

**INDIAN MARITIME UNIVERSITY**  
**(A Central University, Govt. of India)**

**B.Tech (Marine Engineering) - Semester I**  
December 2015 End Semester Examinations

**Basic Electrical & Electronics Engineering**  
Sub Code: UG11T2104/UG11T1104

Time : 3 hrs  
Date : 19.12.2015

Max Marks: 100  
Pass Marks: 50

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**Part- A**

**{Compulsory Question}**

**(3 x 10 = 30 Marks)**

- 1)
- a) State & explain Kirchhoff's Point Law.
  - b) Distinguish Self & Mutual Inductance.
  - c) Define FORM & CREST Factors.
  - d) What are the conditions for a 3 phase balanced circuit?
  - e) Expand a PMMC instrument. What are its disadvantages?
  - f) What are the errors occurring with Wattmeter connections?
  - g) What is Richardson- Dushman equation? Mention the parameters.
  - h) Differentiate Linear & Non-Linear Resistors.
  - i) Why Filters are required with semiconductor Rectifiers?
  - j) Enumerate types of Transistors depending on applications.

**Part B (5 x 14 = 70 Marks)**

**Answer Any Five of the Following**

- 2)
- a) Derive an expression for the Maximum Power transferred in a circuit, assuming appropriate parameters. (6)
  - b) A network consisting of two 12V Batteries connected in series aiding to three parallel Resistors of  $3\Omega$ ,  $6\Omega$  &  $12\Omega$ . Calculate the difference in total current supplied by the Batteries if both are connected in parallel. (8)
- 3)
- a) Explain the term Hysteresis. How the Hysteresis loss can be minimized. (6)
  - b) Derive the expression for total Inductance when 2 solenoids are connected in series? (8)

- 4)
- a) Explain the effect of a sinusoidal voltage applied to a pure RL series circuit. (6)
  - b) A  $250\sin 100\pi t$  alternating emf is connected to a series RLC circuit with  $R= 15\Omega$ ,  $L=100\text{mH}$  and  $C= 20\mu\text{F}$ . Calculate the circuit parameters:  
 (i) Current      (ii) Impedance      (iii) Pf      (iv) Active Power (8)
- 5)
- a) Discuss with a neat sketch, the working of a Dynamometer type of Wattmeter (7)
  - b) A moving coil galvanometer with internal resistance of  $0.5\Omega$  and a full scale deflection of 10A is to be used to measure 100A. What would be the additional shunt Resistance required for measuring a total of 100A. Draw the connection diagram (7)
- 6)
- a) Explain how two Wattmeters can be used for 3 phase power measurement. (7)
  - b) Explain with a neat sketch how a Maxwell's Bridge can be used to measure Inductance. (7)
- 7) a) Write notes on      (i) Field Emission      (ii) Photo-Electric Emission (6)
- b) Discuss with a neat sketch an unbiased PN junction Diode. (8)
- 8)
- a) With a neat sketch explain the working of a bridge rectifier in a single phase circuit. (7)
  - b) Distinguish between forward & reverse biasing of Diodes. (7)
- 9)
- a) With neat graphs explain the CB characteristics of a Transistor. (6)
  - b) Explain how the Transistor acts like an Amplifier (5)
  - c) Define  $\alpha$ ,  $\beta$ , &  $\gamma$  related to a Transistor (3)

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