Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester B.Tech Degree Examination June 2022 (2019 scheme)

Course Code: EST130

Course Name: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

(2019 -Scheme)

PART I : BASIC ELECTRICAL ENGINEERING

Max. Marks: 50 Duration: 90 min

PART A

Answer all questions, each carries 4 marks Marks

1 Three resistors, 6Ω, 10Ω and 15Ω are connected in star configuration. Obtain the equivalent resistance in a delta configuration. (4)

2 Two coils A and B of 500 and 750 turns respectively are connected in series on the same magnetic circuit of reluctance 1.55×10^6 AT/Wb. Assuming that there is no flux leakage, calculate (i) self-inductance of each coil and (ii) mutual inductance between coils. (4)

3 Explain the concept of statically induced emf in a magnetic circuit. (4)

4 Derive the relation between line and phase voltages in a 3 phase star connected system. (4)

5 Define the following terms with an example: (4)

a) Phase b) Phase difference

PART B

Answer one full question from each module, each question carries 10 marks.

MODULE 1

6 Find the mesh currents i_1, i_2, i_3 in the circuit shown in Figure 1 by performing mesh analysis (10)

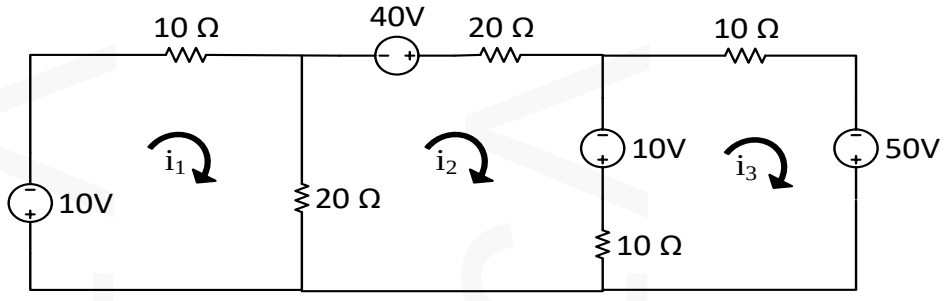

Figure 1

OR

7 Find the node voltages v_1 and v_2 in the circuit given in Fig. 2. Also find the power dissipated in the 4Ω resistor. (10)

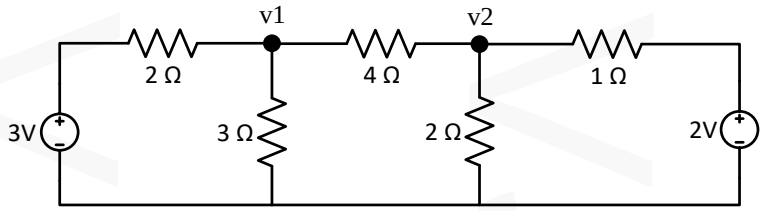

Figure 2

MODULE 2

8 a A core forms a closed magnetic loop of path length 32 cm. Half of this path has a cross-sectional area of 2 cm^2 and relative permeability 800. The other half has a cross-sectional area of 4 cm^2 and relative permeability 400. Find the current needed to produce a flux of 0· 4 Wb in the core if it is wound with 1000 turns of insulated wire. Ignore leakage and fringing effects. (6)

b Compare electric and magnetic circuits. (4)

OR

9 a An iron ring of cross-sectional area 6 cm^2 is wound with a wire of 100 turns and has a saw cut of 2 mm. Calculate the magnetising current required to produce a flux of 0·1 mWb. if mean length of magnetic path is 30 cm and relative permeability of iron is 470. (8)

b Define the terms relative permeability and flux density and give the relation between the two terms. (2)

MODULE 3

10 Explain with phasor diagram instantaneous power when alternating current is supplied through a series R-L circuit. Also draw the impedance triangle and write an expression for active, reactive and apparent power in R-L circuit. (10)

OR

11 A balanced three phase load has per phase impedance of (30 + j50) ohm. if the load is connected across 400 V, 3 phase supply, find (i) Phase current (ii) line current (iii) power supplied to the load when it is connected in (a) star (b) delta. (10)

****

PART 2 : BASIC ELECTRONICS ENGINEERING

Max. Marks: 50 Duration: 90 min

PART A

Answer all questions, each carries 4 marks Marks

12		Draw the symbol of resistor and explain any three specifications.	(4)
13		For an NPN Transistor, $\alpha = 0.98$, $I_B = 100\ \mu A$, Find I_E and I_C.	(4)
14		Explain the action of shunt capacitor filter.	(4)
15		Explain the working principle of Zener voltage regulator.	(4)
16		Differentiate between amplitude modulation (AM) and frequency modulation (FM).	(4)

PART B

Answer one full question from each module, each question carries 10 marks.

MODULE 4

17	a	Explain with necessary diagrams, the principle of operation of NPN transistor	(5)
	b	Describe the colour coding of a resistor with example.	(5)

OR

18	a	Draw the circuit diagram of a common emitter amplifier.	(3)
	b	Explain the input and output characteristics of common emitter configuration with neat diagrams	(7)

MODULE 5

19		Describe the components of a DC power supply using a neat block diagram.	(10)

OR

20		Explain the working of RC coupled amplifier with circuit diagram and relevant waveforms. Also explain the frequency response of RC coupled amplifier.	(10)

MODULE 6

21	a	Explain the concept of cells in cellular communication.	(3)
	b	Draw the block diagram of GSM and explain the principle of operation.	(7)

OR

22	a	Describe the principle and working of an antenna.	(6)
	b	What is frequency reuse? Explain with a diagram.	(4)

****