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INSTITUTE OF AERONAUTICAL ENGINEERING (Autonomous)

Four Year B.Tech III Semester End Examinations (Regular) - November, 2018

Regulation: IARE – R16

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 Hours

(Common to AE | ME | CE)

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) Explain the basic parts of indicating instruments with neat sketch. [7M]
- (b) Calculate the current through 20Ω resistor for given Figure 1. [7M]

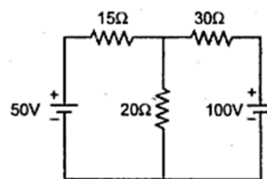


Figure 1

2. (a) State Kirchoff's voltage law and current law. Explain the Faraday's laws of electromagnetic induction. [7M]
- (b) Determine the resistance between A and C shown in Figure 2 using star delta transformation. [7M]

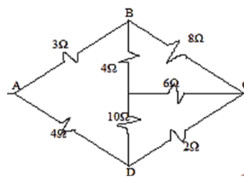


Figure 2

UNIT – II

3. (a) Explain the principle of operation of DC Generator with a neat sketch. [7M]
- (b) A 6 pole DC machine has 400 conductors and each conductor can carry 80A. Flux/pole is 0.020 Wb and the machine is driven at 1800 rpm. Calculate power developed in armature and electromagnetic torque if conductors are wave and lap connected windings. [7M]
4. (a) Derive the equation of torque developed in a DC motor. Give the applications of DC motors. [7M]
- (b) What is the purpose of commutator in a DC machine? Derive the EMF equation of DC generator. [7M]

UNIT – III

5. (a) Explain the principle of operation of a 1Φ transformer. Derive the equation of induced EMF in a 1Φ transformer. [7M]
- (b) Explain the types of losses, efficiency and regulation of a 1Φ transformer. [7M]
6. (a) Explain the principle of operation of alternator with neat sketch [7M]
- (b) Explain the procedure to determinate regulation of an alternator by synchronous impedance method. [7M]

UNIT – IV

7. (a) Draw and explain the input and output V-I characteristics of PN junction diode [7M]
- (b) A center-tapped full-wave rectifier connected to a transformer whose each secondary coil has a r.m.s. voltage of 12 V. Assume the internal resistances of the diode and load resistance are $50\ \Omega$ and $1k\ \Omega$, respectively. Find: [7M]
 - i. The load current measured by a voltmeter.
 - ii. The D.C. load current.
8. (a) Explain the working of bridge rectifier with waveforms. [7M]
- (b) Determine DC output voltage, PIV, rectification efficiency of the given circuit. [7M]

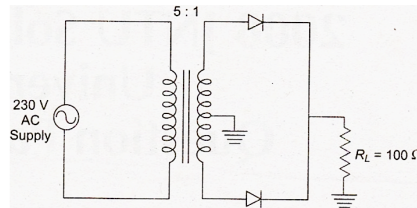


Figure 3

UNIT – V

9. (a) Explain the input and output characteristics of a BJT in common collector configuration. [7M]
- (b) For the circuit shown in figure 4 find the emitter, base and collector voltages and currents. Use $\beta = 50$, assume $V_{BE} = 0.8V$ independent of current level. [7M]

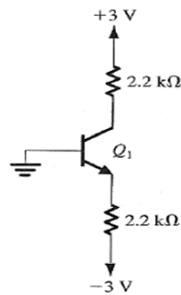


Figure 4

10. (a) Explain how load line is drawn for biasing a transistor. [7M]
- (b) For a transistor circuit having $\alpha = 0.98$, $I_{CBO} = 5\ \mu A$ and $I_B = 100\ \mu A$, find I_C and I_E . [7M]

