

Reg No.: _____

Name: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester B.Tech Degree (S, FE) Examination January 2024 (2019 Scheme)



Course Code: EST130

Course Name: **BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING**
(2019 -Scheme)

PART I : BASIC ELECTRICAL ENGINEERING

Max. Marks: 50

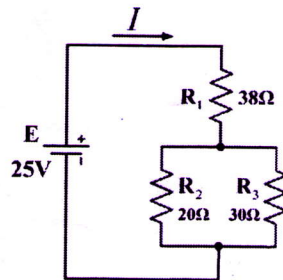
Duration: 90 min

PART A

Answer all questions, each carries 4 marks

Marks

- 1 Calculate the current drawn from the supply in the circuit shown below. (4)



- 2 Three resistors $R_A=6$ ohm, $R_B=4$ ohm and $R_C=3$ ohm is connected in star. Obtain the equivalent delta circuit. (4)
- 3 Derive the expression for energy stored by an inductor. (4)
- 4 Define Coefficient of coupling. Show the relationship between coefficient of coupling and mutual inductance. (4)
- 5 Prove that the power consumed is zero in a pure capacitive circuit is zero when an alternating sinusoidal voltage is applied. Draw the phasors for voltage and current (4)

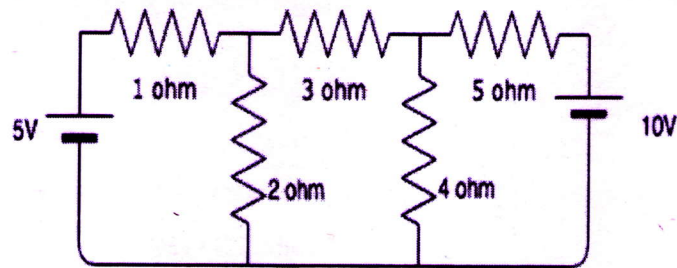
PART B

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

MODULE 1

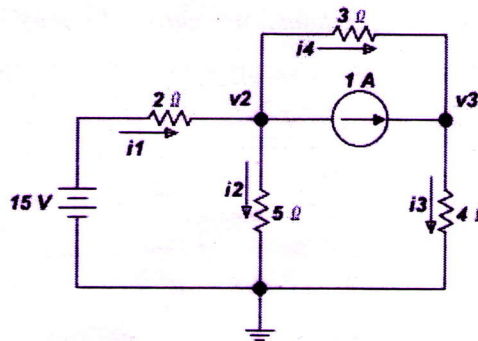
- 6 Using mesh analysis determine the magnitude and direction of the current flowing through 3 ohm resistor. (10)

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OR

- 7 Using Nodal analysis find currents i_1, i_2, i_3 and i_4 . (10)



MODULE 2

- 8 Calculate the average value, rms value and form factor of the output voltage wave of half wave rectifier. (10)

OR

- 9 (a) A toroidal air-cored coil has 1000 turns closely wound, the mean radius of the toroid is 30cm and the diameter of each turn is 4 cm. when a current of 10 A flows through it, find (6)
- a) MMF of the coil
 - b) flux produced
 - c) Flux density
- (b) Derive the expression for self-inductance of a coil. (4)

MODULE 3

- 10 A series RLC circuit containing a resistance of 12Ω , an inductance of 0.15H and a capacitor of $100\mu\text{F}$ are connected in series across a 100V , 50Hz supply. (10)

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Calculate the total circuit impedance, the circuits current, voltage across each element, power factor

OR

- 11 (a) Give reasons for the adoption of three phase A.C. systems over single phase A.C. systems. (4)
- (b) A balanced delta connected load of impedance $16 + j12 \Omega$ /phase is connected to a three phase 400V supply. Find the phase current, line current, power factor, Active power and reactive power. (6)

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 resistor? List any two applications of variable resistor. (4)
- 13 Explain what is avalanche breakdown in a diode. (4)
- 14 Draw the output characteristics of a transistor in Common Emitter configuration and show the 3 regions of operation. (4)
- 15 Draw the block diagram of an electronic instrumentation system. (4)
- 16 Explain the cellular concept in mobile communication. (4)

PART B

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

MODULE 4

- 17 Explain the action of a PN junction diode under forward biased and reverse biased condition. Draw its VI characteristics. (10)

OR

- 18 With neat sketches, explain the working of a NPN transistor. (10)
Also draw the three configurations of a transistor.

MODULE 5

- 19 a) Explain the working of a capacitor filter with relevant waveforms. (4)
- b) Draw the circuit diagram and explain the working of a simple Zener voltage regulator. (6)

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- 20 a) Explain the concept of voltage divider biasing in a Common Emitter amplifier circuit. (6)
- b) Explain the frequency response of an RC coupled amplifier. (4)

MODULE 6

- 21 Draw and explain the block diagram of a super heterodyne receiver. (10)

OR

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