**INDIAN MARITIME UNIVERSITY**
**Time Bound Assignment**
**B Tech (ME) Arrear Examinations**
**September/October 2020**
**UG11T3104**
**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

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Date: 15/09/2020 Max Marks: 70
Duration: 3 Hrs Pass Marks: 35

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**Part – A (compulsory)**
**Answer the following (10x2=20 Marks)**

**1.** State Ohm's Law.

**2.** The three terminals of delta connected network are 1, 2, and 3. The resistances between the two terminals are $R_{12}$, $R_{23}$, and $R_{31}$ respectively. Give the expressions to convert them into equivalent resistances $R_1$, $R_2$, and $R_3$ of star connected network.

**3.** State Coulomb's second law of electrostatics and write the mathematical expression.

**4.** Define Root Mean Square Value of an alternating current.

**5.** Give the relation between the line voltage and phase voltage as well as the line current and phase current of a star connected three-phase a.c. circuit.

**6.** The reluctance of a magnetic circuit is $10^5$ AT/Wb and the excitation coil has 200 turns. Find the energy stored in the coil when the instantaneous current at t = 1 second is one Ampere.

**7.** Name the methods to produce damping torque in measuring instruments.

**8.** Give the classification of extrinsic semiconductors. How are they formed?

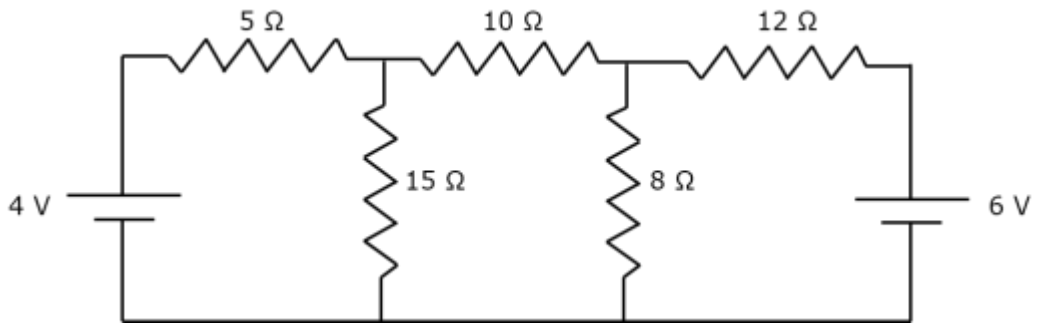
**9.** What is PN junction? How is it formed?

**10.** What is Bipolar Junction Transistor? How are its terminals named?

**Part – B**

**Answer any 5 out of 7 questions (5 x 10= 50 marks)**

**11.** **a.** A network is arranged as shown in the figure below. Determine the value of current in the 8 Ω resistor, using mesh equations. **(5 Marks)**




**b.** A resistance R is connected in series with a parallel circuit comprising two resistors 12 ohms and 8 ohms respectively. The total power dissipated in the circuit is 70 Watts when the applied voltage is 22 Volts. Calculate the value of R. **(5 Marks)**

**12.** What is lead acid battery? Describe the construction and its working principle. **(10 Marks)**

**13.** A series RLC circuit with R = 10 ohms, L = 10mH and C = 1μF has an applied voltage of 200 V at resonant frequency. Calculate the resonant frequency, the current in the circuit, quality factor and bandwidth. **(10 Marks)**

**14.** Discuss the working principle of attraction type moving iron instruments. Also, derive an expression for the deflecting torque. **(10 Marks)**

**15.** Explain how two-wattmeter method is used to measure three phase power in star and delta connected balanced loads. **(10 Marks)**

**16.** **a.** Draw and explain the characteristics of Zener diode. **(6 marks)**

**b.** The arms of an a.c. Maxwell bridge are arranged as follows: AB is a non- inductive resistance of 1,000 Ω in parallel with a capacitor of capacitance 0.5 μF , BC is a non-inductive resistance of 600 Ω CD is an inductive impedance (unknown) and DA is a non- inductive resistance of 400 Ω . If balance is obtained under these conditions, find the value

of the resistance and the inductance of the branch CD. A.C. voltage is applied across the branch AC. **(4 marks)**

**17.** **a.** Draw and explain the working of full wave bridge rectifier using PN junction diodes. **(5 Marks)**

**b.** Draw and explain the output characteristics of NPN transistor in CE configuration. **(5 Marks)**

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