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***B.Tech. Degree VI Semester Supplementary Examination in
Marine Engineering May 2017***

**MRE 607 NAVAL ARCHITECTURE II
(Prior to 2013 Scheme)**

Time: 3 Hours

Maximum Marks: 100

(5 × 20 = 100)

- I. (a) Differentiate still water bending moment and wave bending moment. (5)
 (b) A rectangular barge of 80 m long has 640 t hull weight uniformly distributed along the length. Machinery of 200 t is uniformly distributed amid ships for a length of 20 m. End tanks each of length 20 m are loaded with 340 t in each tank. Prepare the weight curve, buoyancy curve, SF and BM curves in still water. (15)
 (i) Find max value of BM.
 (ii) Find SF and BM at 30 m from end.
- OR**
- II. (a) Sketch and describe the general characteristics of shear force and bending moment distribution curves along the length of the ship. (10)
 (b) Explain how the weight curve of a ship can be obtained. Draw a typical sketch. (10)
- III. (a) Draw sketches showing the views of a propeller and mark the following parts root, tip, hub, shaft, leading edge, trailing edge skew and rake. (5)
 (b) Describe propeller cavitation its types and what are the methods to reduce cavitation? (15)
- OR**
- IV. (a) What are the various types of propellers used for ship propulsion? (5)
 (b) Derive blade element theory with neat sketches. (15)
- V. (a) Sketch a typical rudder and define span, chord, aspect ratio, taper ratio, leading edge, trailing edge, root and tip. (10)
 (b) Explain with neat sketches the different types of rudders used in ocean going ships. (10)
- OR**
- VI. (a) Explain the turning action of ship and role of rudder for it. (10)
 (b) What are the parameters affecting the rudder forces? How do you calculate the rudder torque? (10)
- VII. (a) What are the different types of waves in the sea? Briefly explain. (10)
 (b) Explain six degrees of freedom and motion associated with ship at sea. Which of them are periodic oscillation and why they must be controlled? (10)

OR

(P.T.O.)

- VIII. (a) Derive an equation of motion for a free rolling of a ship. Write down the expression for free rolling period. Explain how the loading and unloading effect rolling period. (10)
- (b) What is sea spectrum? Briefly explain. (10)
- IX. (a) Describe how the hull vibration can be minimized on vessels during design and on vessels already built. (10)
- (b) Define resonance, explain in terms of hull vibration and torsional vibration. (5)
- (c) State four sources of vibration in ships. (5)
- OR**
- X. (a) Define slamming. What are the bad effects of slamming on the ships? (5)
- (b) Explain the turning circle manoeuvre. List the main parameters measured during this manoeuvre. (10)
- (c) State three adverse effects of vibration in ships. (5)
