

***B.Tech. Degree VI Semester Examination in
Marine Engineering June 2013***

MRE 602 MARINE ELECTRICAL TECHNOLOGY

Time : 3 Hours

Maximum Marks : 100

(5 x 20 = 100)

- I. (a) Explain as to why, upon heavy impact loading, self excited compounded alternators provide the best response, in limiting voltage dip and recovery time. (10)
- (b) Draw and explain a brushless alternator with AVR control. (10)
- OR**
- II. (a) With reference to an emergency source of power in cargoships, describe a typical source and its requirements. (10)
- (b) Give a typical list of essential services, which must be supplied simultaneously. Also describe care and maintenance done on emergency batteries. (10)
- III. (a) Describe a main switch board on board. (10)
- (b) Describe the procedure for parallel operation of two numbers alternators. Give two reasons for parallel operation of alternators. (10)
- OR**
- IV. (a) (i) Name the different types of motors used on board giving their applications. (6)
- (ii) Describe the different types of enclosures for motors. (4)
- (b) (i) What do you mean by the following? (4)
- (1) Locked rotor torque (2) Pull up torque
- (3) Break down torque (4) Full load torque (6)
- (ii) Sketch a graph of starting current and torque against speed of rotation for a single cage rotor.
- V. (a) Sketch an electric telegraph system and describe its operation. (10)
- (b) State the rules and regulations for providing navigation lights on board. Sketch and describe a typical navigation light indicator panel in wheel house. (10)
- OR**
- VI. (a) Sketch and describe a typical windlass/ capstan control with built in overload protection and E/M brake. (10)
- (b) Sketch and describe how watertight doors are operated mentioning their specific requirements. (10)

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- VII. (a) Sketch and describe an instrument used for measuring electrical insulation resistance and explain how it is used to measure the insulation resistance of star connected induction motor. (10)
- (b) Describe a method of salvaging a motor affected by sea water. (10)
- OR**
- VIII. (a) (i) What do you mean by condition monitoring? (3)
- (ii) Describe a method to detect a fault in a lighting distribution board on board the ship. (7)
- (b) Describe a typical fire detection system on board with the features incorporated in the control panel. (10)
- IX. (a) (i) What is meant by Ex-protection? State the requirements for Ex-d protection. (5)
- (ii) Describe the maintenance of such Ex-protected equipments. (5)
- (b) (i) State the advantages of turbo electric propulsion system. (5)
- (ii) Differentiate between use of induction motor and synchronous motor for propulsion system. (5)
- OR**
- X. Write brief description of *any four* of the following: (20)
- (i) Rules and regulation for Electro-Hydraulic steering
 - (ii) Ex-i-protection
 - (iii) Air circuit breaker
 - (iv) Preferential tripping system for alternators
 - (v) Classes of insulation
 - (vi) Insulated neutral system.
