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INSTITUTE OF AERONAUTICAL ENGINEERING (Autonomous)

Four Year B.Tech III Semester End Examinations(Regular) - November, 2019
Regulation: IARE – R18

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hours

(AE)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

1. (a) State and explain the Faradays laws of electromagnetic induction. Mention the type of network elements and explain them. [7M]
- (b) Find the value of the source current for the circuit shown in Figure 1. [7M]

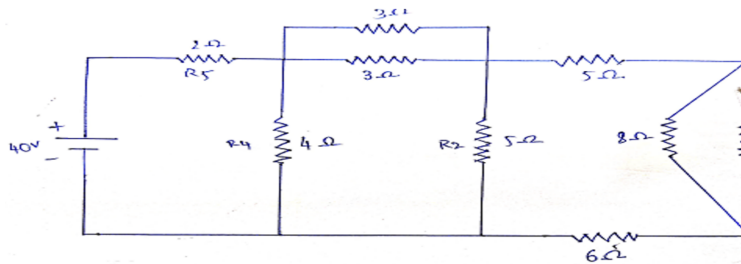


Figure 1

2. (a) Define the terms voltage, current, power and energy with formulae and units. [7M]
- (b) Calculate the equivalent capacitance of the combination shown Figure 2 below across X and Y. [7M]

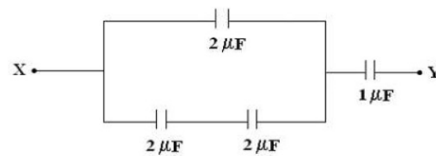


Figure 2

UNIT – II

3. (a) With the help of neat diagrams, classify different types of DC generators with their applications. [7M]
- (b) A 100kW, 240V shunt generator has a field resistance of 55Ω and armature resistance of 0.067Ω . Find the full load generated voltage. [7M]

4. (a) Mention the importance of starter in starting a DC machine. Explain the purpose and working three point starter with a neat sketch. [7M]
- (b) A 440 V, 14 poles lap wound DC shunt motor takes 1550A from the supply. There are 280 conductors. The effective diameter of the armature is 1.3m and active length of each conductor is 0.33m. The value of average flux density is 0.7T. Calculate the value of torque developed and speed of motor. [7M]

UNIT – III

5. (a) What are the functions of transformer? Describe the constructional details of single phase transformer. [7M]
- (b) A transformer supplied a load of 32A at 415V. If the primary voltage is 3320V, find the following: i) Secondary volt ampere ii) Primary current iii) Primary volt ampere. Neglect losses and magnetizing current. [7M]
6. (a) Define various alternating quantities. Give expression for RMS and average value form factor and peak factor. [7M]
- (b) Find the average value, RMS value peak factor and form factor for a half wave rectified sine wave. [7M]

UNIT – IV

7. (a) Define terms conductor, insulators and semiconductors. Explain the operation of PN junction diode in forward bias and reverse bias. [7M]
- (b) Calculate the values of forward current in the case of PN junction diode, with $I_0=10\mu\text{A}$, $V_f = 0.8\text{V}$ at $T=3000\text{K}$. Assume Si diode. [7M]
8. (a) List out the merits and demerits of bridge type full wave rectifiers over center tapped type full wave rectifiers. [7M]
- (b) A full wave bridge rectifier having load resistance of 100Ω is fed with 220V, 50Hz through a step-down transformer of turn's ratio 11:1. Assuming the diodes ideal, calculate
i) DC output voltage ii) Peak inverse voltage iii) Rectifier efficiency. [7M]

UNIT – V

9. (a) Define transistor. Explain the input and output characteristics of a transistor in CE configuration. [7M]
- (b) In a common base connection of a transistor, the emitter current is 1mA. If the emitter circuit is open, the collector current is $50\mu\text{A}$. Find the total collector current. Given that $\alpha = 0.92$ [7M]
10. (a) Define current amplification factor. Explain the term and current gains and their relationship for N-P-N transistor. [7M]
- (b) Compute the values of I_E and I_c for a transistor circuit having $I_{CBo}=50\mu\text{A}$ and $\alpha_{dc}=0.99$. (Assume $I_B=1\text{mA}$) [7M]