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INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech II Semester End Examinations (Regular) - May, 2019

Regulation: IARE – R18

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hours

(ME)

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) Define the following with an example [7M]
- i. Linear and Non-linear circuit
 - ii. Planar and Non-planar circuit
 - iii. Unilateral and Bilateral circuit
- (b) Find the current in each branch of the circuit shown in Figure 1 using current division method. [7M]

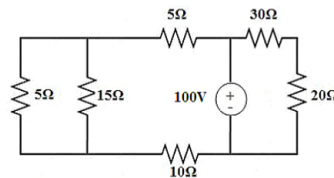


Figure 1

2. (a) Explain the principle and operation of moving iron instrument with neat sketch. [7M]
- (b) Using star delta transformation find the current and power supplied by the battery shown in Figure 2. [7M]

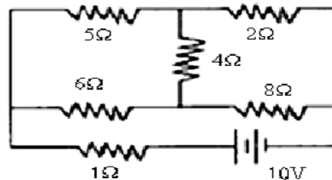


Figure 2

UNIT – II

3. (a) Classify the types of DC generators. Describe the construction of DC machine with neat diagram. [7M]

- (b) A 10KW, 6 pole DC generator develops an emf of 200V at 1500 rpm. The armature has a lap connected winding. The average flux density over a pole pitch is 0.9 Tesla. The length and diameter of the armature are 0.25m and 0.2m respectively. Calculate:
i) Flux per pole ii) The total number of active conductors in the armature. [7M]
4. (a) Explain the construction and working of three-point starter. List the applications of DC motors. [7M]
- (b) A 4-pole series motor has 944 wave-connected armature conductors. At a certain load, the flux per pole is 34.6 mWb and the total mechanical torque developed is 209 N-m. Calculate the line current taken by the motor and the speed at which it will run with an applied voltage of 500 V. Total motor resistance is 3Ω . [7M]

UNIT – III

5. (a) Classify the losses of transformer. Briefly explain the efficiency of transformer. [7M]
- (b) An AC sinusoidal current has RMS value of 40 A at 50 Hz frequency. Write the expression of instantaneous current and obtain its value at 0.002 sec after passing through maximum positive value. [7M]
6. (a) With a neat diagram explain the construction and working of alternator. [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]

UNIT – IV

7. (a) Sketch the V-I characteristics of p-n junction diode for forward bias voltages. Analyze between the incremental resistance and the apparent resistance of the diode. [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]
8. (a) Define rectifier. Explain the working of bridge rectifier with waveforms. [7M]
- (b) For an FWR circuit, the AC voltage input to transformer primary = 115V. Transformer secondary voltage is 50V, $R_L = 25\Omega$. Determine
i) Peak DC component. RMS and AC component of load voltage. [7M]
ii) Peak DC component. RMS and AC component of load current.

UNIT – V

9. (a) Draw and explain the input and output characteristics of a transistor in CE configuration. [7M]
- (b) For an NPN transistor with $\alpha_N = 0.98$, $I_{CO} = 2A$ and $I_{EO} = 1.6\mu A$ connected in common emitter configuration, determine the minimum base current for which the transistor enters into saturation region. V_{CC} and load resistance are given as 12 V and $4.0 K\Omega$ respectively. [7M]
10. (a) What is the need for biasing a transistor. Explain the operation of BJT and its types. [7M]
- (b) Determine I_C , I_B and α for a transistor circuit having $I_E = 12mA$ and $\beta = 100$. [7M]