Time: 3 Hour	s (Common to CSE   IT)	Max Marks: 70
FUNDAM	ENTALS OF ELECTRICAL AND ELECTRONI	CS ENGINEERING
- A POR CV	B.Tech II Semester End Examinations (Supplementary) - May, 2019 Regulation: IARE – R16	
TARE	NSTITUTE OF AERONAUTICAL ENGIN (Autonomous)	IEERING
Hall Ticket	No Qu	estion Paper Code: AEE001

#### Answer ONE Question from each Unit All Questions Carry Equal Marks All parts of the question must be answered in one place only

## $\mathbf{UNIT}-\mathbf{I}$

- 1. (a) Explain the concept of energy stored in mutual inductance. [7M]
  - (b) State Kirchhoff's laws. For the circuit shown in Figure 1, find the current through  $30\Omega$  resistance.

[7M]

Figure 1

- 2. (a) Explain the Kirchhoff's laws with example and neat diagrams. [7M]
  - (b) In the circuit shown in Figure 2 find the equivalent capacitance between A and D [7M]



Figure 2

## $\mathbf{UNIT}-\mathbf{II}$

- 3. (a) Explain the following terms with reference to network topology with an example. [7M]
  i) Twig ii) Node iii) Links iv) Trees
  - (b) In a series circuits source resistance is 45 ohms and load resistor is RL with 20V DC supply. If RL is variable of resistances 10, 20, 30, 40, 45, 50, 60, 70 ohms respectively. Calculate for what resistance of load maximum power is transferred, maximum power value, current and voltage drops in each case. [7M]

- 4. (a) State and explain Superposition theorem. What are the limitations of Superposition theorem.
  - [7M]
  - (b) Calculate the current i in the network shown in Figure 4 using superposition theorem . [7M]



Figure 3

#### $\mathbf{UNIT} - \mathbf{III}$

- 5. (a) Give the steady state response of series RC circuit using sinusoidal input. [7M]
  - (b) In a series RLC circuit, the maximum inductor voltage is twice the capacitor voltage maximum. However the circuit current lags the applied voltage by  $30^0$  and the instantaneous drop across the inductance is given by  $V_L=100 \sin 377t$  V. Assuming the resistance being  $20\Omega$ , find the values of the inductance and capacitance. [7M]
- 6. (a) Write the advantages of three-phase system compare to single phase systems. [7M]
  - (b) A three phase 4 wire 100 V (L-L) system supplied a balanced Y connected load having impedances of  $10\angle 30^0\Omega$  in each phase. Calculate line currents and draw the phasor diagram. How much current is flowing through the neutral [7M]

### $\mathbf{UNIT}-\mathbf{IV}$

- 7. (a) Derive the expression for efficiency in half-wave rectifier with necessary diagrams. [7M]
  - (b) A 230V, 50 Hz voltage is applied to the primary of a 10:1 transformer used in bridge rectifier having a load resistance of 600Ω. Assuming the diodes are ideal, determine i) DC output voltage ii) DC power delivered to the load iii) PIV and iv) Ripple frequency. [7M]
- 8. (a) Draw the V-I characteristics of P-N junction diode and explain its operation. [7M]

(b) In a Zener diode regulator, the supply voltage = 300V,  $V_z$  = 220V,  $I_z$  = 15mA and load current = 25mA. Calculate the value of resistor required to be connected in series with the Zener diode.

[7M]

# $\mathbf{UNIT} - \mathbf{V}$

- 9. (a) Draw and explain the input and output characteristics of Common base configuration [7M]
  - (b) In a certain transistor, the emitter current is 1.02 times as large as the collector current. If the emitter current is 12 mA, Calculate the base current. [7M]
- 10. (a) Explain the operation of NPN transistor. [7M]
  - (b) For a transistor circuit having  $\alpha = 0.98$ ,  $I_{CBO} = I_{CO} = 5\mu A$  and  $I_B = 100\mu A$ , find  $I_C$  and  $I_E$ . [7M]

$$-\circ\circ\bigcirc\circ\circ-$$