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)

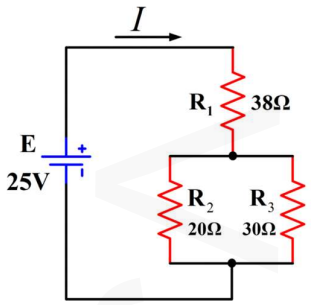
PART I : BASIC ELECTRICAL ENGINEERING

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 Rc=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)

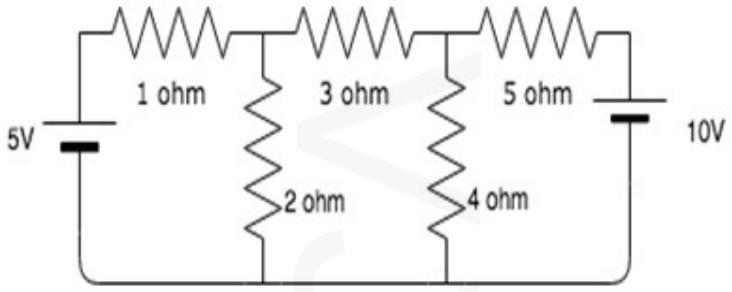
5 Prove that the power consumed is zero in a pure capacitive circuit is zero when an alternating sinusoidal voltage is applied. Draw the phasors for voltage and current (4)

PART B

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

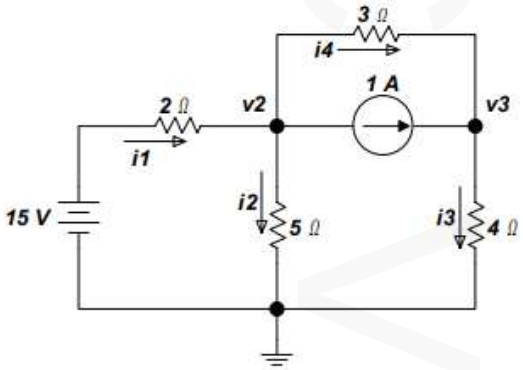
MODULE 1

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



OR

7 Using Nodal analysis find currents i1, i2,i3 andi4.. (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 100uF are connected in series across a 100V, 50Hz supply. (10)

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 Ω/phase is connected to a three phase 400V supply. Find the phase current, line current, power factor, Active power and reactive power. (6)

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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 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)

OR

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)

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