

Government of the People's Republic of Bangladesh Department of Shipping

Sample Written/Oral Question Bank Marine Engineer Officer Class 2 and 1 Combined Naval Architecture & Ship Construction 1. (a) Explain why conventional liquid carriers are divided by longitudinal bulkheads. (2)

(b) Explain why ore carriers may be fitted with wing tanks. (2)

(c) State, other than the carriage of liquids, the purposes of double bottom tanks in dry cargo ships. (2)

(d) A dry cargo ship which has just completed loading is observed to be listing to starboard significantly. The only available means of correcting the list is by adjusting the contents of two large adjacent double bottom ballast tanks port and starboard. The port tank is empty whilst the starboard is half full.

Describe, with reasons, the action a Chief Engineer Officer would advise. (4)

3. (a) State the system of classification for access doors passing through watertight bulkheads of a vessel. (3)

(b) State THREE circumstances under which all watertight doors must be closed when situations are defined as potentially hazardous. (3)

(c) Explain the safety features built into the watertight door operating system to enhance safety to personnel. (3)

4. (a) State the advantages and disadvantages of aluminium alloy in ship building.(4)

(b) Describe, with the aid of a sketch, a method of welding aluminium panels. (6)

5. (a) Explain why twin skeg rudders may be fitted on some vessels. (3)

(b) Explain the advantages of a twin skeg installation in modern vessels with a large cargo carrying capacity. (7)

6. With reference to a bulk carrier, describe, as Chief Engineer Officer, the inspection that should be carried out on the upper topside areas. (10)

7. (a) With reference to the overhaul of a ship side valve in dry dock explain, as Chief Engineer Officer, what information should be given to the docking company prior to work commencing. (5)

(b) Describe how the valves would be overhauled stating the precautions to betaken before returning the ship to service. (5)

8. With reference to large fixed bladed propellers:

(a) describe, with the aid of a sketch, EACH of the following:

(i) the effect of hull fouling; (3)

(ii) operation in clean hull, ballast condition. (3)

(b) explain why fitting a light propeller may be beneficial. (4)

9. With reference to defects found in the steelwork of ballast tanks:

(a) explain the factors that may cause defects in ballast tanks; (4)

(b) state, with reasons, areas most likely to be affected and how they may be indicated; (4)

(c) state methods employed to minimise damage, caused by the facors in (a). (2)

10. With reference to roll reduction systems, explain the principles of operation of EACH of the following, stating the advantages and disadvantages of EACH:

(a) bilge keels; (5)

(b) passive uncontrolled tanks. (5)

11. During sea trials, extensive noise measurements are taken in accordance with the Code of Practice for Noise Levels in Ships.

(a) State and explain the unit of sound measurement. (2)

(b) State the noise level above which personnel are required to wear ear protection. (1)

(c) Explain how a ship's crew may be made aware of the hazards posed by exposure to excessive noise. (2)(d) Explain how the noise levels can be reduced in the design of EACH of the following:

(i) diesel generators; (3)

(ii) ventilation fans and trunkings. (2)

12. Explain the methods adopted in modern shipbuilding practice to prevent hull fractures due to corrosion fatigue, making reference to the sequence of assembly of the plating and welding and the subsequent protection on completion of construction. (10)

(i) diesel generators;

(ii) ventilation fans and trunkings.

13. Sketch FIVE methods used to prevent the distortion of ships' plates and frames during major welded hull repairs in dry dock. (10)

14. With reference to the classification of ships, explain EACH of the following:

(a) why ships are built to classification society rules;

(b) the meaning of the notation +:100A1;

(c) how a ship remains in class throughout the life of the vessel.

15(a) Describe, with the aid of a sketch, how a hydraulically operated folding hatch cover opens and closes.(7)

(b) Explain how the water tightness and security of the hatch cover sketched inpart

(a) can be ascertained before proceeding to sea. (3)

16 (a) State, with reasons, the potential hazards that may be present in

EACH of the following spaces:

(i) an oily bilge tank; (2)

(ii) a ballast tank; (2)

(iii) a refrigerated space. (2)

(b) State the procedures to be undertaken prior to entering enclosed spaces. (4) State the pr14 With reference to roll reduction systems, explain the principles of operation of EACH of the following, stating the advantages and disadvantages of EACH:

(i) Bilge keels (5)

(ii) Passive Uncontrolled Tanks (5)

17. (a) State FOUR reasons for transverse watertight bulkheads in ship construction.

(b) State the minimum number of transverse watertight bulkheads and their location.

(c) Describe how watertight bulkheads are tested.

18. (a) Explain why fatigue cracks occur in a ship's hull, stating the locations where they may be found. (3)

(b) Describe the hull inspection that should be carried out m drydock to ascertain the maintenance and repairs that may need to be carried out. (7)

19. As Chief Engineer officer, write a dry dock specification for the repair of the following damage that has occurred, stating what factors have to be considered when costing the repairs.

Damage to water ballast tank number 1 port wing. The shell plating 15 mm thick for approx 2

metres square has to be removed and replaced along with the relevant damaged stiffeners. (10)

20. Explain, with the aid of a mid-ship half sectional sketch of a container ship, how strength is built into this type of vessel whilst still allowing access to the cargo holds. (10)

21. As Chief Engineer Officer on a new vessel which is experiencing severeaft end vibration at full service speed, write a report to the Engineer

Superintendent suggesting reasons for the vibration and recommendations for further sister vessels presently under construction. (10)

22. With reference to a bulk carrier, describe, as Chief Engineer Officer, the inspection that should be carried out on the upper topside areas. (10)

23. Describe the in-water survey to classification society requirements of the underwater structure of a very large carrier. (10)

24. Describe, with the aid of sketches, how main propulsion efficiency can be improved by the addition of EACH of the following:

(a) ducted propeller (Kort nozzle); (5)

(b) vane or Grim wheel aft of the propeller. (5)

25. (a) With reference to bilge keels:

(i) describe how the design and method of attachment reduces the possibility of damage to the shell plate; (5)

(ii) state what testing must be carried out. (2)

(b) Explain why the bilge keels do not extend the full length of the vessel. (3)

26. (a) State, with reasons, the potential hazards that may be present in EACH of the following spaces:

- (i) an oily bilge tank; (2)
- (ii) a ballast tank; (2)

(b) State the procedures to be undertaken prior to entering enclosed spaces. (6)

27. (a) Explain why twin skeg rudders may be fitted on some vessels. (3)

(b) Explain the advantages of a twin skeg installation in modern vessels with a large cargo carrying capacity. (7)

28. (a) Explain the system of classification for access doors passing through watertight bulkheads of a vessel. (3)

(b) State THREE circumstances under which all watertight doors must be closed when situations are defined as potentially hazardous. (3)

(c) Explain the safety features built into the watertight door operating system to enhance safety to personnel. (4)

29. With reference to cargo hatch covers on large container ships:

(a) describe how they are tested for watertightness; (2)

(b) explain how the weight of the hatch and containers is transferred to the ship's structure whilst allowing for deflections of the hull in a seaway; (3)

(c) describe, with the aid of a sketch, the type and location of damage that can occur due to wear of the hatch supporting arrangements. (5)

30. (a) With reference to bilge keels:

(i) describe, with the aid of a sketch, how the design and method of attachment

reduces the possibility of damage to the shell plate; (5)

- (ii) state what testing must be carried out. (2)
- (b) Explain why the bilge keels do not extend the full length of the vessel. (3)

31. As Chief Engineer Officer, outline the essential information to be supplied to the drydock management prior to drydocking a vessel. (10)

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

(a) define the meaning of Class A bulkheads, stating the requirements; (4)

(b) discuss the design of ventilation systems to prevent the spread of smoke and fire; (4)

(c) explain how the integrity of the bulkhead is retained with respect to ventilation trunkings, where A Class bulkheads have to be penetrated. (2)

33. As Chief Engineer Officer of an older vessel which has recently been purchased, write a report to the Superintendent Engineer detailing the items that should be inspected to ensure that the conditions of assignment of Load Line are satisfactorily complied with. (10)

34. (a) Describe the survey of a hollow rudder. (7)

(b) Explain the possible effects if the watertight integrity of the rudder was compromised. (3)

35. With reference to roll reduction systems, explain the principles of operation of EACH of the following, stating the advantages and disadvantages of EACH:(a) bilge keels; (5)(b) passive uncontrolled tanks. (5)

36. Explain, with the aid of a mid-ship half sectional sketch of a container ship, how strength is built into this type of vessel whilst still allowing access to the cargo

holds. (10)

37. (a) With reference to the overhaul of a ship side valve in dry dock explain, as Chief Engineer Officer, what information should be given to the docking company prior to work commencing. (5)

(b) Describe how the valves would be overhauled stating the precautions to be taken before returning the ship to service. (5)

38. (a) Describe the stresses that the hull of an ocean going vessel is subjected to when it encounters heavy weather.

(b) Explain the constructional details of ships which resist the stresses described in part(a). (5)

39. (a) With reference to bilge keels:

(i) describe how the design and method of attachment reduces the possibility of damage to the shell plate; (5)

(ii) state what testing must be carried out. (2)

(b) Explain why the bilge keels do not extend the full length of the vessel. (3)

40. With reference to tank inspections:

(a) list SIX items that should be looked for in a tank inspection; (3)

(b) state where erosion would be found in ballast tanks; (2)

(c) write a procedure for enclosed space entry. (5)

41. When a vessel is in dry dock, the possible risks of fire in the machinery spaces are heightened due to the nature of the work being carried out.

As Chief Engineer Officer, compile a set of standing orders instructing ship's staff on the actions to be taken should a serious fire occur. (10) 42. With reference to double hulled oil tankers:

- (a) sketch a mid ship cross section; (5)
- (b) state the reason this type of design; (1)
- (c) state FOUR disadvantages of this type of design. (4)

43. With reference to the structure of a large passenger vessel:

- (a) describe how the spread of smoke and fire is prevented; (7)
- (b) describe the standard fire test for a Class A-60 Division material. (3)

44. (a) Explain the function and location of EACH of the following:

- (i) watertight doors; (3)
- (ii) weathertight doors. (3)

(b) Explain why it is essential that scuppers and freeing ports are operational at all times. (4)

45. As Chief Engineer Officer of an older vessel which has recently been purchased, state with reasons, the items that should be inspected to ensure that the conditions of assignment of Load Line are satisfactorily complied with.

- 46. With reference to large fixed bladed propellers:
- (a) describe, with the aid of a sketch, EACH of the following:
- (i) the effect of hull fouling; (3)
- (ii) operation in clean hull, ballast condition. (3)
- (b) explain why fitting a light propeller may be beneficial. (4)

47. With reference to large bulk carriers:

(a) explain how the design and operation of this type of vessel has contributed to structural failure; (5)

(b) describe the designs that have evolved to minimise the possibility of failure.

(5)

48. With reference to drydocking a vessel:

(a) state the pre-docking information that should be given to the drydock authority; (5)

(b) list the items to be inspected once the dock is empty. (5)

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

(a) define the meaning of Class A bulkheads, stating the requirements; (4)

(b) discuss the design of ventilation systems to prevent the spread of smoke and fire; (4)

(c) explain how the integrity of the bulkhead is retained, with respect to ventilation trunkings, where A Class bulkheads have to be penetrated. (2)