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

**MRE 1602 MARINE ELECTRICAL TECHNOLOGY
(2013 Scheme)**

Time : 3 Hours

Maximum Marks : 100

(5 × 20 = 100)

- I. (a) Explain the rules and regulations governing electrical machineries on board the ships. (10)
- (b) Describe a brushless alternator system with a diagram and explain how the voltage is regulated through AVR. (10)
- OR**
- II. (a) (i) Describe the procedure for giving shore power supply to the ship stating necessary precautions to be taken. (8)
- (ii) Explain the dangers associated with connecting a 60 Hz shore supply to 50 Hz ship system. (4)
- (b) Explain the regulations and requirements of emergency source of power on board the ship. (8)
- III. (a) Explain the safeties to be observed with respect to main switch board including any interlocking arrangements provided. (10)
- (b) Sketch an ACB and explain how the arc is controlled. (10)
- OR**
- IV. (a) Differentiate between insulated and earthed neutral system bringing out their advantages and disadvantages. (10)
- (b) (i) What is the purpose of neutral earthing resistor in H.V. system? (3)
- (ii) Calculate the maximum value of E/F current for 6.6 KV 3 ϕ system with a 200 Ω NER. (3)
- (iii) How is an H.V equipment tested? (4)
- V. (a) With reference to power operated watertight doors that employ electromechanical means for their operation.
- (i) Show with the aid of a sketch how the doors are operated normally from the local position. (6)
- (ii) State how the doors may be opened when electrical failure occurs. (2)
- (iii) State, with reasons the type of motors that may be used for such a duty. (2)
- (b) (i) Explain the working of a salinometer with a diagram. (8)
- (ii) What compensation is provided to temperature changes of water? (2)
- OR**
- VI. (a) (i) State the regulations for providing navigation lights on board. (5)
- (ii) Sketch and explain a typical navigation light indicator panel in the wheel house. (5)
- (b) With reference to a three speed alternating current cage motor with two stators and three contactors, suitable for a cargo winch.
- (i) Sketch a line diagram of electrical circuit and explain. (6)
- (ii) Calculate the winch speed that will be obtained with a frequency of 60 Hz and the following number of pole windings. (4)
- (1) 24 (2) 8 (3) 4

- VII. (a) Describe how you will locate an earth fault in any part of distribution system. (10)
(b) Explain how you will present safety trips in the MSB before a surveyor during dry dock survey in respect of the following, with necessary settings provided. (10)
(i) Over current (ii) under voltage (iii) reverse power.
- OR**
- VIII. (a) Describe how you will measure the resistance of a motor winding using multimeter. (10)
(b) Describe a condition monitoring system of maintenance for electrical equipments on board and explain the precautions to be taken to prevent fire and shock hazard. (10)
- IX. (a) Explain the rules and regulations of electric steering gear. Name the safeties incorporated for steering gear motor. (10)
(b) Draw and explain any one type of electric propulsion system bringing out its advantages. (10)
- OR**
- X. (a) (i) Explain the role of zener diode safety barrier in intrinsically safe circuit with a sketch. (6)
(ii) Explain how a flame proof enclosure is used to provide electrical safeties in hazardous areas. (4)
(b) Explain how maintenance and testings of hazardous equipments/area are carried out. (10)
