BT-MRE-VI(S)-06.16-0823 Reg. No. | | | | | | | | | D

B. Tech. Degree VI Semester Supplementary Examination in Marine Engineering June 2016

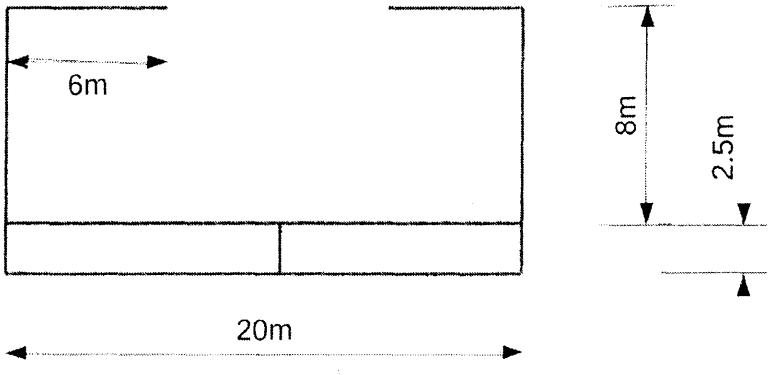
MRE 607 NAVAL ARCHITECTURE II

Time: 3 Hours Maximum Marks: 100

(5 × 20 = 100)

I. (a) Explain weight curve, buoyancy curve, load curve, shear force curve and bending moment curve of ship. (10)

(b) Calculate the section modulus at deck and bottom of the midship section shown. All plates are 12 mm thick and other dimensions in meters are as indicated. (10)



OR

II. (a) A rectangular barge of uniform cross section has a length of 120 m. The weight of empty barge of 12000 t uniformly distributed along the length. Cargo of 18000 t is uniformly distributed over the two-third length in midship region. Calculate maximum values of hear force and bending moment with their locations. (10)

(b) Explain how the wave bending moments can be estimated for sagging and hogging conditions. (10)

III. (a) Explain diameter, pitch, pitch ratio, theoretical speed, apparent slip and wake related to a screw propeller. (10)

(b) A propeller of diameter 4.35 m has an rpm of 120. The ship's speed is 16 kn. Calculate apparent slip and real slip if the wake fraction is 0.35. (10)

OR

IV. (a) With necessary sketches, show the following of a screw propeller, root, tip, hub, leading edge, trailing edge, skew, rake, face, back, projected area. (10)

(b) A propeller of 5.4 m diameter has a pitch ratio of 0.8 and rpm-120. Wake fraction is 0.32 and real slip is 34%. Calculate ship speed, speed of advance and apparent slip. (10)

(P.T.O.)

V. (a) What is cavitation? How does it affect the performance of the propeller? (10)

(b) Explain various types of propellers. (10)

OR

VI. (a) Explain various powers. What is QPC? (10)

(b) A propeller has a pitch of 3.9 m and efficiency of 67%. If the rpm = 120, real slip is 36% and delivered power is 2800 kW, calculate the thrust of the propeller. (10)

VII. (a) How does the rudder helps in turning the ship? Which are the parameters influencing the force on the rudder? (10)

(b) A ship has metacentric height of 0.41 m, speed of 20 kn. The centre of gravity is 6.1 m above the keel, the centre of lateral resistance is 4 m above keel. The rudder is put hard over to port and vessel turns in a circle of 1100 m radius. Calculate the angle of heel. (10)

OR

VIII. (a) Explain different types of rudders. (10)

(b) A ship has a service speed of 13.5 kn and rudder area of 13 m^2. It's centre of effort is 1.12 m from the centre of stock. Calculate the torque on the stock at 35^o rudder angle. (The rudder force can be taken as $F= 580\ AV^2$ [N]). (10)

IX. (a) Explain sea spectrum and its relevance. (10)

(b) A ship of 10,000 t displacement has GM = 0.5 m. The period of roll in still water is 20 seconds. Find new period of roll if a mass of 50 t is discharged from a position of 14 m above centre of gravity. (10)

OR

X. (a) What do you understand by unresisted rolling? What is its significance? What are the effects of loading and unloading of cargo on the rolling period of a ship? (10)

(b) $\zeta(x,t) = A\sin(kx - \omega t)$ is the expression for a regular wave profile moving to right. Explain all terms. A deep sea wave of the above form has a length of 300 m. Find the period and speed of the wave. (10)

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