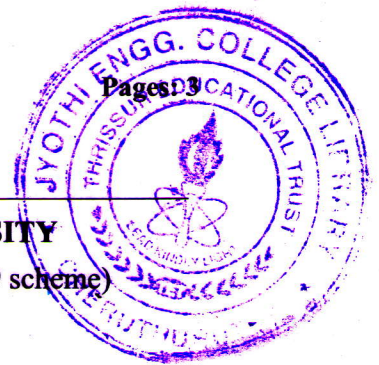


Reg No.: _____

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)

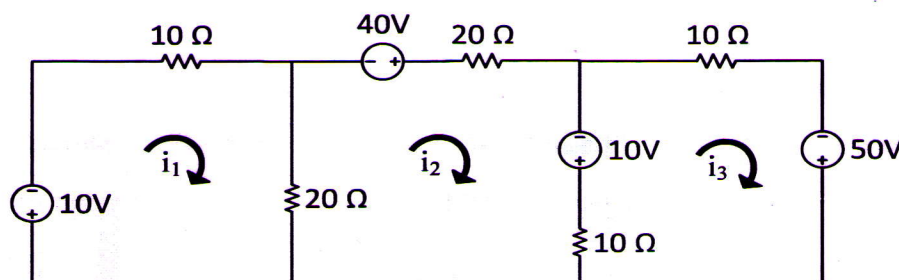


Figure 1

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)

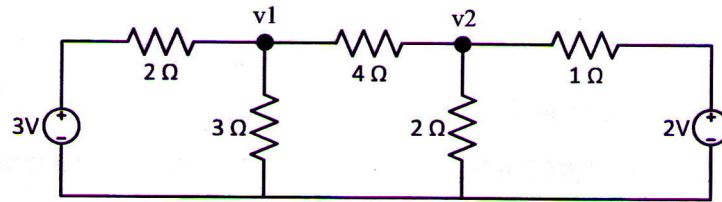


Figure 2

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 $(30 + j50)\text{ ohm}$. 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) |
