Reg No.:_____ Name:_____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

First Semester B.Tech Degree Regular and Supplementary Examination December 2023 (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

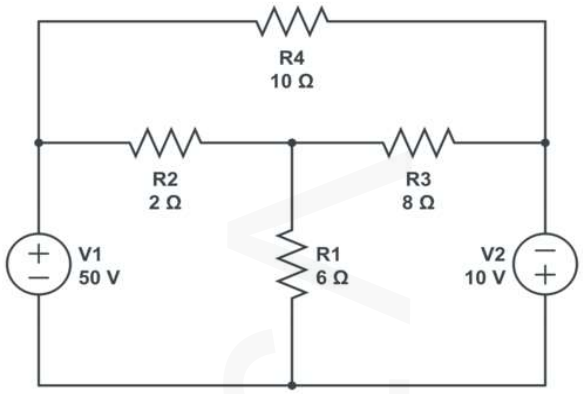
1	Compare electric and magnetic circuits.	(4)
2	Sketch the current and voltage waveform, if $I = I \sin(\omega t - 60)$, $v = V \cos(\omega t + 30)$. What is the Phase difference between the two waveforms.	(4)
3	Explain the following terms : a) Reluctance b) Flux Density c) MMF d) Permeability	(4)
4	Show that for a sinusoidal voltage RMS value is 0.707 times its maximum value.	(4)
5	The impedance of an R-L series circuit is 50 + j100 Ω. When the supply frequency is increased from 50 Hz to100 Hz, what will be the value of impedance?	(4)

PART B

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

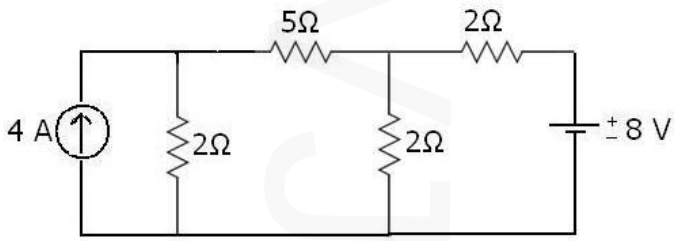
MODULE 1

6 Find the current through 10 ohm resistor using Mesh Analysis. (10)



OR

7 Find the current through 5 ohm resistor using Nodal Analysis. (10)



MODULE 2

8 A rectangular shape iron core has an air gap of 0. 9cm.The mean length of the flux path through iron is 39.99 cm. The relative permeability of iron is 2000. The coil has 1000 turns. The cross-sectional area of the core is 9 $cm^{2.}$. Calculate the current required to produce a flux of 1 mWb in the core. (10)

OR

9 a A sinusoidal voltage of V= 325 sin314t when applied across an L-R series circuit causes a current of I = 14.14 sin (314t – 60º) flowing through the circuit. Calculate the value of L and R of the circuit. Also calculate the power consumed. (6)

b Distinguish between statically induced EMF and dynamically induced EMF. (4)

MODULE 3

10 Two impedances Z_1 and Z_2 when connected separately across 220 V, 50Hz supply, consume 300W and 150W at a power factor of 0.4 lagging and 0.7 leading respectively. When the two impedances are connected in series across the same supply, find total power consumed and overall power factor. (10)

OR

11 (a) Three similar coils each having a resistance of 5 ohm and an inductance of 0.02H are connected across 440V, 3-phase, 50Hz supply. Calculate the line current and total power absorbed when connected in (a)star and (b) Delta (10)

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PART 2 : BASIC ELECTRONICS ENGINEERING

Max. Marks: 50 Duration: 90 min

PART A

Answer all questions, each carries 4 marks Marks

12 What is a variable capacitor? List any two applications of variable capacitor. (4)

13 What is depletion region in a diode? How is it formed? (4)

14 Derive the relation between current gain of CE and CB configurations in a transistor. (4)

15 Draw the block diagram of a public address system. (4)

16 Explain the concept of frequency reuse in cellular communication. (4)

PART B

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

MODULE 4

17 a) Give any four specifications of a resistor. (4)

b) Explain the colour coding of resistor. Illustrate with examples. (6)

OR

18 With neat sketches, explain the input and output characteristics of a transistor in Common Emitter configuration. (10)

MODULE 5

19 Explain the working of a full wave bridge rectifier. Draw its input and output waveforms. (10)

OR

20 With a neat circuit diagram, explain the components and working of an RC coupled amplifier. Draw its frequency response and mark 3dB bandwidth. (10)

MODULE 6

21 a) What is modulation? Differentiate between AM and FM. (6)

b) Explain the principle of an antenna. (4)

OR

22 With a block diagram, explain the principle of GSM system. (10)

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