

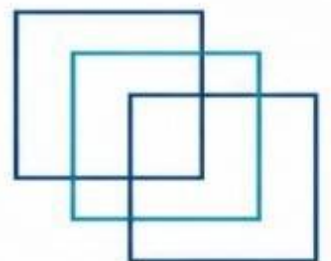


MEO CLASS 4 WRITTEN: NA (NAVAL ARCHITECTURE)

FOR INDIAN COMPETENCY EXAM

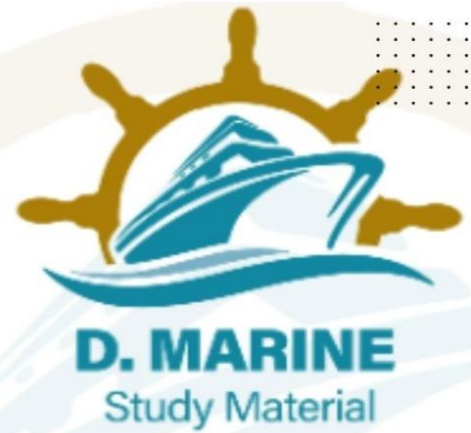


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MAY - 2023(PART-1)

Q1. a) What are the various Static stresses that act on a vessel at rest in still water? Explain with the aid of sketches. (10)

b) Give examples for dynamic stresses on a vessel? (6)

2023/MAY1/Q1

[Click Here to See the Answer](#)

Q2. a) What is the basic type of cargo tanks utilized on board gas carriers?

b) Sketch and describe a membrane type tank for an LNG tanker. (10)

2023/MAY1/Q2

[Click Here to See the Answer](#)

Q3. a) What is bilging and what are the effects of bilging? (4)

b) What are the 3 Classes of bulkheads? (4)

c) What are the advantages of water tight bulkheads? (4)

d) How is the water tight bulkhead tested? (4)

2023/MAY1/Q3

[Click Here to See the Answer](#)

Q4. a) What is free surface effect. (4)

b) Explain the methods used to reduce the free surface effect in ship construction and while operating the ship. (12)

2023/MAY1/Q4

[Click Here to See the Answer](#)

Q5. a) Name the different type of rudders. (6)

b) Draw a labelled sketch of an unbalanced rudder fitted onto a rudder post

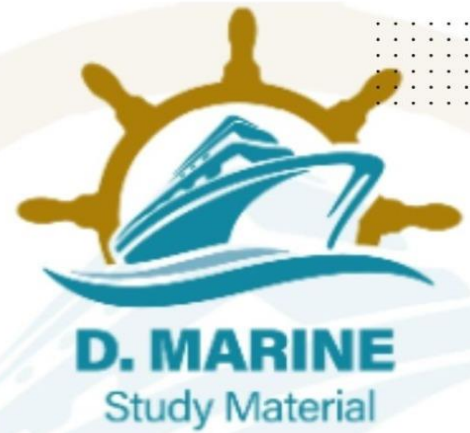
2023/MAY1/Q5

[Click Here to See the Answer](#)

Q6. a) Explain, with reference to moments about the Centreline, how the list may be removed. (6)



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b) A ship of 12,250 tonnes displacement, has $KM = 8$ metres, $KB = 3.8$ metres, $KG = 8$ metres and is floating upright. Find the list if a weight of 2 tonnes, already on board, is shifted transversely through a horizontal distance of 12 metres assuming that the ship is wall-sided (10)

2023/MAY1/Q6

[Click Here to See the Answer](#)

Q7. a) What is the significance of GM-GZ curve. (6)

b) The pitch of a propeller is measured by means of a batten and cord. The horizontal ordinate is found to be 40 cm while the vertical ordinate 1.15 m at a distance of 2.6 m from the centre of the boss. Calculate the pitch of the propeller and the blade width at that point. (10)

2023/MAY1/Q7

[Click Here to See the Answer](#)

Q8. a) Explain why an unstable ship is dangerous. (6)

b) A vessel travelling at 17 knots turns with a radius of 450 m when the rudder is put hard over. The centre of gravity is 7 m above the keel, the transverse metacentre 7.45 m above the keel and the centre of buoyancy 4 m above the keel. If the centripetal force is assumed to act at the centre of buoyancy, calculate the angle of heel when turning. The rudder force may be ignored. (10)

2023/MAY1/Q8

[Click Here to See the Answer](#)

Q9. a) Explain why the draught of a ship decreases when it passes from fresh water to seawater and vice versa. (6)

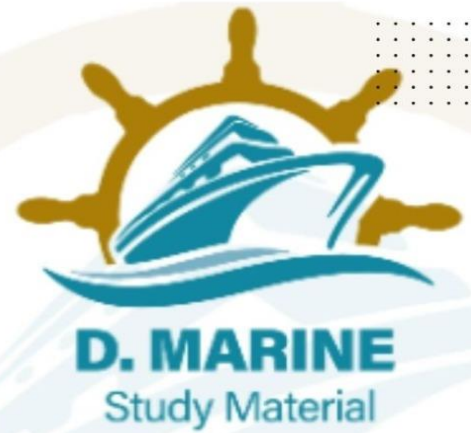
b) A lock gate which is 15 m wide has salt water on one side to a depth of 8 m, and fresh water on the other side to a depth of 9 m. Find the resultant thrust on the lock gate and state on which side of the gate it acts. (10)

2023/MAY1/Q9

[Click Here to See the Answer](#)



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MAY - 2023(PART-2)

- Q1. a) What is a right-handed and a left-handed propeller? (4)
b) With the aid of simple sketches explain Rake, Skew and Pitch of the propeller. (6)
c) What are the advantages and disadvantages of CPP? (6)

2023/MAY2/Q1

[Click Here to See the Answer](#)

- Q2. a) With respect to oil tankers, what are LR1, LR2, VLCC and ULCC? (4)
b) Sketch the mid ship section of a double hulled oil tanker with centre tank and wing tanks (12)

2023/MAY2/Q2

[Click Here to See the Answer](#)

Q3. Define the main purpose of the following with respect to tank and pumping system:

- a) Weighted cocks on tank sounding pipes (4)
b) Remote operated gear for bilge valves (4)
c) Ventilation pipes for double bottom tanks (4)
d) Explain why gauze is sometimes fitted to tank ventilation pipes and explain the effect of mesh size. (4)

2023/MAY2/Q3

[Click Here to See the Answer](#)

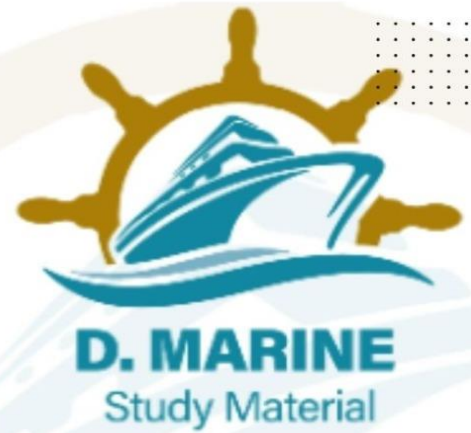
Q4. Briefly explain the following ship terms used:

- a) LOA (2)
b) LBP (2)
c) Breadth Extreme (2)
d) Breadth Moulded (2)
e) Depth Extreme (2)
f) Depth Moulded (2)
g) Draught Extreme (2)
h) Draught Moulded (2)

2023/MAY2/Q4



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[Click Here to See the Answer](#)

Q5. Define centre of buoyancy and show with the aid of sketches how a vessel which is stable will return to the upright after being heeled by an external force (16)

2023/MAY2/Q5

[Click Here to See the Answer](#)

Q6. a) State why cargo ships must have collision bulkheads. (6)

b) A double bottom tank is 1.2 m deep and has a sounding pipe extending 11 m above the tank top. The tank is filled with oil (rd 0.89) to the top of the sounding pipe. The double bottom floors are spaced 750 mm apart and are connected to the tank top by riveted angles, the rivets having a pitch of 7 diameters. If the maximum allowance stress in the rivets is 30 MN/m^2 , calculate the pressure in kN/m^2 on the outer bottom and the diameter of the rivets. (10)

2023/MAY2/Q6

[Click Here to See the Answer](#)

Q7.a) Define TPC. Explain why TPC for a given draught will vary with the density of the water in which the ship floats? (6)

b) The pitch of a propeller is measured by means of a batten and cord. The horizontal ordinate is found to be 40 cm while the vertical ordinate 1.15 m at a distance of 2.6 m from the centre of the boss. Calculate the pitch of the propeller and the blade width at that point.(10)

2023/MAY2/Q7

[Click Here to See the Answer](#)

Q8. a) Explain clearly the meaning of the term "reserve buoyancy". (6)

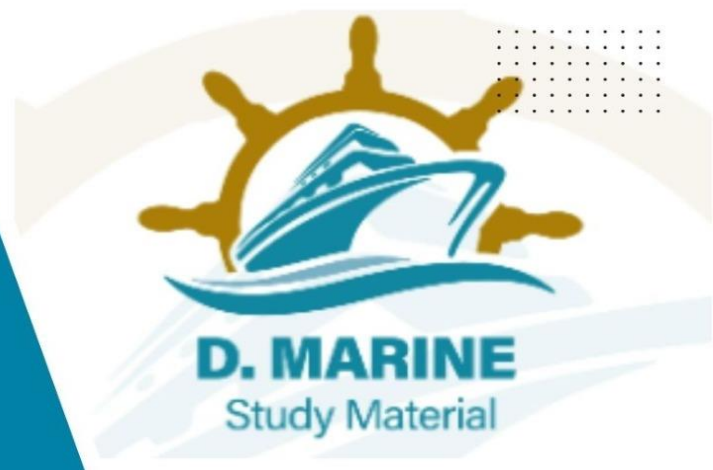
b) The centre of gravity of a ship of 5000 tonne displacement is 6 m above the keel and 1.5 m forward of midships. Calculate the new position of the centre of gravity if 500 tonnes of cargo are placed in the tween decks 10 m above the keel and 36 m aft of midships. (10)

2023/MAY2/Q8

[Click Here to See the Answer](#)



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- Q9. a) Explain what is meant by synchronous or resonant vibration (6)
b) A ship's speed is increased by 20% above normal for 8 hours, reduced by 10% below normal for 10 hours and for the remaining 6 hours of the day the speed is normal. Calculate the percentage variation in fuel consumption in that day from normal. (10)

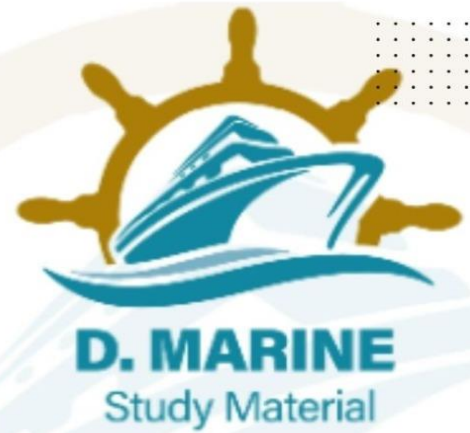
2023/MAY2/Q9

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APRIL - 2023

Q1. a) Draw a labeled Sketch of midship section of a double hull oil tanker.
b) What are Aframax, Suezmax, ULCC and VLCC tanker? (8)

2023/JUN/Q1

[Click Here to See the Answer](#)

Q2. a) What is bilging and what are the effects of bilging? (4)
b) What are the 3 classes of bulkheads? (4)
c) What are the advantages of water tight bulkheads? (4)
d) How is the water tight bulkhead tested? (4)

2023/MAY1/Q3 2023/JUN/Q2

[Click Here to See the Answer](#)

Q3. a) What are the advantages of corrugated bulkheads? (6)
b) Sketch and describe a corrugated transverse watertight bulkhead (10)

2023/JUN/Q3

[Click Here to See the Answer](#)

Q4. a) What is free surface effect. (6)
b) Explain the methods used to reduce the free surface effect in ship construction and while operating the ship. (10)

2023/MAY1/Q4 2023/JUN/Q4

[Click Here to See the Answer](#)

Q5. a) Sketch the curve of statistical stability for a ship with positive initial GM and indicate the following clearly: maximum value of GM, angle of heel at which maximum GZ occurs, angle of vanishing stability, Range of positive stability, Initial GM. (10)

b) What is dynamical stability and how can it be ascertained from the curve. (6)

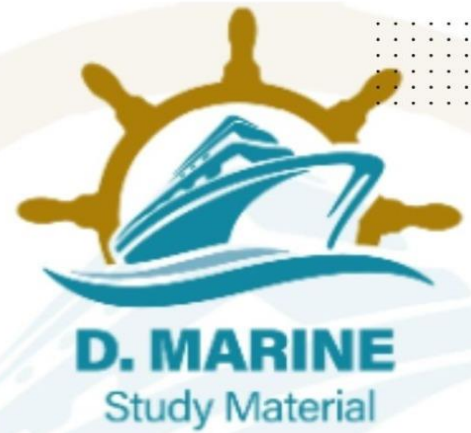
2023/JUN/Q5

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Q6. a) What is the purpose of conducting experiment on a new vessel?



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b) A mass of 6 t is moved transversely through a certain distance on a ship of 4300 t displacement, when the deflection of an 11 m pendulum is found to be 120 mm. The transverse meta-centre is 7.25 m above the keel and KG 5.46 m. Find the distance through which 6 t was moved. (10)

2023/JUN/Q6

[Click Here to See the Answer](#)

Q7. a) What is a right-handed and a left-handed propeller? (6)

b) The pitch angle, measured at a distance of 2 m from the centre of the boss, was found to be 21.5° . Calculate the pitch of the propeller. (10)

2023/JUN/Q7

[Click Here to See the Answer](#)

Q8. a) Explain various powers and efficiencies in the Propulsion plant of a ship. (6)

b) A vessel with a displacement of 12250 t burns 290 t of fuel while travelling at a speed of 15 knots on a voyage of 2850 nautical miles. On a voyage of 1800 nautical miles at a speed of 13 knots and a displacement of 14200 t, estimate the quantity of fuel that will be burnt. (10)

2023/JUN/Q8

[Click Here to See the Answer](#)

Q9. a) What are the effects of adding mass to draught and trim of a ship? (6)

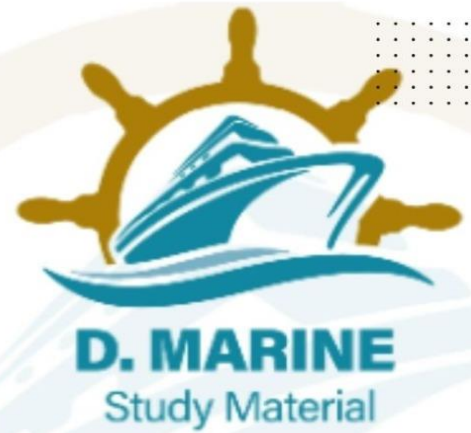
b) A ship of 7000 t displacement has a water plane area of 1500 m^2 . In passing from sea water into river water of 1005 kg/m^3 there is an increase in draught of 10 cm. Find the density of the water. (10)

2023/JUN/Q9

[Click Here to See the Answer](#)



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JULY - 2023

Q1. a) What are the various Static stresses that act on a vessel at rest in still water? Explain with the aid of sketches. (10)

b) Give examples for dynamic stresses on a vessel? (6)

2023/MAY1/Q1 **2023/JUL/Q1**

[Click Here to See the Answer](#)

Q2. Draw a labeled sketch of one half of midship section of a single hull bulk carrier. (16)

2023/JUL/Q2

[Click Here to See the Answer](#)

Q3. a) Describe with the aid of sketches the terms:

a) Camber

b) Sheer

c) Rise of floor

d) Flare

e) What is the purpose of these? (16)

2023/JUL/Q3

[Click Here to See the Answer](#)

Q4. a) Sketch and describe the anchor and chain arrangement in the forecastle of a vessel. (10)

b) What is bitter end and when and how it is put to use? (6)

2023/JUL/Q4

[Click Here to See the Answer](#)

Q5. a) What is a right-handed and a left-handed propeller? (4)

b) With the aid of simple sketches explain Rake, Skew and Pitch of the propeller. (6)

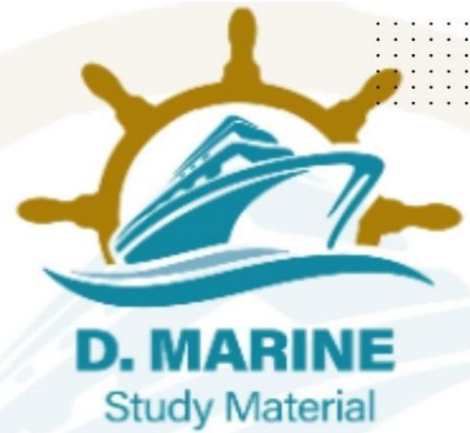
c) What are the advantages and disadvantages of CPP? (6)

2023/MAY2/Q1 **2023/JUL/Q5**

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Q6. a) What are the various resistances acting against the motion of the ship? (6)

b) A vessel uses 300 t of fuel on a voyage of 3000 nautical miles at a speed of 12 knots when her displacement is 10000 t. Estimate the fuel required for an estimated voyage of 1500 nautical miles at a speed of 15 knots and displacement of 14000 t. (10)

2023/JUL/Q6

[Click Here to See the Answer](#)

Q7. a) Explain with the aid of a simple sketch ullage and sounding of a tank.

b) A deep tank 10 m wide and 10 m deep has a rectangular manhole of 1.2 m × 0.6 m at the forward end. The longer sides of the manhole are horizontal and its lower edge is 0.7 m from the bottom of the tank. Find the thrust experienced by the manhole cover when the tank has oil of RD 0.8 to an ullage of 1 m. (10)

2023/JUL/Q7

[Click Here to See the Answer](#)

Q8. a) What is the effect of density of water on draught and TPC? (6)

b) A ship of 15000 t displacement floats at a draught of 7 m in water of RD 1.000. It is required to load the maximum amount of oil to give the ship a draught of 7 m in sea water of RD 1.025. If the water plane area is 2150 m², Calculate the mass of oil required. (10)

2023/JUL/Q8

[Click Here to See the Answer](#)

Q9. a) Draw a metacentric diagram for a vessel of constant triangle cross-section (6)

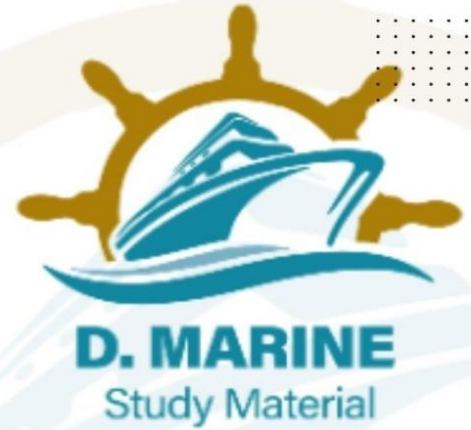
b) A block of wood of uniform density has a constant cross-section in the form of a triangle, apex down. The width is 0.5 m and the depth 0.5 m. It floats at a draught of 0.45 m. Calculate the metacentric height (10)

2023/JUL/Q9

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AUGUST - 2023

Q1. With reference to corrosion processes:

a) Explain the mechanism of:

i) Stress corrosion. (4)

ii) Corrosion fatigue. (4)

b) State where the following types of corrosion may occur, and the materials commonly involved in each case:

i) Fretting corrosion. (4)

ii) Galvanic corrosion. (4)

2023/AUG/Q1

[Click Here to See the Answer](#)

Q2. a) Sketch the arrangement of rudder stock, bearings, glands and method of suspension of a pintleless rudder, labeling the components parts.

b) State how the bearing wear down is measured and what prevents the rudder from jumping? (8)

2023/AUG/Q2

[Click Here to See the Answer](#)

Q3. Describe the construction of chain lockers and how cables are secured in the lockers? Explain how to secure anchors in preparation for a sea passage. (16)

2023/AUG/Q3

[Click Here to See the Answer](#)

Q4. a) Explain what is meant by 'panting' and 'pounding' and state which parts of the ship are affected? (8)

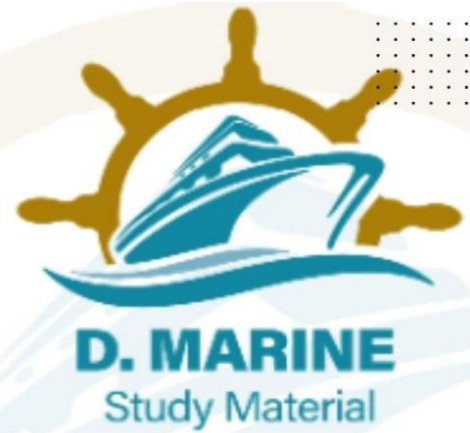
b) Describe in brief the loading conditions which give rise to hogging and sagging stresses. (8)

2023/AUG/Q4

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Q5. Write short notes on:

- a) Free surface effect (4)
- b) Cavitation (4)
- c) Reserve buoyancy (4)
- d) Margin line (4)

2023/AUG/Q5

[Click Here to See the Answer](#)

Q6. A ballast tank is 15 m long, 12 m wide and 1.4 m deep and is filled with fresh water. Calculate the load on the top and short side, if:

- a) The tank is just completely full
- b) There is a head of 7m of water above the tank top. (16)

2023/AUG/Q6

[Click Here to See the Answer](#)

Q7. A box barge 25 m long and 4 m wide floats in fresh water at a draught of 1.2 m and has an empty mid length compartment 5 m long. The bottom of the barge is lined with teak (rd 0.805) 120 mm thick. After grounding all the teak is torn off and the centre compartment laid open to the sea.

Calculate the final draught. (16)

2023/AUG/Q7

[Click Here to See the Answer](#)

Q8. The $\frac{1}{2}$ ordinates of a waterplane 120 m long are as follows:

Section AP $\frac{1}{2}$ | 1 | $1\frac{1}{2}$ | 2 | 3 | 4 | 5 | 6 | 7 | 8 | $8\frac{1}{2}$ | 9 | $9\frac{1}{2}$ | FP

$\frac{1}{2}$ ord 1.2 | 3.5 | 5.3 | 6.8 | 8.0 | 8.3 | 8.5 | 8.5 | 8.5 | 8.4 | 8.2 | 7.9 | 6.2 | 3.5 |

0 m

Calculate:

- a) Waterplane area
- b) Distance of centroid from midships. (16)

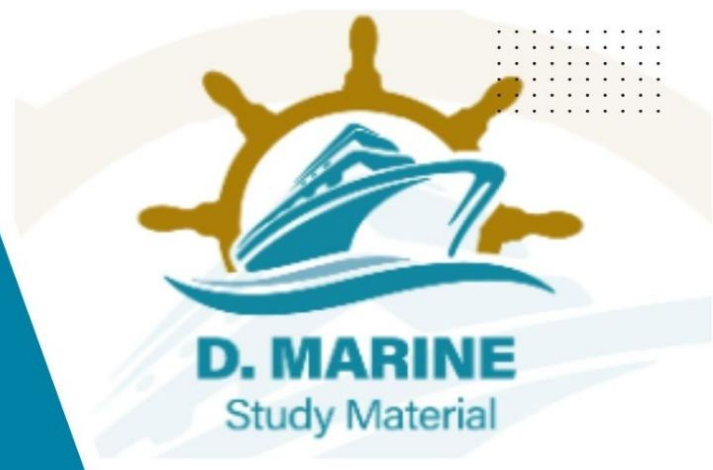
2023/AUG/Q8

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Q9. A hopper barge of box form 50 m long and 10 m wide floats at a draught of 2 m in seawater when the hopper, which is 15 m long and 5 m wide, is



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loaded with mud having relative density twice that of the seawater, to the level of the waterline. Doors in the bottom of the hopper are now opened allowing the mud to be discharged. Calculate the new draught. (16)

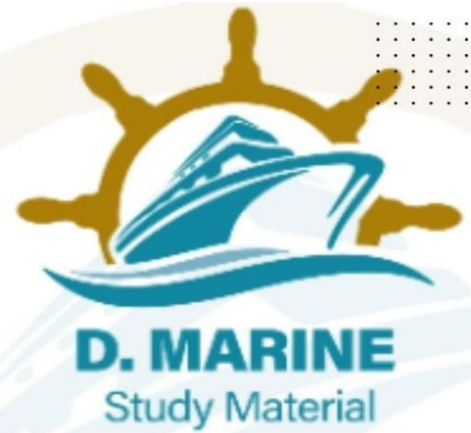
2023/AUG/Q9

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SEPTEMBER – 2023

- Q1. a) Name the different type of rudders. (6)
b) Draw a labelled Sketch of an unbalanced rudder fitted onto a rudder post. (10)

2023/MAY1/Q5 **2023/SEP/Q1**

[Click Here to See the Answer](#)

- Q2. a) Write short notes on panting, pounding and racking. (8)
b) Explain with the aid of simple sketches hogging and sagging of a vessel.

2023/SEP/Q2

[Click Here to See the Answer](#)

- Q3. Draw a labeled sketch of one half of midship section of a single hull bulk carrier. (16)

2023/JUL/Q2 **2023/SEP/Q3**

[Click Here to See the Answer](#)

- Q4. a) What are the advantages of corrugated bulkheads? (6)
b) Sketch and describe a corrugated transverse watertight bulkhead. (10)

2023/JUN/Q3 **2023/SEP/Q4**

- Q5. a) What is free surface effect. (6)
b) Explain the methods used to reduce the free surface effect in ship construction and while operating the ship. (10)

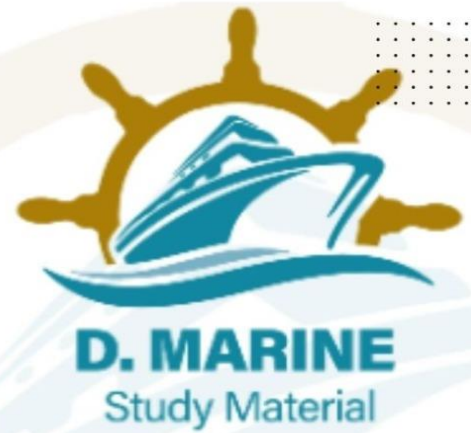
2023/MAY1/Q4 **2023/JUN/Q4** **2023/SEP/Q5**

[Click Here to See the Answer](#)

Q6. A double bottom tank is 1.2 m deep and has a sounding pipe extending 11 m above the tank top. The tank is filled with oil (RD 0.89) to the top of the sounding pipe. The double bottom floors are spaced 750 mm apart and are connected to the tank top by riveted angles, the rivets having a pitch of 7 diameters. If the maximum allowable stress in the rivets is 30 MN/m^2 , calculate the pressure in kN/m^2 on the outer bottom and the diameter of



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the rivets. (16)

2023/MAY2/Q6 **2023/SEP/Q6**

[Click Here to See the Answer](#)

Q7. The pitch of a propeller is measured by means of a batten and cord. The horizontal ordinate is found to be 40 cm while the vertical ordinate 1.15 m at a distance of 2.6 m from the centre of the boss. Calculate the pitch of the propeller and the blade width at that point. (16)

2023/SEP/Q7

[Click Here to See the Answer](#)

Q8. The centre of gravity of a ship of 5000 tonne displacement is 6 m above the keel and 1.5 m forward of midships. Calculate the new position of the centre of gravity if 500 tonne of cargo are placed in the t'ween decks 10 m above the keel and 36 m aft of midships. (16)

2023/SEP/Q8

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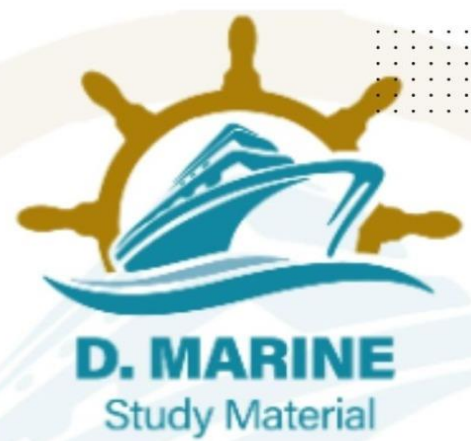
Q9. A ship's speed is increased by 20% above normal for 8 hours, reduced by 10% below normal for 10 hours and for the remaining 6 hours of the day the speed is normal. Calculate the percentage variation in fuel consumption that day from normal. (16)

2023/SEP/Q9

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OCTOBER - 2023

Q1. a) What are the various Static stresses that act on a vessel at rest in still water? Explain with the aid of sketches. (10)

b) Give examples for dynamic stresses on a vessel? (6)

2023/MAY1/Q1 **2023/JUL/Q1** **2023/OCT/Q1**

[Click Here to See the Answer](#)

Q2. a) What is the purpose of water tight doors fitted on bulkheads? (4)

b) Name the locations of water tight door in a vessel. (4)

c) Sketch and describe a vertically mounted water tight door. (8)

2023/OCT/Q2

[Click Here to See the Answer](#)

Q3. a) What are the purposes of providing Forepeak and aft peak tanks? (6)

b) Draw a simple sketch of the aft peak tank with all the relevant structural members clearly labeled. (10)

2023/OCT/Q3

[Click Here to See the Answer](#)

Q4. With reference to hull protection against corrosion describe how EACH of the following operate:

a) Sacrificial anodes (8)

b) Impressed current system (8)

2023/OCT/Q4

[Click Here to See the Answer](#)

Q5. With regard to the carriage of crude oil and its associated products, state a few differences in the constructional features of a conventional tanker and a double hull tanker. (16)

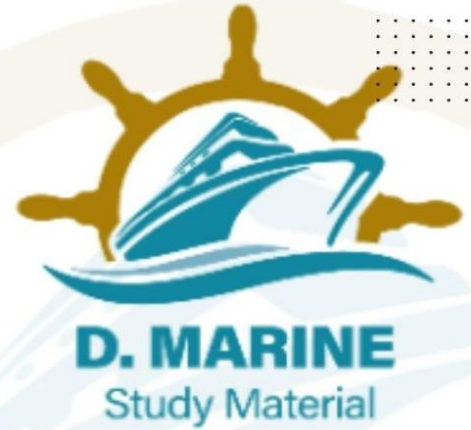
2023/OCT/Q5

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Q6. The ratios of length, breadth and draught of a vessel are 18.5: 2.5 : 1. The water plane area coefficient is 0.73 and the TPC is 0.77 more in sea



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water than in fresh water. Calculate the beam of the ship and TPC in fresh water. (16)

2023/OCT/Q6

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Q7. A ship of 6400 t displacement is floating in salt water. The ship has to proceed to a berth where the density of the water is 1008 kg per cubic meter. Find how much cargo must be discharged if she is to remain at the salt water draft. (16)

2023/OCT/Q7

[Click Here to See the Answer](#)

Q8. A bilge holding tank of 5 m length, 3 m width and 1.8 m depth has water of density 1.020 t/m^3 upto a sounding of 1.3 m and oil of density 0.86 t/m^3 is floating on top of water upto an ullage of 0.3 m. Calculate the mass of water and oil in the tank. (16)

2023/OCT/Q8

[Click Here to See the Answer](#)

Q9. A piece of aluminium has a mass of 300 g and its volume is 42 cm^3 . Calculate:

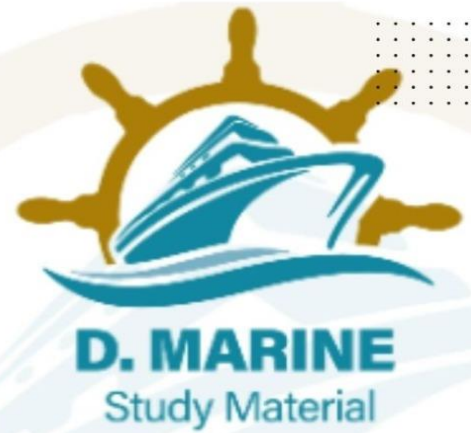
- Its density in kg/m^3
- The relative density
- The mass of 100 cm^3 of aluminium (16)

2023/OCT/Q9

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NOVEMBER – 2023

- Q1. a) What is the purpose of providing air pipes to tanks in the vessel? (5)
b) Sketch an arrangement of air vent head situated on the weather deck. (6)
c) What factors are considered in deciding the bore size of air pipe? (5)

2023/NOV/Q1

[Click Here to See the Answer](#)

- Q2. a) What is a right-handed and a left-handed propeller? (5)
b) With the aid of simple sketches explain Rake, Skew and Pitch of the propeller. (6)
c) What are the advantages and disadvantages of CPP? (5)

2023/MAY2/Q1 2023/JUL/Q5 2023/NOV/Q2

[Click Here to See the Answer](#)

- Q3. a) What are the various types of tankers for carrying bulk liquids?
b) Sketch a mid-ship section of a double-hulled crude oil tanker. (10)

2023/NOV/Q3

[Click Here to See the Answer](#)

Q4. Briefly explain the following ship terms used:

- i) LOA (2)
- ii) LBP (2)
- iii) Breadth Extreme (2)
- iv) Breadth Moulded (2)
- v) Depth Extreme (2)
- vi) Depth Moulded (2)
- vii) Draught Extreme (2)
- viii) Draught Moulded (2)

2023/MAY2/Q4 2023/NOV/Q4

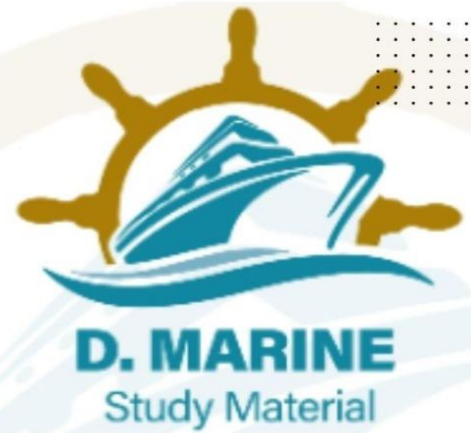
[Click Here to See the Answer](#)

- Q5. a) Sketch a ship's anchor & chain and label the various parts. (8)
b) Sketch the arrangement from anchor to the chain locker. (8)

2023/NOV/Q5



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Q6. A vessel of 10000 t displacement burns 25 t of fuel per day when her speed is 12 knots. Calculate the probable consumption of fuel over a voyage of 3000 nautical miles at a speed of 11 knots with a displacement of 11000 t. (16)

2023/NOV/Q6

[Click Here to See the Answer](#)

Q7. A ship consumes 360 t of fuel, stores and water when moving from sea water of 1.025 t/m^3 into fresh water of 1.000 t/m^3 and on arrival it is found that the draught has remained constant. Calculate the displacement in sea water. (16)

2023/NOV/Q7

[Click Here to See the Answer](#)

Q8. A ship 96 m long floating at 5 m forward draft and 6.4 m aft draft. MCTC 180 tm, TPC 16. COF is 2 m abaft of midships. Find the location where a weight of 50 t should be placed so as to keep the aft draft constant. (16)

2023/NOV/Q8

[Click Here to See the Answer](#)

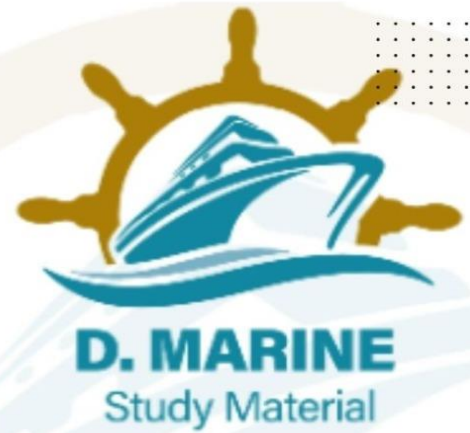
Q9. A ship 120 meters long at the waterline has equidistantly spaced half-ordinates commencing from forward as follows: 0, 3.7, 5.9, 7.6, 7.5, 4.6, and 0.1 meters respectively. Find the area of the waterplane using Simpson's Second Rule and the TPC at this draft. Water density is 1.025 t/m^3 . (16)

2023/NOV/Q9

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DECEMBER – 2023

- Q1. a) Sketch a transverse section through a duct keel labeling its component parts. Indicate the duct keel's position in the ship structure. (8)
b) Explain why duct keels are fitted. (8)

2023/DEC/Q1

[Click Here to See the Answer](#)

- Q2. a) Write short notes on panting, pounding and racking. (8)
b) Explain with the aid of simple sketches hogging and sagging of a vessel.

2023/SEP/Q2 2023/DEC/Q2

[Click Here to See the Answer](#)

- Q3. a) What are the 3 classes of bulkheads?
b) What are the advantages of water tight bulkheads?
c) How is the water tight bulkhead tested?
d) What is the purpose of providing air pipes to tanks in the vessel?
(4 each)

2023/MAY1/Q3 2023/JUN/Q2 2023/DEC/Q3

[Click Here to See the Answer](#)

- Q4. a) What is the fundamental purpose of a 'Load line' marking on ships?
b) Sketch and describe the features of a 'Load line' marking. (6)
c) Name five conditions that must be met before freeboard is assigned to a ship. (5)

2023/DEC/Q4

[Click Here to See the Answer](#)

- Q5. a) Name the different type of rudders. (6)
b) Draw a labeled sketch of an unbalanced rudder fitted onto a rudder post.

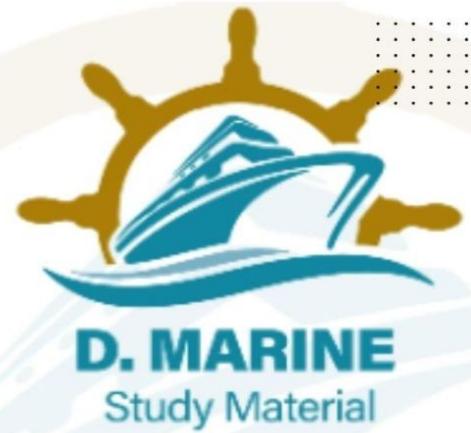
2023/MAY1/Q5 2023/SEP/Q1 2023/DEC/Q5

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- Q6. a) Sketch and describe the midship section of a hopper barge showing the structural members. (6)



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b) A vessel 40 m long has a constant cross-section in the form of a trapezoid 10 m wide at the top, 6 m wide at the bottom and 5 m deep. It floats in sea water at a draught of 4 m. Calculate its displacement. (10)

2023/DEC/Q6

[Click Here to See the Answer](#)

Q7. Briefly explain the following ship terms commonly used:

- a) Gross Tonnage
- b) Deadweight
- c) Displacement
- d) Strakes
- e) Deck Beams
- f) Girders (20)

2023/DEC/Q7

[Click Here to See the Answer](#)

Q8. a) What is the purpose of conducting an inclining experiment on a new vessel? (6)

b) A mass of 6 t is moved transversely through a certain distance on a ship of 4300 t displacement, when the deflection of an 11 m pendulum is found to be 120 mm. The transverse metacentre is 7.25 m above the keel and KG 5.46 m. Find the distance through which the mass of 6 t was moved. (10)

2023/DEC/Q8

[Click Here to See the Answer](#)

Q9. A hopper barge of box form 50 m long and 10 m wide floats at a draught of 2 m in seawater when the hopper, which is 15 m long and 5 m wide, is loaded with mud having relative density twice that of the seawater, to the level of the waterline. Doors in the bottom of the hopper are now opened allowing the mud to be discharged. Calculate the new draught. (16)

2023/AUG/Q9 **2023/DEC/Q9**

[Click Here to See the Answer](#)