Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

First Semester B.Tech Degree (S, FE) Examination June 2024 (2019 Scheme)

Course Code: EST130
Course Name: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING
(2019 -Scheme)
PART I : BASIC ELECTRICAL ENGINEERING

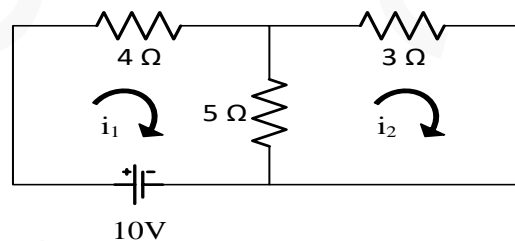Max. Marks: 50   Duration: 90 min

PART A

*Answer all questions, each carries 4 marks*   Marks

1   Write the mesh equations in terms of i_1 and i_2 for the following circuit.   (4)

2   A conductor of length 1 metre moves at right angles to a uniform magnetic field of   (4)
     flux density 1.5 Wb/m^2 with a velocity of 50 metre/second. Calculate the emf.
     induced in it. Also find the value of induced emf. when the conductor moves at an
     angle of 30º to the direction of the field.

3   Explain the significance of RMS value representation of alternating quantity.   (4)

4   Compare single phase and three phase ac systems.   (4)

5   Define active, reactive and apparent power of a circuit.   (4)

PART B

Answer one full question from each module, each question carries 10 marks.
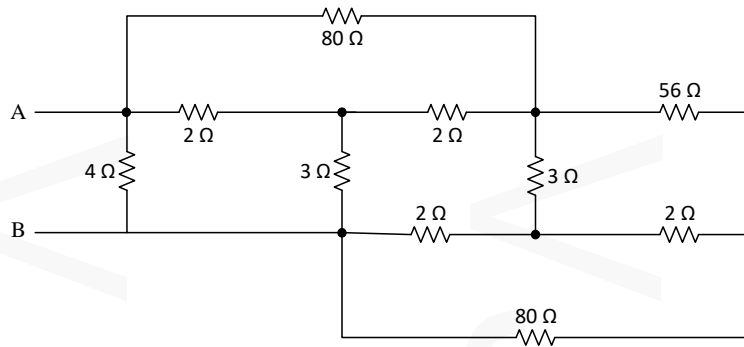### MODULE 1

6   a   Write the node equations in terms of v_1 and v_2 for the following circuit   (5)
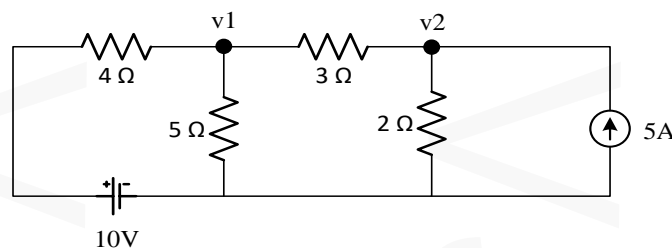
     b   Derive the expression for energy stored in an inductor.   (5)

OR

7 Find the resistance between points A and B (10)

MODULE 2

8 a An iron ring has a mean diameter of 15cm and cross sectional area of 20cm^2, a radial (7)
air gap of 0.5mm is cut in it. It is uniformly wound with 1500turns of insulated wire
and a magnetizing current of 1A produces a flux of 1mwb. Neglecting the effect of
magnetic leakage and fringing. Calculate i) Reluctance of the circuit ii) relative
permeability of iron and iii) inductance of the winding.

   b Differentiate between statically induced emf and mutually induced emf (3)

OR

9 a Coils A and B in a magnetic circuit have 600 and 500 turns respectively. A current (5)
of 8 A in coil A produces a flux of 0·04 Wb. If the coefficient of coupling is 0·2,
calculate (i) Self-inductance of coil A, with B open-circuited. (ii) Flux linking with
coil B.(iii) The average e.m.f. induced in coil B when the flux with it changes from
zero to full value in 0·02 seconds. (iv) Mutual inductance. And (v) Average e.m.f.
in B when the current in A changes from 0 to 8 A in 0·05 seconds.

   b Explain the terms peak factor and form factor of a sinusoidal waveform. (5)

MODULE 3

10 A series RC circuit takes a power of 7000 W when connected to 200 V, 50 Hz supply. (10)
The voltage across the resistor is 130 V. Calculate (i) Current (ii) Resistance (iii)
impedance (iv) Capacitance (v) Power factor (vi) Equation for instantaneous values
of voltage and current.

OR

11 A 400 V three phase 50 Hz power supply is applied across the three terminals of a (10)
delta connected three phase load. The resistance and reactance of each phase is 6
ohm and 8 ohm, respectively. Calculate the line current, phase current, active power,
reactive power and apparent power of the circuit.

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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 | The colour bands marked on a capacitor are Yellow, Violet, Orange, White, Red. What is the value of Capacitance? | (4) |

13 What is meant by Avalanche Breakdown?   (4)

14 What are the factors that cause a reduction of gain at lower and higher   (4)
    frequencies, in RC coupled amplifier?

15 List the merits and demerits of bridge rectifier.   (4)

16 Describe the principle of amplitude modulation (AM) with relevant waveforms.   (4)

PART B

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

MODULE 4

17 a Draw and explain the forward and reverse characteristics of PN Junction diode   (6)

    b Explain the different types of variable resistors   (4)

OR

18 a Explain the three transistor configurations with figures.   (6)

    b Derive the relation between current gains in all three transistor configurations. (4)

MODULE 5

19 a What is the purpose of filter in a rectified power supply?   (5)

    b Describe the amplifier action of a BJT with diagram.   (5)

OR

20 Draw the block diagram of an electronic instrumentation system & explain the   (10)
    function of each section

MODULE 6

21 a Write the equation of an AM wave if $m(t) = A_m cos(2\pi f_m t)$ and $c(t) =$ (3)
       $A_c cos(2\pi f_c t)$. Also draw the AM waveform.

    b Describe the working of a super heterodyne receiver using a block diagram.   (7)

OR

22 a List the frequency bands used in communication systems.   (4)

    b With the help of a diagram explain the basic principle of cellular communication. (6)

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