbour Building,  
38 Pier Road,  
Central,  
Hong Kong.

2.5.2 Applicants should return the completed form to the Seafarers' Certification Section at least one month before the intended date of examination, together with:

- (a) the examination fee;
- (b) two passport type photographs (50mm x 40mm);
- (c) sea service testimonials, Employment Registration Book, Seaman's Discharge Book or Certificates of Discharge, where applicable;
- (d) proof of nationality, name and date of birth;
- (e) where appropriate
  - (i) existing certificates of competency;
  - (ii) certificate of medical fitness;
  - (iii) subsidiary course certificates;
  - (iv) training record books.

2.5.3 Candidates who have made a previous attempt when making application for re-examination must also submit their copy of the record of results issued by the examiner following their previous attempt.

2.5.4 It is important that the correct procedure for application is followed as the sea service testimonials, Employment Registration Book, Seaman's Discharge Book or Certificates of Discharge, where applicable, should be submitted for verification which can take time. In the absence of such verification the candidate cannot be accepted for examination.

2.5.5 Applications from candidates abroad may be made by post to the Seafarers' Certification Section, accompanied by the prescribed examination fee and copies of the relevant supporting documents. Original documents should not be sent through the post in such cases, but should be presented to the examiner on the applicant's next return to Hong Kong prior to the date of examination. Notification by the examiner of acceptance for the examination will be given as soon as possible after receipt of the application.

2.5.6 Candidates who fail in all, or in a part, of an examination, may attend for the next scheduled examination for the relevant certificate provided that accommodation is available in the examination hall, even if this means that they are unable to give the full

one month notice as required by paragraph 2.5.2. In order to take advantage of this facility candidates must submit written application to resit the examination, or part of examination, together with the appropriate fee, immediately upon receiving notification of the examination results.

## 2.6 **Enquiries**

- 2.6.1 Candidates may make enquiries about examinations and in doing so should ensure that the point on which information is sought is clearly stated. Enquiries from candidates should be addressed to:

The Examiner of Engineers,  
Seafarers' Certification Section,  
Marine Department,  
3/F., Harbour Building,  
38 Pier Road,  
Central,  
Hong Kong

Tel: (852) 2852 4364  
Fax: (852) 2541 6754  
E-mail: seexam@mardep.gov.hk.

- 2.6.2 Candidates writing to request a provisional estimate of their sea service should include a detailed summary of their service with the enquiry but should not include original documents.

## 2.7 **Particulars of Sea Service**

- 2.7.1 A candidate's eligibility for examination will depend, amongst other factors, on the amount of sea service performed and upon the seagoing ranks in which the candidate has served. It is therefore imperative that the particulars which candidates record on the application form are accurately stated.
- 2.7.2 The amount of sea service set down in these Determinations for each class of certificate is the absolute minimum that can be accepted. Unless candidates can prove the full amount they will not be admitted to the examination.

## 2.8 **Testimonials**

- 2.8.1 Candidates for certificates of competency must produce testimonials in respect of all sea service performed. These testimonials, which should state the seniority on watch, the type of main propelling machinery and the nature of duties performed, are to be signed by the Chief Engineer Officer and endorsed by the Master or the Engineer Superintendent. In the case of service as Chief Engineer Officer, the testimonials should be signed by the Engineer Superintendent or some other responsible representative of the employer. A specimen copy of the form of testimonial recommended for this purpose is shown in the Appendix. Testimonials will be returned to candidates when the examination is completed.

2.8.2 Testimonials or certificates of sea service should include reports as to the candidate's character, sobriety, experience and ability for the full period of service covered by the application for examination.

## 2.9 **Use of Information**

2.9.1 Information required by the application form will be used by Marine Department for process of application for examination and issue of certificate. This information may be divulged to other departments and agencies authorised to process the information for the mentioned purposes as well as for verification of certificates.

2.9.2 The supply of information is obligatory. A candidate should ensure that all the information filled in the application form is accurate. Failure to do so may, besides subject to paragraph 2.10, result in an unsuccessful application.

2.9.3 For making correction and access to personal data after submission of application form, a candidate may contact the following subject officer:

Officer-in-charge  
Marine Department,  
Seafarers' Certification Section,  
3/F., Harbour Building,  
38 Pier Road,  
Central,  
Hong Kong

## 2.10 **Fraud or Misrepresentation**

2.10.1 Candidates are reminded that any person who, in connection with an application for the issue of a certificate of competency, or in connection with the endorsement to, or extension of validity of, a certificate of competency:

- (a) makes a false pretence; or
- (b) supplies false information;

knowing it to be false, or not believing it to be true, commits an offence and is liable to a fine and to imprisonment.

## 2.11 **Attempted Bribery**

2.11.1 Any candidate who offers an advantage to any officer of the Marine Department shall be guilty of an offence under the Prevention of Bribery Ordinance and shall be liable on summary conviction to a fine and to imprisonment. Such a candidate will not be re-examined for such a period as may be decided by the Director.

## 2.12 **Unsatisfactory Conduct**

2.12.1 Candidates, who have neglected to join their vessels after signing the employment contracts or crew agreements (where applicable), or who have left their vessels after joining, other than upon discharge, or who have committed misconduct on board, will be required to produce satisfactory proof of two years subsequent service at sea with good conduct unless the Director, after investigation, should see fit to reduce this period.

## 2.13 **Deafness and other Physical or Mental Handicaps**

2.13.1 If, in the course of any examination, the examiner finds that a candidate is afflicted with deafness, an impediment in speech, or with some other physical or mental handicap which he considers sufficient to render the candidate incapable of discharging adequately the ordinary seagoing duties of the holder of a certificate of competency, he will not allow the candidate to complete the examination and the candidate will be refunded of the examination fee.

2.13.2 If such a candidate subsequently produces a medical certificate to the effect that the particular handicap has been overcome or has improved or that the candidate's condition is now normal, the Director will consider the candidate for re-examination.

## 2.14 **Knowledge of English and Chinese for Conduct of Examination**

2.14.1 All candidates for all classes of certificates of competency must demonstrate to the satisfaction of the examiner that they can speak and write English, Putonghua and Cantonese sufficiently well to perform the duties required on a mainland trade ship.

2.14.2 Candidates for all classes of certificates of competency may choose to have the examination conducted in English or Chinese. Candidates must specify their language of choice at the time of making the application. Candidates who choose to have the examination conducted in English may have all the written and oral examinations conducted in English. But candidates who choose to have the examination conducted in Chinese will be required to have at least one professional subject in the written examination as selected by the candidate to be examined in English and also part of the oral examination to be conducted in English.

2.14.3 Candidates for written examinations which are conducted in English will be expected to demonstrate a reasonable standard of grammar, spelling and composition in their answers.

2.14.4 Candidates for written examinations which are conducted in Chinese will be expected to demonstrate a reasonable standard of grammar, fluency, accuracy and the comprehensive ability in the use of Chinese language.

## 2.15 **Issue of Certificates**

- 2.15.1 Candidates who are successful in all parts of an examination, and who meet all the requirements for the issue of a certificate of competency of the class applied for, will, within 5 working days, be issued with a certificate of competency. When the certificate is ready, it will be forwarded by registered post to the candidate's address as given on the application form, unless the candidate wishes to collect in person or make other arrangements.
- 2.15.2 A candidate who has passed all parts of the examination but who has not yet obtained the subsidiary qualifications necessary to become eligible for the issue of a certificate of competency will be issued with a record of results form. Upon production of this form and proof that the requisite subsidiary qualifications have been obtained the candidate will be issued with a certificate of competency in the normal manner.
- 2.15.3 All other candidates for the examination will receive a record of results form which should be retained and produced at any subsequent examinations.
- 2.15.4 To avoid unnecessary delays in the issue of certificates, it is important that candidates should inform the examiner promptly of any change in the address given on the application form.

## 2.16 **Insufficient Service**

- 2.16.1 If after a candidate has passed the examination, it is discovered that the candidate's sea service is insufficient to entitle the candidate to receive a certificate of the class for which the candidate has been examined, the candidate will not be issued with such a certificate. If, however, the Director is satisfied that the error in the calculation of sea service did not occur through any fault or misrepresentation on the part of the candidate, the appropriate certificate will be granted when the candidate has made up the deficiency in sea service.

## 2.17 **Fees**

- 2.17.1 Applicants for examination will be required to pay the appropriate examination fees before any steps are taken to verify their eligibility for examination. Candidates who are found to be ineligible will have their fees returned.
- 2.17.2 The fees paid for examination for a certificate of competency is not refundable in the event of a candidate's failure to pass. A candidate who fails to appear in any part of any examination at the appointed time may be regarded as having failed by default in that part of the examination and the examination fee will be forfeited unless the candidate produces reasonable proof that failure to attend was unavoidable.
- 2.17.3 Details of the current scale of fees may be obtained from the Seafarers' Certification Section.
- 2.17.4 A candidate who due to circumstances beyond his/her control, has to postpone an examination for which the candidate has already made application, may do so for a maximum period of one year beyond the date of the examination applied for. The candidate should apply in writing for the postponement of examination at least three days in advance. On subsequently appearing to sit the postponed examination the

candidate will be required to pay the balance of any statutory increase in fees which may have come into force since the candidate's original application.

- 2.17.5 A candidate who wishes to postpone an examination, for which the candidate has already made application, beyond one year from the date of the examination will forfeit the examination fee and will be required to resubmit his/her application and pay the fee as if it were a new application.

## 2.18 **Replacement Certificate**

- 2.18.1 In the event that a certificate of competency is lost, the holder may apply to the Seafarers' Certification Section for a replacement certificate. A fee will be charged for the provision of such a certificate unless the holder can show that the loss was as a result of shipwreck or fire. An applicant for a replacement certificate will be required to make a declaration to the examiner as to the circumstances in which the certificate was lost.

## CHAPTER 3

### CERTIFICATES

#### PART 1

#### QUALIFYING REQUIREMENTS

##### 3.1 Class 3 Certificate

3.1.1 To qualify for the issue of a Class 3 certificate a candidate must:

- (a) be not less than 18 years of age;
- (b) have received basic education to the standard of Form 5 or equivalent;
- (c)
  - (i) have at least two years of acceptable technical education and practical training of suitable quality standard, which are relevant to the duties of a marine engineer, and qualifying sea service as an assistant engineer of at least six months; or
  - (ii) have served at least 2<sup>1</sup>/<sub>2</sub> years as oiler or assistant fitter in a seagoing ship; or
  - (iii) hold a Local Certificate of Competency as engineer for machinery over 150 BHP or an equivalent local certificate of competency; or
  - (iv) hold a Certificate of Competency (Marine Engineer Officer) (River Trade) Class 3.
- (d) have completed an approved Advanced Fire-Fighting course or equivalent;
- (e) have completed and passed the assessment of an approved Medical First Aid or equivalent;
- (f) have completed an approved Proficiency in Survival Craft and Rescue Boats;
- (g) pass the examination set out in Chapter 4; and
- (h) hold an approved and valid certificate of medical fitness.

3.1.2 Alternatively, a candidate who holds a Local Certificate of Competency as engineer for machinery over 150 BHP or a Certificate of Competency (Marine Engineer Officer) (River Trade) Class 3, and satisfied the conditions under 3.1.1 (d), (e), (f) and (h), is qualified for the issue of a Class 3 certificate (Mainland Trade) after satisfactorily completion of an approved course and passing the course examination. The candidate under this condition is not required to pass the examination set out in Chapter 4 of the Determinations.



### 3.2 **Class 2 Certificate**

3.2.1 To qualify for the issue of a Class 2 certificate a candidate must:

- (a) hold a Certificate of Competency (Marine Engineer Officer)(Mainland Trade) Class 3 or an equivalent certificate;
- (b) have completed a period of qualifying service of at least 12 months as a watchkeeping officer in a vessel powered by engines of over 750 kW;
- (c) pass the examination set out in Chapter 4; and
- (d) hold an approved and valid certificate of medical fitness.

3.2.2 Alternatively, to qualify for the issue of a Class 2 certificate (Mainland Trade) a candidate who holds a Certificate of Competency (Marine Engineer Officer) (River Trade) Class 2 with an approved and valid certificate of medical fitness, must either pass the examination set out in Chapter 4 or have satisfactorily completed an approved course and passed the course examination.

### 3.3 **Class 1 Certificate**

3.3.1 To qualify for the issue of a Class 1 certificate a candidate must:

- (a)
  - (i) have completed a period of qualifying service of at least 12 months as a watchkeeping officer in a vessel powered by engines of over 3,000 kW whilst holding a Certificate of Competency (Marine Engineer Officer)(Mainland Trade) Class 2 or an equivalent certificate; or
  - (ii) have completed a period of qualifying service of at least 24 months as a watchkeeping officer in a vessel powered by engines over 750 kW but less than 3,000 kW whilst holding a Certificate of Competency (Marine Engineer Officer)(Mainland Trade) Class 2 or an equivalent certificate; or
  - (iii) have completed pro rata qualifying service in accordance with (i) and (ii) above; and
- (b) pass the examination set out in Chapter 4; and
- (c) hold an approved and valid certificate of medical fitness.

3.3.2 Alternatively, to qualify for the issue of Class 1 certificate (Mainland Trade) a candidate who holds a Certificate of Competency (Marine Engineer Officer) (River Trade) Class 1 with an approved and valid certificate of medical fitness, must either pass the examination set out in Chapter 4 or have satisfactorily completed an approved course and passed the course examination.

## **PART II**

### **GENERAL REQUIREMENTS**

#### **3.4 Qualifying Service**

3.4.1 Qualifying service, unless otherwise specified, must be served on vessels with engines of over 750 kW excluding fishing vessels and pleasure craft.

3.4.2 Qualifying service will be reckoned from the date of engagement to the date of discharge from a ship under crew agreement or employment contract, where applicable. When there are no articles of agreement, the total time during which the candidate has been employed on a vessel will be accepted. Qualifying service must be attested/certified by the Engineer Superintendent or other representative of the Owners.

#### **3.5 Equivalent Certificates**

3.5.1 Candidate who holds a certificate issued by another Authority and if such certificate is considered by the Director as equivalent and appropriate, then the candidate can be issued with an equivalent class of mainland trade certificate of competency subject to the conditions set forth by the Director.

#### **3.6 Admission to Examinations**

3.6.1 Candidates applying for Class 3, Class 2 or Class 1 examination, must have completed the requisite qualifying sea service.

3.6.2 There is no restriction on the number of subjects for a candidate to attempt in the Class 2 or Class 1 examination. A candidate who has passed any subject in the examination will not be required to resit that subject again in a subsequent attempt.

3.6.3 Candidates must pass the written part of the Engineering Knowledge examination and the oral part of the examination, for a particular class of certificate, within a two years period to retain the validity of a pass in either part.

### 3.7 **Pass Marks**

- 3.7.1 Candidates will be required to obtain not less than fifty percent marks in each subject attempted in the written examinations.

### 3.8 **Exemptions**

- 3.8.1 Candidate who has completed an approved course in Hong Kong and passed the terminal examinations leading to the award of a qualification which is approved by the Director, may be granted exemptions from the written examinations on a subject for subject basis except Engineering Knowledge.

## **PART III**

## **REVALIDATION OF CERTIFICATES**

### **Introduction**

- 3.9 All classes of certificates of competency will fall due for revalidation on the expiry date stated on the certificate. Once a certificate has been revalidated it will thereafter fall due for further revalidation upon expiry of the extended validity.

### **Conditions to be satisfied for revalidation**

- 3.10 A certificate holder who wishes to revalidate his certificate must pay the prescribed fee and must :
- (a) meet the medical fitness requirements by producing a valid certificate of medical fitness signed by an approved medical practitioner;
  - (b)
    - (i) have served as an engineer officer in any mainland trade ship, other than a pleasure craft or a fishing vessel, for at least 12 months during the preceding 5 years; or
    - (ii) have satisfactorily completed an approved shore based updating course; or
    - (iii) have completed not less than 3 months sea service on ships having a registered power of 350 kW or more in a supernumerary capacity or in lower ranks than that for which the certificate held is valid immediately prior to taking up the rank for which it is valid; or
    - (iv) have performed, for at least half of the preceding 5 years period, other functions relating to the duties which ensure an adequate updating of marine engineering knowledge. The duties may be as a marine engineering superintendent. Application for revalidation from certificate holders who have been engaged in other activities will be considered by the Director on its merits.
- 3.11 Additional information concerning the procedure for revalidation may be obtained from the Seafarers' Certification Section.

## **PART IV**

### **DANGEROUS CARGO ENDORSEMENTS**

- 3.12 The officers manning the stations of Chief Engineer and Second Engineer, and any other person having an immediate responsibility for the cargo, in a ship carrying a cargo of oil are required to hold certificates of competency that carry endorsements to the effect that they have satisfied the Director with regard to the requirements for specialized training and service set out in this Chapter.
- 3.13 The dangerous cargo endorsement is Dangerous Cargo Endorsement (oil tanker).
- 3.14 In order to qualify for the issue of a dangerous cargo endorsement applicants must have completed, within the six years before the date of application, an approved specialized training course on the carriage of the relevant dangerous cargo and a period of shipboard training or service as specified in paragraph 3.15.
- 3.15 The period of shipboard training or service required may be any one of the following:
- (a) 14 days shipboard training in a supernumerary capacity in a ship carrying cargoes of the type for which the endorsement is sought, or on a ballast passage between carrying such cargoes, and a further 3 months credited shipboard service; or
  - (b) 6 months credited shipboard service; or
  - (c) 28 days approved intensive shipboard training.
- 3.16 The credited shipboard service referred to in paragraph 3.15 is service in ships carrying oil.
- 3.17 In order for officers, other than chief engineers or second engineers or any other person with immediate responsibility for the cargo on board oil tanker, assigned specific duties and responsibilities related to cargo or cargo equipment on tankers to qualify for the issue of a dangerous cargo endorsement applicants must pay the appropriate fee and have completed, within six years before the date of application, an approved oil tanker familiarisation course or at least three months of supervised shipboard service in an oil tanker.
- 3.18 All applicants for dangerous cargo endorsements are required to produce reports from the Chief Engineers of the ships in which they have performed their shipboard training or shipboard service, and a certificate from a training establishment attesting to satisfactory completion of the training course. A specimen form of certificate for the Chief Engineer report is attached at Appendix.

### **Revalidation of Dangerous Cargo Endorsements (Oil)**

- 3.19 A dangerous cargo endorsement is valid for a period of not more than 5 years from the date issued.
- 3.20 Certificate holders who wish to have their dangerous cargo endorsements revalidated must:
- (a) produce evidence of at least 3 months service in a tanker of any type during the preceding 5 years; or at least 6 months on a storage tanker, barge or terminal in operations involving loading or discharging of tankers during the preceding 5 years;
  - (b) produce a valid certificate of medical fitness; and
  - (c) pay the prescribed fee.
- 3.21 Failure to meet the requirements of paragraph 3.20 will result in the withdrawal of the dangerous cargo endorsement. A dangerous cargo endorsement which has been withdrawn will only be re-issued after the holder has either:
- (a) satisfactorily completed an approved shore based oil tanker safety course; or
  - (b) satisfactorily completed 14 days supervised shipboard training in an oil tanker.

## **PART V**

## **EXAMINATION STRUCTURES**

### **3.22 Class 3 Certificate**

3.22.1 The examination for a Class 3 certificate will be oral only.

### **3.23 Class 2 Certificate**

3.23.1 The examination for Class 2 certificate consists of two parts as follows:

<u>Written examination</u>	<u>Duration</u>
Engineering Theory	2 hours
Engineering Knowledge (1)	2 hours
Engineering Knowledge (2)	2 hours
<u>Oral examination</u>	<u>Duration</u>
Engineering Knowledge Safety of Life and Ship	Approximately 1 hour

### **3.24 Class 1 Certificate**

3.24.1 The examination for Class 1 certificate consists of two parts as follows:

<u>Written examination</u>	<u>Duration</u>
Engineering Theory I	3 hours
Engineering Theory II	3 hours
Engineering Knowledge (1)	3 hours
Engineering Knowledge (2)	3 hours
<u>Oral examination</u>	<u>Duration</u>
Engineering Knowledge Safety of Life and Ship	Approximately 1 hour

## CHAPTER 4

### EXAMINATION SYLLABUSES

#### PART I

#### CLASS 3 CERTIFICATE

##### 4.1 EXAMINATION

Oral examination ) Approximately  
Engineering knowledge ) one hour.

##### 4.2 ENGINEERING KNOWLEDGE

#### **Function 1: Marine engineering at the operational level**

#### **Competence (i): Maintain a safe engineering watch**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<b><u>Principles in keeping an engineering watch</u></b> i. Duties associated with taking over and accepting charge of the engine room. ii. Routine duties undertaken during a watch. iii. Maintenance of the machinery space log book and the significance of the readings taken. iv. Duties associated with handing over to the following engineer.	Understanding the principles and procedures in conducting, handover and relief of charge of the engine room. Understanding the special precautions during the charge to be taken under different conditions and in different sea states. Understanding the proper record to be maintained for the movements and activities relating to the ship's engineering systems.
<b><u>Safety and emergency procedures</u></b> Safety and emergency procedure, changeover of remote/automatic to local control of all systems.	Understanding the procedures to isolate, bypass and take emergency control of machinery.
<b><u>Safety Precautions</u></b> Safety precaution to be observed during a voyage and immediate actions to be taken in the event of fire or accident with particular reference to oil systems.	Understanding the action that would be necessary in case of accident involving oil systems and damages resulting from equipment breakdown, fire, flooding, rupture, collision or other causes in order to contain the effects.



**Competence (ii): Use Chinese or English in oral form**

Content of examination	Criteria for satisfactory examination
<u>Knowledge of Chinese or English language</u> Communication ability in Chinese or English.	Communication in Chinese or English is clear and understood.

**Competence (iii): Operate main and auxiliary machinery and associated control systems**

Content of examination	Criteria for satisfactory examination
<u>Motorship</u>  <u>Main and auxiliary machinery</u>	
i. Preparation of main diesel propulsion machinery and preparation of auxiliary machinery for operation.	Proficiency in planning and carrying out operations for preparation of main and auxiliary machinery in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment. Proficiency in identification of deviations from norm.
ii. Operation of auxiliary boiler including combustion systems, and water treatment.	
iii. Method of checking water level in boiler and action necessary if water level is abnormal.	
iv. Fuel and lubricating oil systems for marine diesel plant. Properties and handling of oils	Understanding properties, storage and handling of fuel and lubricating oils.
v. Scavenge fire and crankcase explosion	Understanding the causes, remedial action and prevention of scavenge fire and crankcase explosion.
vi. Location of common faults in diesel propulsion machinery and auxiliary machinery in engine room and steering gear room and action necessary to prevent damage.	Proficiency in identification of the causes of malfunction and actions to ensure the overall safety of the ship and the plant having regard to the prevailing circumstances and conditions.

**Competence (iv): Operate pumping systems and associated control systems**

Content of examination	Criteria for satisfactory examination
<u>Pumping systems</u>	
i. Routine pumping operations.	Proficiency in planning and carrying out pumping operations in accordance with established rules and procedures to ensure safety of operations and avoid pollution of marine environment.
ii. Operation of bilge, ballast and cargo pumping systems.	

**Function 2: Maintenance and repair at the operational level**

**Competence: Maintain marine engineering systems including control systems**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Marine systems</u></b> Basic mechanical knowledge and skills of marine systems.</p>	<p>Understanding basic knowledge and skills of engineering systems including control systems.</p> <p>Proficiency in isolation, dismantling and re-assembly of plant and equipment in accordance with accepted practices and procedures. Understanding actions to restore plant and equipment by methods most suitable and appropriate to the prevailing circumstances and conditions.</p>
<p><b><u>Safety and emergency procedures</u></b> Safe isolation of electrical and all plant and equipment before personnel are permitted to work on such plant or equipment.</p>	
<p><b><u>Maintenance and repair</u></b> Maintenance and repair to main propulsion plant, auxiliary machinery including steering gear, deck machinery and survival equipment.</p>	

**Function 3: Electrical, electronic and control engineering at the operational level**

**Competence : Operate alternators, generators and control systems**

<b>Content of examination</b>	<b>Criteria for satisfactory competency</b>
<p><b><u>Generating plant</u></b></p> <p>i. Basic electrical knowledge and skills of generating plant and the associated electrical distribution system and gears.</p> <p>ii. Preparation, starting, coupling and change over alternators or generators.</p> <p>iii. Location of common faults in electrical and electronic systems and actions to prevent damage.</p>	<p>Proficiency in planning and carrying out operations for generating plant and control systems in accordance with established rules and procedures to ensure safety of operations.</p>
<p><b><u>Control systems</u></b> Location of common faults in control system and action to prevent damage.</p>	

**Function 4: Controlling the operation of the ship and care for persons on board at the operational level**

**Competence (i): Ensure compliance with pollution prevention requirements**

<b>Content of examination</b>	<b>Criteria of satisfactory examination</b>
<p><b><u>Prevention of pollution</u></b></p> <p>i. Knowledge of the precautions to be taken to prevent pollution of the marine environment.</p> <p>ii. Anti-pollution procedures and all associated equipment including oily water separator.</p>	<p>Proficiency in procedures for monitoring shipboard operations and ensuring compliance with pollution prevention requirements.</p>

**Competence (ii): Maintain seaworthiness of the ship**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Ship stability</u></b></p> <p>i. Working knowledge and application of stability, trim and stress tables, diagrams and stress calculating equipment.</p> <p>ii. Fundamentals of watertight integrity.</p> <p>iii. Fundamental action to be taken in the event of partial loss of intact buoyancy.</p> <p><b><u>Ship construction</u></b></p> <p>General knowledge of the principal structural members of a ship and the proper names for the various parts.</p>	<p>Understanding the stability conditions complying with intact stability criteria under all conditions of loading.</p> <p>Understanding actions to ensure and maintain the watertight integrity of the ship in accordance with accepted practice.</p>

**Competence (iii): Monitor compliance with legislative requirements**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>IMO conventions</u></b></p> <p>Working knowledge of the relevant IMO conventions concerning safety of life at sea and protection of marine environment.</p>	<p>A command of legislative requirements relating to safety of life at sea and protection of marine environment.</p>

## **PART II**

### **CLASS 2 CERTIFICATE**

#### **4.3 ENGINEERING THEORY**

##### **Function 1: Marine engineering at the management level**

##### **Competence: Plan and schedule operations**

###### **Criteria for satisfactory examination:**

- i. Understanding the basic concepts of thermodynamics and its applications. Understanding the design parameters on thermodynamics and heat transmission for power installation to suit the planning and preparation of operations.
- ii. Understanding the basic knowledge on mechanics and fluid mechanics, and its applications. Understanding the design parameters on mechanics for power installation to suit the planning and preparation of operations.

##### **4.3.1 Heat**

Temperature and its measurement. Significance of absolute temperature. Heat as energy. Conservation of energy applied to heat and work. Fuels. Calorific value. Expansion and contraction of solids, liquids and gases. Change of phase. Properties of refrigerant fluids. Compression and expansion of gases. Gas Laws. Boyle's Law. Charles' Law. Characteristic gas equation. Elementary qualitative treatment of heat transfer by conduction, convection and radiation. Effect of insulation. Internal combustion engines. Indicator diagram, power developed, fuel consumption. Principles of combustion. Insufficient, minimum and excess air.

##### **4.3.2 Applied Mechanics**

The vector representation of forces. Triangle of forces.

Resultant and equilibrant of a system of concurrent co-planar forces.

The principle of moments, application to simply supported beams and cantilevers. Centre of area. Centre of gravity.

Displacement, time, speed, linear velocity and acceleration. Force, moment of force, torque, work, energy, power.

Simple machines. Velocity ratio, mechanical advantage, efficiency.

Friction, Laws for dry surfaces, coefficient of friction (horizontal plane only). Direct stress and strain. Hooke's Law. Modulus of elasticity, elastic limit, UTS, yield stress, limit of proportionality, safety factor, shear stress.

Relative density, variation of fluid pressure with depth. Archimedes principles. Elementary treatment of transverse stability. Transverse movement of masses across deck. Free surface effect.

#### 4.3.3 **Mathematical calculations**

Extraction and cancellation of common factor, significant figures, degree of accuracy. Averages, percentages, ratio, proportions, use of tables, square roots, reciprocals, use of logarithms for multiplication, division, powers and roots. Surface areas and volumes of cylinders, spheres, cones, frustums and cubes.

### **Function 2: Electrical, electronic and control engineering at the management level**

**Competence: Operate electrical and electronic control equipment**

<b><u>Criteria for satisfactory examination :</u></b>
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Understanding the basic electrical and electronic principles for the operation and control of electrical machines and power electronic systems.
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#### 4.3.4 **Electricity**

Simple electric circuits. Effects of electric current - chemical, magnetic and thermal. Ohm's law. Series and parallel circuits. Electromotive force, voltage. Units of current, resistance, voltage, energy. Secondary cells (acid and alkali), construction, capacity - ampere hour. Distribution of current in circuits. Resistance of conductor, variation with dimensions, material, temperature. Temperature coefficient of resistance. Motor and generator principle.

4.4 ENGINEERING KNOWLEDGE (1)

**Function 1: Marine engineering at the management level**

**Competence (i): Start up and shut down main propulsion and auxiliary machinery including associated systems**

Content of examination	Criteria for satisfactory examination
<p><b><u>Ship power installation and refrigeration</u></b> Operating principles of ship power installations (diesel and gas turbine) and refrigeration.</p>	<p>Adequate knowledge on the planning and preparation of operations to suit the design parameters of the power installation and to the requirements of the voyage.</p> <p>Adequate knowledge on types, specifications, properties, usage, preparation and treatment of fuel and lubricating oils. Understanding the methods of making available fuels and lubricants.</p> <p>Adequate knowledge on the technical specifications, and application of engineering materials and substances for shipboard use. Proficiency in the methodology used for production and material repair for marine machinery.</p>
<p><b><u>Fuels and lubricants</u></b> Physical and chemical properties of fuels and lubricants; general requirements for their storage, processing and safe handling on board ships.</p>	
<p><b><u>Technology of materials</u></b> i. Properties and characteristics of metals, materials, liquids, gases and vapours used in machinery on board ships. ii. Manufacture methods, treatment, and processes used for marine machinery.</p>	

**Competence (ii): Maintain safety of engine equipment, systems and services**

Content of examination	Criteria for satisfactory examination
<p><b><u>Operation and maintenance of auxiliary machinery</u></b> i. Operation and maintenance of auxiliary machinery, e.g. generators, air compressors, heat exchangers, pumps, pumping systems, oily water separators. ii. Constructional details, principles involved and operation of steering gear, refrigeration machinery. iii. Principles involved, operation and construction of thrust blocks, shafting bearings, stern tubes, propellers, ship-side fittings.</p>	<p>Adequate knowledge on the arrangements needed for ensuring the safe operation and maintaining the condition of auxiliary machinery including control systems and machinery on deck to suit all modes of operation.</p>
<p><b><u>Control systems</u></b></p>	

Principles of operation, testing, operational fault rectification of automatic control and alarm systems.	
<b><u>Cargo-handling equipment and deck machinery</u></b>	
Principles involved with the construction, operation and maintenance of cargo handling equipment and deck machinery.	

**Competence (iii): Manage fuel and ballast operations**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<b><u>Fuel and ballast pumping systems</u></b> General requirements concerning fuel and ballast pumping systems with particular reference to prevention of marine pollution.	Adequate knowledge on fuel and ballast operations including planning, preparation, procedures, monitoring and safety precautions to meet operational requirements and prevent pollution of environment.

**Competence (iv): Use internal communication systems**

<b>Content of examination</b>	<b>Criteria of satisfactory examination</b>
<b><u>Internal communication systems</u></b> Principles and use of all internal communication systems on board.	Adequate knowledge on the types, system details, function and use of all internal communication equipment or arrangement for effective transmission and reception of message.

**Function 2: Electrical, electronic and control engineering at the management level**

**Competence :** Test, detect faults and maintain and restore electrical, electronic and control equipment to operating condition

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<b><u>Electrical and electronic control equipment</u></b> Safe and efficient operation of electrical machines, systems and electronic control equipment including fault diagnostics.	Proficiency in planning and procedures to carry out maintenance activities in accordance with technical, legislative, safety and procedural specification. Proficiency in identifying the effects of malfunctions of electrical and electronic control equipment on associated plant.

**Function 3: Maintenance and repair at the management level**

**Competence (i) : Organize safe maintenance and repair procedures**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Marine engineering practice</u></b> Maintenance of operating records, the planning of maintenance schedules and the procurement of stores and spare parts.</p> <p><b><u>Maintenance and repair procedures</u></b> Organizing and carrying out safe maintenance and repair procedures.</p>	<p>Proficiency in planning and procedures to carry out maintenance activities in accordance with technical, legislative, safety and procedural specifications.</p> <p>Adequate knowledge on appropriate plans, for maintenance and repair. Understanding action taken leading to the restoration of plant by the most suitable method.</p>

**Competence (ii): Detect and identify the cause of machinery malfunctions and correct faults**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Machinery malfunction</u></b> Detection of machinery malfunction, location of faults and action to prevent damage.</p>	<p>Proficiency on the methods based on recommended practices and procedures for comparing actual operating conditions.</p> <p>Proficiency in the principles for taking action and decisions to deal with machinery malfunction in accordance with recommended operating specifications and limitation.</p>

**Competence (iii): Ensure safe working practices**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Safe working practice</u></b></p> <p>i. Safe working practices in machinery operation and maintenance.</p> <p>ii. Safe working practices to be observed for entry into confined or enclosed spaces.</p>	<p>Adequate knowledge on working practices with reference to legislative requirements, code of practice, permits to work and environmental concerns to ensure safety and health of those living and working on board ship.</p>

**Function 4: Controlling the operation of ship and care for persons on board at the management level**

**Competence (i): Control trim, stability and stress**



<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Effects on trim and stability due to ship damage</u></b></p> <p>i. Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and counter measures to be taken.</p> <p>ii. Knowledge of IMO recommendations concerning ship stability.</p>	<p>Understanding the criteria for maintaining stability and stress conditions within safety limits at all times.</p>

**Competence (ii): Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea and protection of the marine environment**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Knowledge of relevant international maritime laws embodied in international agreements and conventions</u></b></p> <p>i. Certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and the period of their legal validity.</p> <p>ii. responsibilities under the relevant requirements of the International Convention on Load Lines, International Convention for the Safety of Life at Sea, International Convention for the Prevention of Pollution from ships and the International Safety Management (ISM) Code.</p> <p>iii. maritime declaration of health and the requirements of the International Health Regulations.</p> <p>iv. responsibilities under international instruments affecting the safety of the ship, passengers, crew or cargo.</p> <p>v. methods and aids to prevent pollution of the environment by ships.</p> <p>vi. knowledge of national legislation for implementing international agreements and conventions.</p>	<p>Thorough understanding of the legal responsibilities at the management level and procedures for monitoring operations and maintenance in compliance with legislative requirements. Proficiency in identification of potential non-compliance. Adequate knowledge on requirements for renewal and extension of certificates to ensure continued validity of survey items and equipment.</p>

**Competence (iii): Maintain safety and security of the vessel, crew and passengers and the operational condition of life-saving, fire-fighting and other safety systems**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Life-saving appliance regulations</u></b></p>	

<p>A thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea).</p> <p><b><u>Fire and abandon ship drills</u></b> Organization of fire and abandon ship drills.</p> <p><b><u>Maintenance of safety systems</u></b> Maintenance of operational conditions of life-saving, fire-fighting and other safety systems.</p> <p><b><u>Protection of persons</u></b> Actions to be taken to protect and safeguard all persons on board in emergencies.</p> <p><b><u>Emergency Actions</u></b> Actions to limit damage and save the ship following fire, explosion, collision or grounding.</p>	<p>Adequate knowledge on the function, use and procedures for maintaining in operational state of the life-saving appliances, fire-fighting appliances and other safety systems.</p> <p>Proficiency in procedures for handling emergency to save the ship and persons on board following fire, explosion, collision or grounding.</p>
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**Competence (iv): Develop emergency and damage control plans and handle emergency situations**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Ship construction and damage control</u></b> Shipbuilding materials. Watertight integrity of hull and compartments. Damage control arrangement.</p> <p><b><u>Fire prevention, detection and extinction</u></b> i. Fire prevention, detection, extinction. Principles of operation, application and maintenance of fire extinguishers, respirators, safety lamps. General requirements of fire pumping systems. Fixed fire detection and extinguishing arrangements for accommodation, cargo and machinery spaces.</p> <p><b><u>Life-saving appliances</u></b> Function and use of life-saving appliances.</p>	<p>Proficiency in plans for emergency situations and the emergency procedures.</p> <p>Proficiency in practices and requirements for maintaining fire-fighting appliances to operational conditions.</p> <p>Proficiency in practices and requirements for maintaining life-saving appliances to operational conditions.</p>

**Competence (v): Organize and manage the crew**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Personal management, organization</u></b> A knowledge of personnel management and organization on board ships.</p>	<p>Adequate personnel management concept for managing crew to execute duties and achieve performance in accordance with the competency standard.</p>

<p><b><u>International maritime conventions</u></b> A knowledge of international maritime conventions and recommendations, and related national legislation.</p>	<p>Adequate knowledge on international maritime conventions.</p>
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#### 4.5 ENGINEERING KNOWLEDGE (2)

### Function 1: Marine engineering at management level

#### Competence (i): Start up and shut down main propulsion and auxiliary machinery including associated systems

Content of examination	Criteria for satisfactory examination
<p><b><u>Fuels and lubricants</u></b> Physical and chemical properties of fuel oils and lubricating oils; general requirements concerning fuel oil and lubricating oil systems.</p>	<p>Adequate knowledge on types, specifications, properties, usage, preparation and treatment of fuel and lubricating oils. Understanding the methods of making available fuels and lubricants.</p>

#### Competence (ii): Operate, monitor and evaluate engine performance and capacity

Content of examination	Criteria for satisfactory examination
<p><b><u>Operation and maintenance of compression ignition engines</u></b></p> <p>i. Working principles and constructional details of compression ignition engines, turbo-chargers, running gear, chains.</p> <p>ii. Safe and efficient operation and maintenance of compression ignition engines. The determination, recognition and rectification of irregularity in the performance of diesel machinery. Indicator cards.</p>	<p>Adequate knowledge on the design features, constructional details, installation requirements and maintenance of compression ignition engines.</p> <p>Adequate knowledge on operating the engine to achieve performance level to meet the operational requirements and in accordance with technical specifications. Proficiency on the methods of measuring load capacity of engines in accordance with technical specifications.</p>
<p>iii. Fuel injection system. Reversing mechanism. Starting system. Gearing, clutches.</p> <p><b><u>Auxiliary Power Plant</u></b></p>	<p>Adequate knowledge on operating and maintaining ancillary equipment to achieve performance level to meet the operational requirements and in accordance with technical specifications.</p> <p>Adequate knowledge on operating and</p>

<ul style="list-style-type: none"> <li>i. Safe and efficient operation of oil fired and exhaust gas boilers and their associated equipment.</li> <li>ii. Chemical treatment of boiler water and the prevention of contamination.</li> <li>iii. General requirements of auxiliary diesel engines and boilers and auxiliary steam and gas turbines.</li> <li>iv. Principles of operation of integrated power systems.</li> </ul>	<p>maintaining ancillary equipment to achieve performance level to meet the operational requirements and in accordance with technical specifications.</p>
<p><b><u>Marine gas turbines</u></b> Operation and maintenance of marine gas turbines.</p>	<p>Proficiency in operational and maintenance requirements of marine gas turbines.</p>

**Function 2: Electrical, electronic and control engineering at the management level**

**Competence : Operate electrical and electronic control equipment**

<b>Content of examination</b>	<b>Criteria of satisfactory examination</b>
<p><b><u>Automation, instrumentation and control systems</u></b></p> <ul style="list-style-type: none"> <li>i. Main propulsive machinery control systems, automation and instrumentation.</li> <li>ii. Bridge control.</li> </ul>	<p>Adequate knowledge on instrumentation and proficiency in operation of control equipment and systems to the designed performance level.</p>

**Function 3: Maintenance and repair at the management level**

**Competence : Organize safe maintenance and repair procedures**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Marine engineering practice</u></b></p> <ul style="list-style-type: none"> <li>i. Principles of preventive, corrective and condition monitoring maintenance</li> </ul>	<p>Proficiency in planning and procedures to carry out maintenance activities in</p>

<p>strategy and repair technology for marine engine and machinery.</p> <p>ii. Common recurrent failures and causes on marine engine.</p>	<p>accordance with technical, legislative, safety and procedural specifications.</p>
<p><b><u>Safe maintenance and repair procedures</u></b></p> <p>Methods of dealing with wear and tear of engines. Alignment of machinery components. Correction of defects. Temporary and permanent repairs in the event of breakdown. Overhauling of machinery. Safe working practice.</p>	<p>Adequate knowledge on appropriate plans, specifications, materials and equipment to be made available for maintenance and repair. Understand action taken leading to the restoration of plant by the most suitable method.</p>

#### 4.6 ORAL EXAMINATION

The oral examination will determine if the candidate has gained sufficient knowledge and skills to fulfil the duties of a Second Engineer Officer. Questions will be taken selectively through the range of topics detailed in the Engineering Knowledge (1) and (2) syllabuses.

The examiner may also ask questions on items contained in other syllabuses to the extent necessary to test the candidate's knowledge in the operational and safety aspects relevant to the Second Engineer Officer's duties.

## **PART III**

### **CLASS 1 CERTIFICATE**

#### 4.7 **ENGINEERING THEORY I (HEAT ENGINES AND APPLIED MECHANICS)**

**Function:** Marine engineering at the management level

**Competence:** Plan and schedule operations

#### **Criteria for satisfactory examination:**

- i. Understanding the basic concepts of thermodynamics and its application to design and engineering processes. Understanding the design parameters on thermodynamics and heat transmission for power installation to suit the planning and preparation of operations.
- ii. Adequate knowledge on statics, mechanics of solids, kinematics, kinetics, fluid mechanics and its applications to design engineering components and machines and engineering processes. Understanding the design parameters on mechanics and hydromechanics for power installation to suit the planning and preparation of operations.

##### 4.7.1 **Heat Engines**

**Heat.** Temperature and its measurement. Absolute temperature. Specific heat. Problems involving change of phase. Linear, superficial and volumetric expansion due to temperature changes. Coefficients and the relationship between them.

**Basic Thermodynamic Principles.** The First Law of Thermodynamics. Flow and non-flow process.

**Heat Transfer.** Qualitative treatment of heat transfer by conduction, convection and radiation. Laws of conduction and thermal conductance and their application to problems.

**Gases.** Boyle's and Charles' Laws for perfect gases. Characteristic equation. Constant 'R' and its use in simple problems. Isothermal, adiabatic and polytrophic processes. Relationships between pressure, temperature and volume. Specific heat  $C_p$  and  $C_v$  and the relationship between them.

**Ideal Gas Cycles.** Constant volume cycle. Diesel cycle. Air standard efficiency.

**I.C. Engines.** Elementary principles and cycles of operation. Actual indicator diagrams. Mean effective pressure. Work done, power developed, indicated and brake thermal efficiencies, mechanical efficiency, overall efficiency. Fuel consumption. Heat balance.

**Air Compressors.** Elementary principles and cycles of operation. Calculation of work done. Indicator diagrams.

**Combustion.** Solid and liquid fuels. Calorific value. Chemical equations for complete combustion. Theoretical minimum air required. Excess air.

**Refrigeration.** Vapour-compression cycle. Refrigerating effect. Cooling load. Use of tables of properties of refrigerants. Coefficient of performance.

#### 4.7.2 Applied Mechanics

**Statics.** Force as a vector. Triangle and polygon of forces. Moment of a force. Moments of areas and volumes. Centroids and centre of gravity (limited to geometrical shapes). Conditions of equilibrium of solids. Necessary force applied parallel to an inclined plane to pull body up or down the plane or to hold it stationary (including effect of friction). Work done at uniform speed up the plane.

**Friction.** Coefficient of friction. Friction angle. Energy and power lost due to friction in simple bearings.

**Kinematics.** Linear motion. Graphs and equation for displacement, speed, velocity and uniform acceleration. Velocity as a vector. Relative velocities in one plane.

**Dynamics.** Work and power. Energy. Potential energy. Kinetic energy of translation. Newton's laws of motion. Conservation of momentum. Centrifugal force and its application to conical pendulum, unloaded governor, curved tracks and machine parts. Stress in thin rim due to centrifugal action.

**Machines.** Simple lifting machine. Velocity ratio, mechanical advantage and efficiency of machines, e.g. wheel and axle, rope pulley blocks, screw jacks, worm-driven chain blocks. Reduction gearing.

**Stress and Strain.** Direct stress and strain. Modulus of elasticity. Shear stress and strain. Modulus of rigidity. Factor of safety.

**Beams.** Shearing force and bending moment diagrams for cantilevers and simply supported beams. Stress due to bending.

**Torsion.** Strength and stiffness of solid and hollow shafts. Stress due to torsion. Power transmitted by shafts and coupling bolts.

**Thin Shells.** Circumferential and longitudinal stress in thin cylindrical shell subject to internal pressure.

**Hydrostatics.** Equilibrium of floating bodies. Variation of fluid pressure with depth. Total force due to liquid pressure on immersed plane surfaces horizontal or vertical. Centre of pressure on a rectangular vertical plane surface or triangular plane surface, both with one edge parallel to the surface of the liquid.

**Hydraulics.** Full bore flow of liquid through pipes under constant head. Flow through orifice. Coefficient of velocity, contraction of area and discharge.

#### 4.8 ENGINEERING THEORY II (ELECTROTECHNOLOGY AND NAVAL ARCHITECTURE)

**Function 1: Electrical, electronic and control engineering at the management level**

**Competence: Operate electrical and electronic control equipment**

**Criteria for satisfactory examination :**

Understanding the basic electrical and electronic principles for the design, operation, maintenance and control of electrical machines and power electronic systems.

##### 4.8.1 Electrotechnology

**The Electric Circuit.** Units - ampere, ohm, volt. Difference between electromotive force and potential difference. Ohm's Law. Kirchoff's Laws. Simple series and parallel circuits involving e.m.f., current, resistances. Power and energy. Specific resistance. Temperature coefficient of resistance. Conductor resistance, effect of length, area, material and temperature, d.c. 2-wire distribution system. Types of insulation.

**Electrolytic action and secondary cells.** Uses of electrolysis. Secondary cells (acid or alkaline). Construction and principles. Maintenance, charging. Watt-hour and ampere-hour efficiencies.

**Electromagnetism.** Electromagnetic induction. Simple magnetic circuit. Simple magnetic theory. Faraday's and Lenz's Laws.

**Electronics.** Semi-conductors. Junction diodes, junction transistors and their operating characteristics. Simple transistor circuits. Photo-electric effect.

**Alternating Current Theory.** Simple continuous periodic waves: frequency, amplitude, instantaneous, maximum, r.m.s. and average values, form factor. Phase difference. The inductor. Inductance and its effect on the circuit. The capacitor. Capacitance and its effect on the circuit. Simple series and parallel circuits. Relationship between resistance, reactance and impedance. Simple treatment of power factor. Power in single phase a.c. circuit.

**Instruments.** Qualitative treatment of the principles and functions of a.c. and d.c. indicating instruments and relays. Uses of shunts and series resistances to increase the range. Rectifiers and transducers.

**Distribution Systems.** Systems and a.c. and d.c. shipboard installations. Protective devices such as fuses, circuit breakers, earth lamps. Cable material and installation. Connection of shore supply.

**D.C. Machines.** The principles, constructional details and protection of d.c. series, shunt and compound wound motors and generators. Self-excitation, e.m.f. and load voltage equations. Load characteristics. Methods of voltage control, paralleling



procedures and load sharing for generators. Need for and types of starter. Speed and torque equations. Speed control of d.c. motors.

**A.C. machines.** Simple explanation of the principles, constructional details and protection of alternators, squirrel-cage induction motors and single phase transformers, parallel running and synchronizing theory.

**Function 2: (a) Marine engineering at the management level  
(b) Controlling the operation of ship and care for persons on board at the management level**

**Competence: (a) Plan and schedule operations  
(b) Control trim, stability and stress**

**Criteria for satisfactory examination :**

- i. Adequate knowledge on the principles of Naval Architecture to solve problems concerning stability, power estimation and ship's strength. Understanding ship construction.
- ii. Understanding the criteria for maintaining stability and stress conditions within safety limits at all times.

**4.8.2 Naval Architecture**

**General.** Displacement. Wetted surface. Block, mid-section, prismatic and water-plane area coefficient. Tonne per centimetre immersion. Application of Simpson's Rules to areas, moment of area, volumes and moment of volumes.

**Draught and buoyancy.** Effect of bilging midship compartment.

**Transverse Stability.** Centre of gravity. Centre of buoyancy. Metacentre. Shift of centre of gravity due to addition or removal of mass. Free surface effect.

**Resistance and Propulsion.** Frictional and residual resistances. Admiralty and fuel coefficients. Relation between speed of vessel and fuel consumption with constant displacement, assuming that resistance varies as (speed)<sup>n</sup>. Elementary treatment of propeller and simple problems on pitch, pitch ratio, apparent slip, real slip, wake, thrust and power.

**Structural Strength.** Simple problems on strength of structural members to resist liquid pressure. Loading due to head of liquid.

**Ship Construction.** Common terms used in the measurement of steel ships, e.g. length between perpendiculars, breadth overall, moulded depth, draught and freeboard. Definitions of shipbuilding terms in general use. Descriptions and sketches of structural members in ordinary type of steel ships. Watertight doors. Hatches. Rudders. Bow thrusters. Propellers. Watertight bulkheads. Double bottoms. Anchors and cables. Descriptive treatment of the effect of free surface of liquids on stability. Ventilation arrangements for holds and oil fuel tanks. Fore and aft peak tanks, double bottom and deep tank filling and pumping arrangements. Compartmental drainage. Levelling arrangements for damaged side compartments.

#### 4.9 ENGINEERING KNOWLEDGE (1)

The syllabus for this examination is the same as that for the Engineering Knowledge (1) examination of the Class 2 examination. However, the candidate will be expected to answer more in depth questions than the Class 2 examination, and from the perspective that would be expected of a candidate for assuming the duties of a Chief Engineer.

### Function 1: Marine engineering at the management level

#### Competence (i): Start up and shut down main propulsion and auxiliary machinery including associated systems

Content of examination	Criteria for satisfactory examination
<p><b><u>Ship power installation and refrigeration</u></b> Operating principles of ship power installations (diesel and gas turbine) and refrigeration.</p>	Adequate knowledge on the planning and preparation of operations to suit the design parameters of the power installation and to the requirements of the voyage.
<p><b><u>Fuels and lubricants</u></b> Physical and chemical properties of fuels and lubricants; general requirements for their storage, processing and safe handling on board ships.</p>	Adequate knowledge on types, specifications, properties, usage, preparation and treatment of fuel and lubricating oils. Understanding the methods of making available fuels and lubricants.
<p><b><u>Technology of materials</u></b> i. Properties and characteristics of metals, materials, liquids, gases and vapours used in machinery on board ships. ii. Manufacture methods, treatment, and processes used for marine machinery.</p>	Adequate knowledge on the technical specifications, and application of engineering materials and substances for shipboard use. Proficiency in the methodology used for production and material repair for marine machinery.

#### Competence (ii): Maintain safety of engine equipment, systems and services

Content of examination	Criteria for satisfactory examination
<p><b><u>Operation and maintenance of auxiliary machinery</u></b> i. Operation and maintenance of auxiliary machinery, e.g. generators, air compressors, heat exchangers, pumps, pumping systems, oily water separators. ii. Constructional details, principles involved and operation of steering gear, refrigeration machinery. iii. Principles involved, operation and</p>	Adequate knowledge on the arrangements needed for ensuring the safe operation and maintaining the condition of auxiliary machinery including control systems and machinery on deck to suit all modes of operation.

<p>construction of thrust blocks, shaft bearings, stern tubes, propellers, ship-side fittings.</p> <p><b><u>Control systems</u></b> Principles of operation, testing, operational fault rectification of automatic control and alarm systems.</p> <p><b><u>Cargo-handling equipment and deck machinery</u></b> Principles involved with the construction, operation and maintenance of cargo handling equipment and deck machinery.</p>	
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**Competence (iii): Manage fuel and ballast operations**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Fuel and ballast pumping systems</u></b> General requirements concerning fuel and ballast pumping systems with particular reference to prevention of marine pollution.</p>	<p>Adequate knowledge on fuel and ballast operations including planning, preparation, procedures, monitoring and safety precautions to meet operational requirements and prevent pollution of environment.</p>

**Competence (iv): Use internal communication systems**

<b>Content of examination</b>	<b>Criteria of satisfactory examination</b>
<p><b><u>Internal communication systems</u></b> Principles and use of all internal communication systems on board.</p>	<p>Adequate knowledge on the types, system details, function and use of all internal communication equipment or arrangement for effective transmission and reception of messages.</p>

**Function 2: Electrical, electronic and control engineering at the management level**

**Competence :** Test, detect faults and maintain and restore electrical, electronic and control equipment to operating condition

Content of examination	Criteria for satisfactory examination
<p><b><u>Electrical and electronic control equipment</u></b> Safe and efficient operation of electrical machines, systems and electronic control equipment including fault diagnostics.</p>	Proficiency in planning and procedures to carry out maintenance activities in accordance with technical, legislative, safety and procedural specification. Proficiency in identifying the effects of malfunctions of electrical and electronic control equipment on associated plant.

**Function 3: Maintenance and repair at the management level**

**Competence (i) :** Organize safe maintenance and repair procedures

Content of examination	Criteria for satisfactory examination
<p><b><u>Marine engineering practice</u></b> Maintenance of operating records, the planning of maintenance schedules and the procurement of stores and spare parts.</p>	Proficiency in planning and procedures to carry out maintenance activities in accordance with technical, legislative, safety and procedural specifications.
<p><b><u>Maintenance and repair procedures</u></b> Organizing and carrying out safe maintenance and repair procedures.</p>	Adequate knowledge on appropriate plans, for maintenance and repair. Understanding action taken leading to the restoration of plant by the most suitable method.

**Competence (ii):** Detect and identify the cause of machinery malfunctions and correct faults

Content of examination	Criteria for satisfactory examination
<p><b><u>Machinery malfunction</u></b> Detection of machinery malfunction, location of faults and action to prevent damage.</p>	Proficiency on the methods based on recommended practices and procedures for comparing actual operating conditions. Proficiency in the principles for taking action and decisions to deal with machinery malfunction in accordance with recommended operating specifications and limitation.

**Competence (iii):** Ensure safe working practices

Content of examination	Criteria for satisfactory examination
<p><b><u>Safe working practice</u></b> i. Safe working practices in machinery</p>	Adequate knowledge on working practices

<p>operation and maintenance.</p> <p>ii. Safe working practices to be observed for entry into confined or enclosed spaces.</p>	<p>with reference to legislative requirements, code of practice, permits to work and environmental concerns to ensure safety and health of those living and working on board ship.</p>
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**Function 4: Controlling the operation of ship and care for persons on board at the management level**

**Competence (i): Control trim, stability and stress**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Effects on trim and stability due to ship damage</u></b></p> <p>i. Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and counter measures to be taken.</p> <p>ii. Knowledge of IMO recommendations concerning ship stability.</p>	<p>Understanding the criteria for maintaining stability and stress conditions within safety limits at all times.</p>

**Competence (ii): Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea and protection of the marine environment**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Knowledge of relevant international maritime laws embodied in international agreements and conventions</u></b></p> <p>i. Certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and the period of their legal validity.</p> <p>ii. responsibilities under the relevant requirements of the International Convention on Load Lines, International Convention for the Safety of Life at Sea, International Convention for the Prevention of Pollution from ships and the International Safety Management (ISM) Code.</p> <p>iii. maritime declaration of health and the requirements of the International Health Regulations.</p> <p>iv. responsibilities under international instruments affecting the safety of the</p>	<p>Thorough understanding of the legal responsibilities at the management level and procedures for monitoring operations and maintenance in compliance with legislative requirements. Proficiency in identification of potential non-compliance. Adequate knowledge on requirements for renewal and extension of certificates to ensure continued validity of survey items and equipment.</p>

<p>v. ship, passengers, crew or cargo. methods and aids to prevent pollution of the environment by ships.</p> <p>vi. knowledge of national legislation for implementing international agreements and conventions.</p>	
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**Competence (iii): Maintain safety and security of the vessel, crew and passengers and the operational condition of life-saving , fire-fighting and other safety systems**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Life-saving appliance regulations</u></b> A thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea).</p> <p><b><u>Fire and abandon ship drills</u></b> Organization of fire and abandon ship drills.</p> <p><b><u>Maintenance of safety systems</u></b> Maintenance of operational conditions of life-saving, fire-fighting and other safety systems.</p> <p><b><u>Protection of persons</u></b> Actions to be taken to protect and safeguard all persons on board in emergencies.</p> <p><b><u>Emergency Actions</u></b> Actions to limit damage and save the ship following fire, explosion, collision or grounding.</p>	<p>Adequate knowledge on the function, use and procedures for maintaining in operational state of the life-saving appliances, fire-fighting appliances and other safety systems.</p> <p>Proficiency in procedures for handling emergency to save the ship and persons on board following fire, explosion, collision or grounding.</p>

**Competence (iv): Develop emergency and damage control plans and handle emergency situations**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<b><u>Ship construction and damage control</u></b>	

<p>Shipbuilding materials. Watertight integrity of hull and compartments. Damage control arrangement.</p> <p><b><u>Fire prevention, detection and extinction</u></b>  Fire prevention, detection, extinction. Principles of operation, application and maintenance of fire extinguishers, respirators, safety lamps. General requirements of fire pumping systems. Fixed fire detection and extinguishing arrangements for accommodation, cargo and machinery spaces.</p> <p><b><u>Life-saving appliances</u></b>  Function and use of life-saving appliances.</p>	<p>Proficiency in plans for emergency situations and the emergency procedures.</p> <p>Proficiency in practices and requirements for maintaining fire-fighting appliances to operational conditions.</p> <p>Proficiency in practices and requirements for maintaining life-saving appliances to operational conditions.</p>
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**Competence (v): Organize and manage the crew**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Personal management, organization</u></b>  A knowledge of personnel management and organization on board ships.</p> <p><b><u>International maritime conventions</u></b>  A knowledge of international maritime conventions and recommendations, and related national legislation.</p>	<p>Adequate personnel management concept for managing crew to execute duties and achieve performance in accordance with the competency standard.</p> <p>Adequate knowledge on international maritime conventions.</p>

**4.10 ENGINEERING KNOWLEDGE (2)**

The syllabus for this examination is the same as that for the Engineering Knowledge (2) examination of the Class 2 examination. However, the candidate will be expected to

answer more in depth questions than the Class 2 examination, and from the perspective that would be expected of a candidate for assuming the duties of a Chief Engineer.

**Function 1: Marine engineering at management level**

**Competence (i): Start up and shut down main propulsion and auxiliary machinery including associated systems**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Fuels and lubricants</u></b> Physical and chemical properties of fuel oils and lubricating oils; general requirements concerning fuel oil and lubricating oil systems.</p>	Adequate knowledge on types, specifications, properties, usage, preparation and treatment of fuel and lubricating oils. Understanding the methods of making available fuels and lubricants.

**Competence (ii): Operate, monitor and evaluate engine performance and capacity**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<p><b><u>Operation and maintenance of compression ignition engines</u></b></p> <p>i. Working principles and constructional details of compression ignition engines, turbo-chargers, running gear, chains.</p> <p>ii. Safe and efficient operation and maintenance of compression ignition engines. The determination, recognition and rectification of irregularity in the performance of diesel machinery. Indicator cards.</p> <p>iii. Fuel injection system. Reversing mechanism. Starting system. Gearing, clutches.</p> <p><b><u>Auxiliary Power Plant</u></b></p> <p>i. Safe and efficient operation of oil fired and exhaust gas boilers and their associated equipment.</p> <p>ii. Chemical treatment of boiler water and the prevention of contamination.</p> <p>iii. General requirements of auxiliary diesel engines and boilers and auxiliary steam and gas turbines.</p> <p>iv. Principles of operation of integrated</p>	<p>Adequate knowledge on the design features, constructional details, installation requirements and maintenance of compression ignition engines.</p> <p>Adequate knowledge on operating the engine to achieve performance level to meet the operational requirements and in accordance with technical specifications. Proficiency on the methods of measuring load capacity of engines in accordance with technical specifications.</p> <p>Adequate knowledge on operating and maintaining ancillary equipment to achieve performance level to meet the operational requirements and in accordance with technical specifications.</p> <p>Adequate knowledge on operating and maintaining ancillary equipment to achieve performance level to meet the operational requirements and in accordance with technical specifications</p>



power systems. <b><u>Marine gas turbines</u></b> Operation and maintenance of marine gas turbines.	Proficiency in operational and maintenance requirements of marine gas turbines.
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**Function 2: Electrical, electronic and control engineering at the management level**

**Competence : Operate electrical and electronic control equipment**

<b>Content of examination</b>	<b>Criteria of satisfactory examination</b>
<b><u>Automation, instrumentation and control systems</u></b> i. Main propulsive machinery control systems, automation and instrumentation. ii. Bridge control.	Adequate knowledge on instrumentation and proficiency in operation of control equipment and systems to the designed performance level.

**Function 3: Maintenance and repair at the management level**

**Competence : Organize safe maintenance and repair procedures**

<b>Content of examination</b>	<b>Criteria for satisfactory examination</b>
<b><u>Marine engineering practice</u></b> i. Principles of preventive, corrective and condition monitoring maintenance strategy and repair technology for marine engine and machinery. ii. Common recurrent failures and causes on marine engine.	Proficiency in planning and procedures to carry out maintenance activities in accordance with technical, legislative, safety and procedural specifications.
<b><u>Safe maintenance and repair procedures</u></b> Methods of dealing with wear and tear of engines. Alignment of machinery components. Correction of defects. Temporary and permanent repairs in the event of breakdown. Overhauling of machinery. Safe working practice.	Adequate knowledge on appropriate plans, specifications, materials and equipment to be made available for maintenance and repair. Understand action taken leading to the restoration of plant by the most suitable method.

**4.11 ORAL EXAMINATION**

The oral examination will determine if the candidate has gained sufficient knowledge and skills to fulfil the duties of a Chief Engineer Officer. Questions will be taken selectively through the range of topics detailed in the Engineering Knowledge (1) and (2) syllabuses.

The examiner may also ask questions on items contained in other syllabuses to the extent necessary to test the candidate's knowledge in the operational and safety aspects relevant to the Chief Engineer Officer's duties. Candidates should also be well acquainted with machinery and boiler casualties which may occur at sea and be able to state how these may be prevented and remedied.

**Appendix**

**Standard Form of Documents**

**FORM 1**

**SEA SERVICE TESTIMONIAL**

( Name and address of shipping company )

I certify that the following is a full and true statement of the sea service performed by  
M..... under my supervision in MV ..... O.N.....

Period of Service (Dates)		Rank of officer and actual seniority on watch	Description of Main Machinery	Nature of duties (For appropriate description see below)
From	To			

During the whole period stated above this engineer officer,

- (a) was granted no leave of absence
- (b) was granted      days of leave whilst still on crew agreement.

Report as to ability .....

Report as to conduct .....

Report as to sobriety .....

Signature of Chief Engineer Officer .....

(Engineer Superintendent .....  
( or

Signature of (Master or other representative of owners  
(  
(.....

I Day work

II Regular\* watch on auxiliary machinery

III Regular\* watch on main propulsion machinery:

- (a) in full charge,
- (b) in subsidiary capacity

IV Regular work practices in ships possessing:

- (a) centralized control room
- (b) full or partial automation
- (c) facility to operate machinery in the unattended mode for a significant proportion of each twenty four hour period.

\* Regular watch means eight hours in every twenty four hours.

This form should be used when the engineer officer concerned, or the Chief Engineer Officer, leaves a ship.

**FORM 2**

**REPORT OF SHIPBOARD SERVICE OR TRAINING FOR DANGEROUS  
CARGO ENDORSEMENT**

The report of the Master or Chief Engineer Officer should be headed by the full name, certificate number and discharge book number of the subject officer, and should include a statement along the lines of the specimens below, as appropriate.

**Report of service**

M ..... has served as .....(Rank) in  
MV/SS ..... between the following dates ..... and  
..... During this time the ship carried the following types of cargo:

I consider M ..... to be competent to carry out safely  
cargo handling duties on board an oil tanker.  
(to be signed by the Master; or by the Chief Engineer Officer and countersigned by the Master).

**Report of ship-board training as a supernumerary**

M ..... has served in a supernumerary capacity in  
MV/SS ..... between the following dates .....  
and ....., and during this time has undergone a course of 14 days ship-board  
training in cargo operations. The ship was carrying petroleum products.

I consider that M..... now has an overall appreciation of  
petroleum cargo operations.  
(to be signed by the Chief Engineer Officer, Chief Officer or Cargo Officer and countersigned by  
the Master).