



# **MEO CLASS 2**

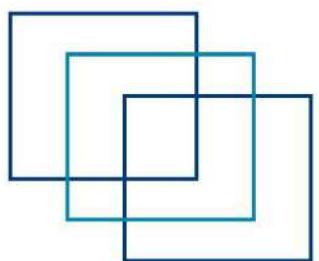
# **WRITTEN: SSEP**

**(SHIP SAFETY & ENVIRONMENTAL PROTECTION)**

## **FOR INDIAN COMPETENCY EXAM**



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## JAN-2022

Q1. (a) Describe the immediate action that the Engineer Officer of the watch should take in the event of the engine room bilge rising faster than can be contained by the bilge pump; Also mention your immediate action to stop the ingress of sea water completely into engine room bilges in a particular situation like inlet sea water pipe line of main sea water pump is ruptured and sea water filling up engine room bilges very rapidly and engine room pumping systems are not coping up at all  
(b) State the features provided in the engine room pumping systems to deal with the situation in the event of the engine room bilge rising faster than can be contained by the bilge pump.

**2022/JAN/Q1**

[\*\*Click Here to See the Answer\*\*](#)

Q2. (a) Describe with the aid of sketch the release arrangement for a machinery space fixed firefighting installation using CO2. State in your answer any special need for rapid delivery of the gas and the time permitted for discharge.

(b) Explain precaution to be taken prior release of CO2.  
(c) Explain the reason for securing the CO2 bottles, and what checks are carried out with respect to securing for smooth operation of the system.  
(d) During the weighment of CO2, if few bottles are found less than the original capacity. State the reasons for the same and checks / tests to be made prior refilling.  
(e) With reference to MSC1/ Circ.1318/Rev.1, high pressure cylinders (CO2 bottles) are subjected to an internal inspection and hydrostatic test. State the stipulated criteria for such hydrostatic test and periodic test interval of high-pressure cylinders (CO2 bottles)

**2020/NOV/Q1 2021/JUL/Q3 2021/OCT/Q2 2022/JAN/Q2**

[\*\*Click Here to See the Answer\*\*](#)

Q3. With reference to MEPC 76, the combined technical and operational approaches to improve energy efficiency of ships and GHG reduction measures, explain the below mentioned new requirements.

(a) Energy Efficiency Existing Ship Index (EEXI)



(b) Carbon Intensity Indicator (CII) and CII rating.

**2022/JAN/Q3**

[\*\*Click Here to See the Answer\*\*](#)

Q4. With reference to a periodically unattended machinery space of a dry cargo vessel discuss the requirements for.

A. Protection against flooding.

B. Control of propulsion machinery from the navigating bridge.

**2020/FEB/Q5**

**2021/JAN/Q8**

**2021/FEB/Q8**

**2021/MAR/Q1**

**2021/NOV/Q5**

**2022/JAN/Q4**

[\*\*Click Here to See the Answer\*\*](#)

Q5. India, one of the world's five major ship recycling countries, has acceded to the IMO Hong Kong Convention, the treaty that will set global standards for safe and environmentally sound ship recycling. Discuss the key features of "The Hong Kong International convention for the safe and environmentally sound Recycling of Ships".

**2021/FEB/Q2**

**2021/NOV/Q8**

**2022/JAN/Q5**

[\*\*Click Here to See the Answer\*\*](#)

Q6. With reference to SOLAS Ch-XII (Additional safety measures for bulk carriers);

A. Damage stability requirements for bulk carriers;

B. Structural requirements for bulk carriers;

C. Water ingress alarms.

**2020/NOV/Q8**

**2021/FEB/Q9**

**2021/JUL/Q9**

**2021/JUL/Q5**

**2021/SEP/Q6**

**2021/OCT/Q8**

**2021/DEC/Q5**

**2022/JAN/Q6**

[\*\*Click Here to See the Answer\*\*](#)

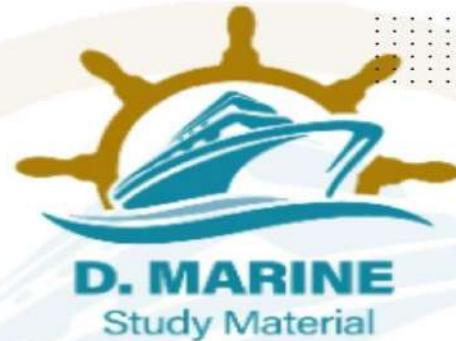
Q7. With reference to the SOLAS 1974 Convention as amended, which outlines mandatory requirements for steering gear tests and drills?

A. Describe the test procedure to be carried out within the, 12 hours before departure on a sea-voyage;

B. Describe the emergency steering drills that must take place at least once every, 3 months;



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C. State how often the test in (A) and the drill in (B) should be carried out for ships which regularly engage on voyages of short duration.

**2020/NOV/Q6 2021/JUL/Q8 2021/OCT/Q5 2022/JAN/Q7**

[\*\*Click Here to See the Answer\*\*](#)

Q8. Describe the background, relevance, and key features of the International convention on civil liability for Bunker Oil Pollution Damage, 2001.

**2021/MAR/Q5 2021/NOV/Q4 2022/JAN/Q8**

[\*\*Click Here to See the Answer\*\*](#)

Q9. With reference to STCW Convention:

- A. Explain the principles underlying the STCW Convention;
- B. Explain how as a senior engineer you would implement the regulation for controlling and monitoring of minimum hours of rest for watch keepers;
- C. What type of specific shipboard familiarization is required to be given to a seafarer new to a particular type of vessel?

**2020/NOV/Q5 2021/JAN/Q7 2021/FEB/Q1 2021/JUL/Q1**

**2022/JAN/Q9**

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**FEB-2022**

Q1. With regard to a ship operation in the U.M.S mode having an automatic fire detection system for the machinery space, answer following:

- (a) Sketch a line diagram of the system showing how shipboard mains supply is fed through battery charger and emergency battery to fire detector heads and fire zone indicator panel and alarms.
- (b) In the event of a mains supply failure state the length of time for which the emergency battery should be capable of operating the system.
- (c) Sketch and describe a line termination or other method of monitoring the integrity of the system.

**2022/FEB/Q1**

[\*\*Click Here to See the Answer\*\*](#)



Q2. With reference to free fall lifeboat of an ocean-going ships:

- A. Periodical maintenance, tests and checks on lifeboat and releasing gear.
- B. Secondary means of lowering.
- C. Lifeboat Drills.

2020/OCT/Q8	2020/DEC/Q2	2021/APR/Q4	2021/APR/Q2
2021/JUL/Q2	2021/OCT/Q4	2021/DEC/Q3	2022/FEB/Q2

[Click Here to See the Answer](#)

Q3. With reference to MEPC 76, the combined technical and operational approaches to improve energy efficiency of ships and GHG reduction measures, explain the below mentioned new requirements.

- (a) Energy Efficiency Existing Ship Index (EEXI)
- (b) Carbon Intensity Indicator (CII) and CII rating.

2022/JAN/Q3	2022/FEB/Q3
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[Click Here to See the Answer](#)

Q4. Prepare a proposal for safe manning requirements for a ship of your choice taking into account the IMO guidelines on the issue, also considering frequent port calls, rest hour management and high-risk areas.

2020/MAR/Q7	2020/OCT/Q4	2020/DEC/Q4	2021/APR/Q4
2021/JUL/Q5	2021/SEP/Q1	2021/OCT/Q1	2022/FEB/Q4

[Click Here to See the Answer](#)

Q5. (a) With regard to MARPOL Annex I, state the discharge criteria (in outside special area) of processed bilge water from machinery spaces; Specify the additional discharge criteria requirement that are applicable in Special Areas as defined in MARPOL 73/78

(b) With regard to MARPOL Annex IV, what is the applicability and Sewage efficient discharge criteria

(c) With regard to MARPOL Annex VI, explain NOx emission limits / requirements of Tier I, Tier II and Tier III

2022/FEB/Q5
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[Click Here to See the Answer](#)

Q6. With regard to ballast water Management Convention, Explain following:

- (a) Ballast water exchange standard



- (b) Ballast water Performance standard
- (c) Treatment methods for ballast water
- (d) Approval methods for treatment system using active and non-active substances
- (e) What are the marine pollution problems related to port development such as ballast water, dredging and spills from ships.

**2021/OCT/Q7 2022/FEB/Q6**

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Q7. (a) Briefly explain Intrinsically safe circuit and explosion proof circuit.

- (b) What is EXD and EXI ? Where they are used onboard ship.
- (c) What all Intrinsically safe equipment used on Deck. Explain how they are intrinsically safe.
- (d) What is Zener Barrier? How flame and explosion contained inside the enclosure.

**2022/FEB/Q7**

[\*\*Click Here to See the Answer\*\*](#)

Q8. With reference to activated fin stabilizers give reasons why:

- (a) For large vessels such units are preferred to passive tanks; (6)
- (b) These units are preferred for passenger and fast cargo ships; (6)
- (c) Partial rather than maximum damping of ship movement in heavy weather is advisable for reasons other than overstressing of fin stocks and activating gear. (8)

**2020/FEB/Q6 2021/JAN/Q9 2021/NOV/Q6 2022/FEB/Q8**

[\*\*Click Here to See the Answer\*\*](#)

Q9. (a) Discuss International Maritime Organization (IMO) Data Collection System (DCS) for fuel oil consumption of ships covering following:

- (i) Applicability of ship size (GT)
- (ii) When the requirement of Data Collection System (DCS) entered into force;
- (iii) What data required to collect ship;
- (iv) The aggregated data is submitted to who and when (frequency) to submit;
- (v) Relevance of SEEMP pertaining to Data Collection System (DCS)



(b) List out the main differences between the EU Monitoring, Reporting and Verification (MRV) regulation and International Maritime Organization (IMO) Data Collection System (DCS).

**2021/JAN/Q5** **2021/MAR/Q8** **2022/FEB/Q9**

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## MARCH-2022

Q1. Explain the advantages and disadvantages of an inert gas smothering system from flue compared to an inert gas generator. Explain why inert gas generator is more advantageous. Why it is unsuitable for use in machinery spaces. (20)

**2020/FEB/Q2** **2020/MAR/Q8** **2022/MAR/Q1**

[Click Here to See the Answer](#)

Q2. With reference to STCW Convention:

- A. Explain the principles underlying the STCW Convention;
- B. Explain how as a senior engineer you would implement the regulation for controlling and monitoring of minimum hours of rest for watch keepers;
- C. What type of specific shipboard familiarization is required to be given to a seafarer new to a particular type of vessel?

**2021/JAN/Q7** **2021/FEB/Q1** **2021/JUL/Q1** **2022/JAN/Q9**

**2022/MAR/Q2**

[Click Here to See the Answer](#)

Q3. Explain in detail a fixed gas fire extinguisher system, indicating the quantity of the fire-extinguishing medium, the controls required for the system, installation requirements and training required to bring the system to be readily operated.

**2020/FEB/Q1** **2020/DEC/Q8** **2021/FEB/Q6** **2021/SEP/Q7**

**2021/NOV/Q1** **2022/MAR/Q3**

[Click Here to See the Answer](#)

Q4. With respect to the hazardous areas of tankers,

- A. Explain the term Intrinsic Safety (Ex i) and flameproof (Ex d) for electrical equipment;



B. State the type of electrical equipment that would be protected in this way.  
C. List likely defects of flameproof equipment.

**2022/MAR/Q4**

[\*\*Click Here to See the Answer\*\*](#)

Q5. Describe the background, relevance, and key features of the International convention on civil liability for Bunker Oil Pollution Damage, 2001.

**2021/MAR/Q5** **2021/NOV/Q4** **2022/JAN/Q8** **2022/MAR/Q5**

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Q6. With reference to effluent discharge from the onboard Scrubber:

- (a). What are the alternative arrangements, in case local authorities do not permit this?
- (b). What is the difference between open-loop and closed loop Scrubbers, how is the water treatment carried out?
- (c) What are the parameters to be checked, with respect to water quality, prior allowing for discharge of effluent overboard?

**2022/MAR/Q6**

[\*\*Click Here to See the Answer\*\*](#)

Q7. Define briefly the construction details peculiar to each of the following types of closure that enables their primary function to be fully realized:

- A. Water tight doors;
- B. Fire proof doors;
- C. Gas tight doors,
- D. With reference to above doors, State why
  - (A) can perform function of
  - (B) as well as of
  - (C), whereas function of
  - (B) and (C) are restricted solely to their primary function.

**2022/MAR/Q7**

[\*\*Click Here to See the Answer\*\*](#)

Q8. With respect to Bunkering operation onboard:

- A) As Second Engineer of a new ship, prepare standing orders for all future bunkering operations onboard.



B. State why it is very important to obtain a representative sample of heavy fuel oil bunkered and State how a representative sample is obtained

**2022/MAR/Q8**

[\*\*Click Here to See the Answer\*\*](#)

Q9. Write reference to gravity life boat davits:

- (a) Explain load testing of life boat davit
- (b) state the purpose of the following:
  - (i). Centrifugal brake,
  - (ii). Dead man's handle.
  - (iii). Davit limit switch.

**2020/FEB/Q9 2022/MAR/Q9**

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## APRIL-2022

Q1. With reference to independent emergency fire pumps:

- (a) State three areas where they are commonly installed and give reasons why?
- (b) (i) Describe with the aid of a sketch an air pump or primer used to initiate suction when the fire pump is situated above sea water level;  
(ii) state the suction lift which would be expected from a single stage pump system?
- (c) State how the capacity of the fire pump should be tested.
- (d) State how it can be ensured that the pump is kept in good working order.
- (e) State what precaution must be taken in sub-zero temperatures.

**2022/APR/Q1**

[\*\*Click Here to See the Answer\*\*](#)

Q2. With reference to free fall lifeboat of an ocean-going ship:

- A. Periodical maintenance, tests and checks on lifeboat and releasing gear.
- B. Secondary means of lowering.
- C. Lifeboat Drills.

**2020/OCT/Q8 2020/DEC/Q2 2021/APR/Q4 2021/APR/Q2**



**2021/JUL/Q2** **2021/OCT/Q4** **2021/DEC/Q3** **2022/FEB/Q2**

**2022/APR/Q2**

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Q3. The fire protection provided for the propulsion motor and generator of a diesel electric drive vessel is usually one of the following methods:

- a. Fixed foam extinguisher; b. Fixed CO<sub>2</sub> system;
- c. Steam smothering system; d. Dry Chemical Powder.

Briefly state in a comparative analysis, how each one of these methods has some disadvantages when used with propulsion system as stated above.

**2022/APR/Q3**

[\*\*Click Here to See the Answer\*\*](#)

Q4. Prepare a proposal for safe manning requirements for a ship of your choice taking into account the IMO guidelines on the issue, also considering frequent port calls, rest hour management and high-risk areas.

**2020/MAR/Q7** **2020/OCT/Q4** **2020/DEC/Q4** **2021/APR/Q4**

**2021/JUL/Q5** **2021/SEP/Q1** **2021/OCT/Q1** **2022/FEB/Q4**

**2022/APR/Q4**

[\*\*Click Here to See the Answer\*\*](#)

Q5. Sketch and describe an arrangement for automatic connection of emergency batteries upon loss of main power, include in your answer:

- (a) Means of obtaining d.c. charging supply from a.c. mains;
- (b) A method of maintaining charge on lead acid batteries;
- (c) The arrangement to check that batteries operate at loss of main power
- (d) The length of time for which emergency batteries of passenger and cargo ships must provide power.

**2022/APR/Q5**

[\*\*Click Here to See the Answer\*\*](#)

Q6. With respect to the hazardous areas of tankers,

- A. Explain the term flameproof (Ex d) for electrical equipment;
- B. State the type of electrical equipment that would be protected in this way.
- C. List likely defects of flameproof equipment.



**2020/DEC/Q6** **2021/FEB/Q5** **2021/APR/Q7** **2021/APR/Q6**

**2021/JUL/Q9** **2022/APR/Q6**

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Q7. Which legislation is framed at preventing the emission of black smoke, sets the limits on the length of time of such emission?

- A. Discuss the reasons for setting time limits rather than imposing a complete ban on emission
- B. State why different times are quoted, giving examples.
- C. State the likely constituents of black smoke from the combustion of residual fuel in a boiler.
- D. List the contaminants likely to be found in the clear exhaust from a diesel driven alternate burning gas.

**2022/APR/Q7**

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Q8. Explain in detail a fixed gas fire extinguisher system, indicating the quantity of the fire-extinguishing medium, the controls required for the system, installation requirements and training required to bring the system to be readily operated.

**2020/FEB/Q1** **2020/DEC/Q8** **2021/FEB/Q6** **2021/SEP/Q7**

**2021/NOV/Q1** **2022/MAR/Q3** **2022/APR/Q8**

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Q9. With reference to chemical tankers:

- A. Sketch a suitable cargo pumping and stripping system, labelling the component parts and indicating the direction of fluid flow;
- B. State the requirements of the regulations involved to reduce pollution of the sea by chemical tanker cargoes.

[\*\*Click Here to See the Answer\*\*](#)

## **JUNE-2022**

Q1. Describe the background, relevance, and key features of the International convention on civil liability for Bunker Oil Pollution Damage, 2001.



**2021/MAR/Q5** **2021/NOV/Q4** **2022/JAN/Q8** **2022/MAR/Q5**  
**2022/JUN/Q1**

[Click Here to See the Answer](#)

Q2. A. A hydraulically operated ballast tank valve situated in the duct keel has failed to close. State as Second Engineer your procedure for directing safe entry by engine room staff to the duct keel to ascertain the cause and possibility to carry out a repair.

B. State if any procedure is to be followed before making an entry, and the relevant IMO code under which such procedures are required

**2021/AUG/Q1** **2022/JUN/Q2**

[Click Here to See the Answer](#)

Q3. A vessel is due for International Oil Pollution Prevention Certificate renewal survey and company instructed to offer this vessel for survey at next port of call.

A. As a 2nd Engineer officer of above mentioned vessel, what all checks you carry out and how you prepare for the IOPP renewal survey.

B. What records, procedures, certificates etc., you will keep ready for attending surveyor verification.

**2021/JUL/Q1** **2021/AUG/Q2** **2021/SEP/Q2** **2022/JUN/Q3**

[Click Here to See the Answer](#)

Q4. With reference to automatic sprinkler systems for fire fighting purpose:

(a) Explain, with the aid of a Heat Release versus Time diagram, the difference between fire control and fire suppression;

(b) State the limitations of using glass bulbs to activate sprinkler heads and suggest with reasons, an alternative mechanism.

**2021/SEP/Q5** **2022/JUN/Q4**

[Click Here to See the Answer](#)

Q5. With reference to MEPC 76, the combined technical and operational approaches to improve energy efficiency of ships and GHG reduction measures, explain the below mentioned new requirements.

(a) Energy Efficiency Existing Ship Index (EEXI)

(b) Carbon Intensity Indicator (CII) and CII rating.



**2022/JAN/Q3** **2022/FEB/Q3** **2022/JUN/Q5**

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Q6. With reference to structural fire protection in passenger ship accommodation spaces:

- (a) Define the meaning of class A bulkheads, stating requirements;
- (b) Discuss the design of ventilation systems to prevent the spread of smoke and fire;
- (c) Explain how the integrity of the bulkhead is retained with respect to ventilation trunkings, where A class bulkheads have to be penetrated.

**2021/AUG/Q6** **2021/NOV/Q9** **2021/DEC/Q9** **2022/JUN/Q6**

[\*\*Click Here to See the Answer\*\*](#)

Q7. A. (i) discuss the various hazards and problems which are associated with electric cable insulation in the event of fire;

(ii) Suggest remedies for these problems.

B. State how the spread of fire may be reduced by the method used for installing electric cables.

**2020/DEC/Q1** **2021/APR/Q1** **2021/AUG/Q7** **2022/JUN/Q7**

[\*\*Click Here to See the Answer\*\*](#)

Q8. With reference to a periodically unattended machinery space of a dry cargo vessel discuss the requirements for.

A. Protection against flooding.

B. Control of propulsion machinery from the navigating bridge.

**2020/FEB/Q5** **2021/JAN/Q8** **2021/FEB/Q8** **2021/MAR/Q1**

**2021/NOV/Q5** **2022/JAN/Q4** **2022/JUN/Q8**

[\*\*Click Here to See the Answer\*\*](#)

Q9. With reference to Annex V of MARPOL 73/78, concerned with the prevention of pollution of the sea by garbage from ships:

A. Define the following terms;

- (i) Garbage;
- (ii) Nearest land;
- (iii) Special areas:



B. State the regulations governing the disposal of garbage outside special areas.

**2020/NOV/Q2** **2022/JUN/Q9**

[Click Here to See the Answer](#)

## JULY-2022

Q1. A. (i) discuss the various hazards and problems which are associated with electric cable insulation in the event of fire;

(ii) Suggest remedies for these problems.

B. State how the spread of fire may be reduced by the method used for installing electric cables.

**2020/DEC/Q1** **2021/APR/Q1** **2021/AUG/Q7** **2022/JUN/Q7**

**2022/JUL/Q1**

[Click Here to See the Answer](#)

Q2. Write short notes on following:

(a) Role of Classification Society on ship who act as Recognized Organization.

(b) Enhanced survey program (ESP) and its applicability.

(c) Condition of Class (COC).

**2021/APR/Q8** **2022/JUL/Q2**

[Click Here to See the Answer](#)

Q3. With reference to SOLAS Ch-XII (Additional safety measures for bulk carriers);

A. Damage stability requirements for bulk carriers;

B. Structural requirements for bulk carriers;

C. Water ingress alarms.

**2020/NOV/Q8** **2021/FEB/Q9** **2021/JUL/Q9** **2021/JUL/Q5** **2021/SEP/Q6**

**2021/OCT/Q8** **2021/DEC/Q5** **2022/JAN/Q6** **2022/JUL/Q3**

[Click Here to See the Answer](#)

Q4. (a) Describe the operating mechanism for a watertight door, which has provision for remote closure from the bridge and local operation.



(b) State the source of power for closure of electrical and the source of power for alarm and indicator.

**2020/NOV/Q3 2021/OCT/Q3 2022/JULY/Q4**

[\*\*Click Here to See the Answer\*\*](#)

Q5. In engine rooms that are operated under UMS conditions describe with the aid of sketches how the following are monitored:

- A. The perforation of a high-pressure fuel pipe;
- B. The imminence or possibility of a scavenge fire;
- C. Condition that may be conducive to a crankcase explosion

**2021/JUL/Q4 2021/SEP/Q4 2021/DEC/Q4 2022/JUL/Q5**

[\*\*Click Here to See the Answer\*\*](#)

Q6. A. Explain the principles underlying the STCW Convention;  
B. Explain how as a senior engineer you would implement the regulation for controlling and monitoring of minimum hours of rest for watch keepers;  
C. What type of specific shipboard familiarization is required to be given to a seafarer new to a particular type of vessel?

**2020/NOV/Q5 2021/JAN/Q7 2021/FEB/Q1 2021/JUL/Q1**

**2022/JAN/Q9 2022/MAR/Q2 2022/JUL/Q6**

[\*\*Click Here to See the Answer\*\*](#)

Q7. Name various statutory Certificates and Documents to be carried on board Crude Oil Tankers giving a reference to the conventions and justify for their requirement. (20)

**2020/FEB/Q3 2022/JUL/Q7**

[\*\*Click Here to See the Answer\*\*](#)

Q8. Explain the principle of port State control and give in detail the verification the State control Officer may carry out with particular reference to the following:

- A. Emergency generator;
- B. Main switchboard;
- C. Lifeboat;
- D. Oily water separator;
- E. Navigational lighting.



**2020/FEB/Q7** **2021/NOV/Q7** **2022/JUL/Q8**

[Click Here to See the Answer](#)

Q9. A. State the instructions you as Second Engineer will give to watch keepers with respect to boiler uptake fire;  
B. State how the incidence of uptake fires may be minimized.  
C. State the reasons for blow-back from the furnace of an auxiliary boiler.  
D. State the standing instructions you might have received from your Chief Engineer With respect to the avoidance of boiler furnace blow-back.

**2020/DEC/Q9** **2021/MAR/Q2** **2021/APR/Q9** **2021/SEP/Q3**

**2021/DEC/Q8** **2022/JUL/Q9**

[Click Here to See the Answer](#)

## AUG-2022

Q1.a) Briefly describe the environmental impact of NOx & SOx and allowable limitations as per Annex VI of MARPOL in emission control areas and outside emission control areas. (10)

b) Briefly describe methods to control NOx emissions (10)

**2022/AUG/Q1**

[Click Here to See the Answer](#)

Q2. With reference to classification society's survey, explain the following

A. Why a Class certificate is issued to a newly built ship after satisfactory completion of survey and sea trials, what is the purpose of a Class certificate?  
B. Is it necessary to call a Class surveyor after repair or alteration to the ship's structure If so, why?  
C. Describe the requirement for initial and periodical survey respect to International Load Line.

**2022/AUG/Q2**

[Click Here to See the Answer](#)

Q3. A. Sketch and describe a vacuum sewage system; (7)

B. List the advantages of the system described in Q9(a). (7)

C. State why untreated sewage should not be allowed to stagnate.(6)



**2021/AUG/Q1** **2021/SEP/Q9** **2022/AUG/Q3**

[Click Here to See the Answer](#)

Q4. With reference to fresh water HI-FOG firefighting systems:

- a) sketch such a system (7)
- b) state how the system in (a) is activated (3)
- c) state, with a reason, a suitable location for the above system. (5)
- d) List the periodic maintenance to be carried out on the system (5)

**2022/AUG/Q4**

[Click Here to See the Answer](#)

Q5. What is understood by risk on board a ship? As a second engineer discuss various methods for

hazard identification and assessment of the risks available on board. (20)

**2022/AUG/Q5**

[Click Here to See the Answer](#)

Q6.a) Draw and Explain flammability diagram. (5)

b) What is critical dilution in flammability diagram? (5)

c) How does inert gas reduce flammability range (5)

d) Describe purging and gas freeing operation of cargo tank in Crude Oil Tanker. (5)

**2022/AUG/Q6**

[Click Here to See the Answer](#)

Q7. (a) Explain at least three features which assist in the starting of lifeboat engines in cold climate conditions. (5)

(b) Describe two devices that control the rate of fall of a lifeboat when launched from standard davits

(C) Describe the periodic maintenance carried out on lifeboat davit and who are authorized /allowed to carry out these routine jobs as per M.S Notice 1 of 2020. (10)

**2022/AUG/Q7**

[Click Here to See the Answer](#)



Q8. With respect to refrigeration gases used on-board vessels, answer the following:

- a). Explain Ozone Depleting Potential (ODP) and Global warming potential (GWP) of conventional refrigerant gases. (7)
- b). Name the alternate refrigerant gases available and being used on board.
- c). Explain the steps you will take to ensure that release of refrigerant gases from the plant is minimized during normal operation and during maintenance activities. (6)

**2022/AUG/Q8**

[\*\*Click Here to See the Answer\*\*](#)

Q9. With reference to "emergency preparedness", discuss

- (i) Search and rescue;
- (ii) Evacuation of critically injured personnel;
- (iii) Helicopter operation;
- (iv) Rescue from enclosed spaces;
- (v) Abandon ship

**2022/AUG/Q9**

[\*\*Click Here to See the Answer\*\*](#)

**SEP-2022**

Q1. a) What do you understand by the terms Convention, Protocol, Amendments? State in which order these will be adopted by the IMO? (10)  
b) What procedure is nowadays followed for putting the amendments into effect? (10)

**2020/OCT/Q7 | 2022/SEP/Q1**

[\*\*Click Here to See the Answer\*\*](#)

Q2. With reference to MLC answer the following;



- a) Briefly discuss DMLC Part I and Part II covering the welfare points for seafarers (10)
- b) Briefly discuss the grievance redressal mechanism for seafarers of Indian flagged vessel (10)

**2022/SEP/Q2**

[\*\*Click Here to See the Answer\*\*](#)

Q3. With regard to ballast water Management Convention, Explain following:

- (a) Ballast water exchange standard
- (b) Ballast water Performance standard
- (c) Treatment methods for ballast water
- (d) Approval methods for treatment system using active and non-active substances
- (e) What are the marine pollution problems related to port development such as ballast water, dredging and spills from ships.

**2021/OCT/Q7 2022/FEB/Q6 2022/SEP/Q3**

[\*\*Click Here to See the Answer\*\*](#)

Q4. With respect to MARPOL 73/78, Annex - II, Noxious liquid chemicals are divided into categories;

- A. State the number of categories, and what does each category signify.
- B. Give conditions under which they can be discharged outside special areas
- C. State the requirement of Procedures and Arrangements Manual, and what information is available.

**2022/SEP/Q4**

[\*\*Click Here to See the Answer\*\*](#)

Q5. With reference to additional safety measures for bulk carriers, discuss the following with reference to structure of ships

- a) Damage stability requirements for bulk carriers (7)
- B. Structural requirements for bulk carriers; (7)
- C. Water ingress alarms. (6)

**2020/NOV/Q8 2021/FEB/Q9 2021/JUL/Q9 2021/JUL/Q5 2021/SEP/Q6**

**2021/OCT/Q8 2021/DEC/Q5 2022/JAN/Q6 2022/JUL/Q3**

**2022/SEP/Q5**

[\*\*Click Here to See the Answer\*\*](#)



**Q6.** During loading of a petroleum tanker, the incoming cargo forces out from the tank its previous atmospheric contents (air-vapour-inert gas)

a) Explain: (10)

(i) The dangers of venting during the loading via open tank hatches

(ii) Why the pressure / vacuum valve is not used venting

b) Sketch and describe a patent high velocity vent and state why such device is used (10)

**2022/SEP/Q6**

[\*\*Click Here to See the Answer\*\*](#)

**Q7.** With reference to fire smothering agents explain as to why:

A. Effectiveness of foam is directly related to its degree of effervescence and surface tension? (5)

B. Low expansion foam is best suited for use against localized fire, whilst high expansion foam is most effective in major conflagrations? (5)

C. In the absence of foam appliances, water jets can be effectively used against oil fires? (5)

D. Explain how a mixture of foam making compound and sea water are converted into foam (5)

**2022/SEP/Q7**

[\*\*Click Here to See the Answer\*\*](#)

**Q8.** Which legislation is framed at preventing the emission of black smoke, sets the limits on the length of time of such emission?

A. Discuss the reasons for setting time limits rather than imposing a complete ban on emission

B. State why different times are quoted, giving examples.

C. State the likely constituents of black smoke from the combustion of residual fuel in a boiler.

D. List the contaminants likely to be found in the clear exhaust from a diesel driven alternate burning gas.

**2022/APR/Q7 | 2022/SEP/Q8**

[\*\*Click Here to See the Answer\*\*](#)

**Q9.** Write short notes on;



- a) Harmonization of survey and certification (4)
- b) Enhanced survey programme (ESP) surveys for bulk carriers and oil tankers (4)
- c) Condition monitoring of tail shaft propeller shaft (4)
- d) Condition assessment program (4)
- e) Condition assessment scheme (4)

**2022 /SEP/Q9**

[\*\*Click Here to See the Answer\*\*](#)

**OCT-2022**

Q1. List at least 2 conventions of the IMO under each heading- (1) safety, (2) environmental protection, and (3) liability and compensation. For each convention briefly discuss its objectives and main contents.

**2022/OCT/Q1**

[\*\*Click Here to See the Answer\*\*](#)

Q2. Write short notes on:

- a) Role of IACS on ship
- b) Merchant Shipping rules
- c) EEXI and EEDI
- d) Condition of Class
- e) Emergency towing arrangement on tankers

**2022/OCT/Q2**

[\*\*Click Here to See the Answer\*\*](#)

Q3: With reference to an emergency fire pump state –

- A. The regulation that influence its location, capacity and power;
- B. How the power supply to emergency pump is ensured?
- C. Why a relief valve is necessary on the deck main?

**2022/OCT/Q3**

[\*\*Click Here to See the Answer\*\*](#)

Q4. With regard to NOx control requirements of Annex VI:

- (a) Explain Tier I, Tier II and Tier III requirements.



(b) Briefly explain NOx technical code and NOx Technical file. What entries are required to make in onboard NOx Technical file.  
(c) The control of diesel engine NOx emissions is achieved by what means?  
(d) Explain with a simple sketch any two systems for NOx emission reduction.

**2022/OCT/Q4**

[\*\*Click Here to See the Answer\*\*](#)

Q5. a) Sketch the following detection heads and for each give a brief description of their operation.  
(i) Rate of air temperature rise detector.  
(ii) Flame detector,  
(iii) Fixed temperature fire detector of the quartzoid bulb sprinkler type.  
b) (i) What type of space is the rate of temperature rise detector used to protect? Give two spaces on board the ship where it would be fitted.  
(ii) State where the fixed temperature fire detector is fitted on board the ship. Name three places on the detector where its working temperature is indicated.  
(iii) Where are flame detectors usually required to be fitted on ship?

**2022/OCT/Q5**

[\*\*Click Here to See the Answer\*\*](#)

Q6. A. Describe information which is available in the record which is attached as a supplement to the IOPP Certificate, for a bulk carriers and oil tanker.  
B. What are the provisions for engine room under MARPOL 73/78 Annex -1, for large ocean-going vessels?  
C. What is IBC Code and what Certificates are issued under the Code and to which ship?

**2022/OCT/Q6**

[\*\*Click Here to See the Answer\*\*](#)

Q7: With reference to Regulation 12 of SOLAS Chapter XII, dealing with Water Level Detection and Alarm System to spaces;  
A. type of ships water level detection and alarm system is required to be installed;  
B. Brief description of such installation;  
C. Requirements with respect to detection system;



D. Requirements with respect to alarm system.

**2022/OCT/Q7**

[\*\*Click Here to See the Answer\*\*](#)

Q8. State the difference between Flag State control and port State control (PSC), under which International Conventions Port State Control be exercised. What do you understand by Memorandum of Understanding in respect of PSC? Name the different MOU's.

**2022/OCT/Q8**

[\*\*Click Here to See the Answer\*\*](#)

Q9. A) Describe with the aid of a sketch the general arrangement of an oil monitoring system;

B. State the inputs that are recorded;

C. Differentiate between monitoring chambers using direct light and those using scattered light

D) Explain the problem to be overcome in the design of monitoring systems.

**2022/OCT/Q9**

[\*\*Click Here to See the Answer\*\*](#)

**NOV-2022**

Q1. With reference to MEPC 76, the combined technical and operational approaches to improve energy efficiency of ships and GHG reduction measures, explain the below mentioned new requirements.

(a) Energy Efficiency Existing Ship Index (EEXI)

(b) Carbon Intensity Indicator (CII) and CII rating.

**2022/JAN/Q3 2022/FEB/Q3 2022/JUN/Q5 2022/NOV/Q1**

[\*\*Click Here to See the Answer\*\*](#)

Q2. With reference to activated fin stabilizers give reasons why:

(a) For large vessels such units are preferred to passive tanks; (6)

(b) These units are preferred for passenger and fast cargo ships; (6)

(c) Partial rather than maximum damping of ship movement in heavy weather is advisable for reasons other than overstressing of fin stocks and activating gear. (8)



**2020/FEB/Q6** **2021/JAN/Q9** **2021/NOV/Q6** **2022/FEB/Q8**

**2022/NOV/Q2**

[\*\*Click Here to See the Answer\*\*](#)

Q3: A new instrument by IMO for the Control and Management of ships Ballast Water and sediments' will be in force in the near future. In relation to this discuss the following;

- A. The need for such a convention
- B. What are the options available for treatment of Ballast Water, and the methods being used presently?
- C. What are the responsibility as a flag State and port State?
- D. What is current status of the IMO BWM convention ratification and what is included in the certification and type approval process?

**2022/NOV/Q3**

[\*\*Click Here to See the Answer\*\*](#)

Q4. A. What are the general requirements of fixed gas fire-extinguishing systems for shipboard use?

B. What are the specific requirements related to CO2 systems with respect to quantity, piping, controls and volume of free CO2

C. What are the maintenance carried out on the Fixed co2 firefighting system.

**2022/NOV/Q4**

[\*\*Click Here to See the Answer\*\*](#)

Q5. With reference to shipboard sewage systems,

A. Describe the principle of operation of EACH of the following types:

I. Flow through system; II. Collection / Holding / transfer system; III. Zero discharge system.

B. I. Explain why sewage systems involving aerobic action are to be preferred to those with anaerobic action. Aerobic Action:

II. Explain the meaning and significance of the term Biological oxygen demand.

**2022/NOV/Q5**

[\*\*Click Here to See the Answer\*\*](#)



Q6. Fire protection for the accommodation spaces of passenger vessels incorporates means of detection, fighting and containment to reduce the spread of any fire.

- A. Describe the means of detection and firefighting commonly installed;
- B. State how the spread of fire is prevented and how the containment is used with the firefighting and detection arrangement to locate the fire.

**2021/JAN/Q4 2021/FEB/Q4 2022/NOV/Q6**

[\*\*Click Here to See the Answer\*\*](#)

Q7. With reference to SOLAS ch – XII write short notes on: A. Emergency towing arrangement on tankers;

- B. Safe access to tanker bows; C. Safe access to cargo holds, cargo tanks; D. Protective coatings of ballast tanks.

**2022/NOV/Q7**

[\*\*Click Here to See the Answer\*\*](#)

Q8. A fire in the exhaust gas boiler on a motor ship may develop in two or three stages. With reference to such situations; discuss:

- A. The factors which could be responsible for initiation and development of:
  - (i) Ignition of soot;
  - (ii) Small soot fires;
  - (iii) High temperature fires;

- B. State the standing instruction you, as Second Engineer Officer, would issue to watch keepers with respect to the action to be taken in the event of a boiler uptake fire.

**2022/NOV/Q8**

[\*\*Click Here to See the Answer\*\*](#)

Q9. A. Sketch a circuit that may be incorporated in a control panel for an array of fire detectors. Describe, Audible fire alarm circuits, Identification, of zone of fire and Automatic change over from normal power supply.

**2020/OCT/Q6 2021/JUL/Q6 2021/OCT/Q6 2022/NOV/Q9**

[\*\*Click Here to See the Answer\*\*](#)



**DEC-2022**

1. Petroleum vapours are dangerous substances and when mixed with air can be ignited.

- a) i) sketch an explosimeter or combustion gas indicator which can be used to check the atmosphere of a tank or pumproom.
- ii) describe the explosimeter and its operation
- iii) state one reason that may cause the explosimeter to give a false reading
- b) for flammable mixtures, explain the meaning of the terms lower and upper flammable limits

**2022/DEC/Q1**

[\*\*Click Here to See the Answer\*\*](#)

Q2. With respect to MARPOL 73/78, Annex - II, Noxious liquid chemicals are divided into categories;

- A. State the number of categories, and what does each category signify.
- B. State the requirement of Procedures and Arrangements Manual, and what information is available.
- (c) What are the latest amendments in IBC code.

**2022/DEC/Q2**

[\*\*Click Here to See the Answer\*\*](#)

Q3. With reference to Annex VI of MARPOL, What are the salient features of

- A. EEDI (Energy efficiency design index)
- B. EEOI (Energy Efficiency Operational Indicator)
- C. SEEMP (Ship Energy Efficiency Management Plan)
- D. CII (Carbon Intensity Indicator)

4. Explain how PSC is different from FSC? Discuss Clear Grounds under SOLAS, MARPOL and the STCW with examples.

**2022/DEC/Q3**

[\*\*Click Here to See the Answer\*\*](#)

Q5. Discuss the following with respect to International Safety Management (ISM) code:

- A. Emergency preparedness, drills and training;



- B. Reporting of near miss, non-conformities, accidents/incidents and hazardous occurrences;
- C. Risk assessment Identification of critical equipment, tests and minimum spares requirement.

**2020/NOV/Q7 2022/DEC/Q5**

[\*\*Click Here to See the Answer\*\*](#)

6. Discuss on the following with respect AFS Convention:

- a) Silent features and benefits of AFS Convention
- b) Benefits of new generation TBT free paints
- c) Survey and certification requirements for vessels GT 400 and above.
- d) Survey and certification requirements for vessels GT less than 400.

**2022/DEC/Q6**

[\*\*Click Here to See the Answer\*\*](#)

Q7. A. State where information can be obtained with regard to the safe carriage of hazardous substances as cargos.

B. For a hazardous substance of your choice as a cargo, discuss each of the following;

- i) Storage and transport;
- ii) Hazardous properties;
- iii) Firefighting and suppression techniques;
- iv) Medical effects and treatment after physical contact with cargo

**2022/DEC/Q7**

[\*\*Click Here to See the Answer\*\*](#)

8.What are the core features of the FSS Code? (International fire safety systems code). Elaborate on any one test prescribed by the Code.

**2022/DEC/Q8**

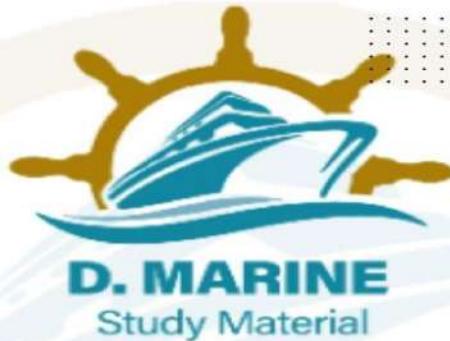
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Q9. With reference to a recent ILO notice on the health hazards from asbestos.

- A. State where asbestos may be found on board ship.
- B. State the health risks from asbestos
- C. Outline the precautions necessary to minimize exposure to asbestos during an emergency repair.



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**2022/DEC/Q9**

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