Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
First Semester B.Tech Degree Examination December 2021 (2019 scheme)

Course Code: EST130
Course Name: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

PART I: BASIC ELECTRICAL ENGINEERING

(2019 Scheme)

Max. Marks:50   Duration: 90 min

## PART A
Answer all questions, each carries 4 marks.

1   A coil of 180 turns is linked with a flux of 0.03 Wb when carrying a current of 10A. Calculate the inductance of the coil. If the current is uniformly reversed in 0.04 sec, calculate the emf induced in the coil.

2   An alternating current is represented by i(t)=14.14 sin (377t). Find (i)rms value (ii) frequency (iii)time period and (iv)instantaneous value of the current at t=3ms.

3   Derive an expression for the energy stored in an inductor.

4   Derive the expression for the current in an ac series RLC circuit.

5   A resistance of 10Ω, an inductance of 0.3 H, and a capacitance of 100μF are connected in series across 230V, 50 Hz single phase power supply. Calculate the impedance, current through and power factor of the circuit.   (5x4=20)

PART B
Answer one full question from each module, each question carries 10 marks
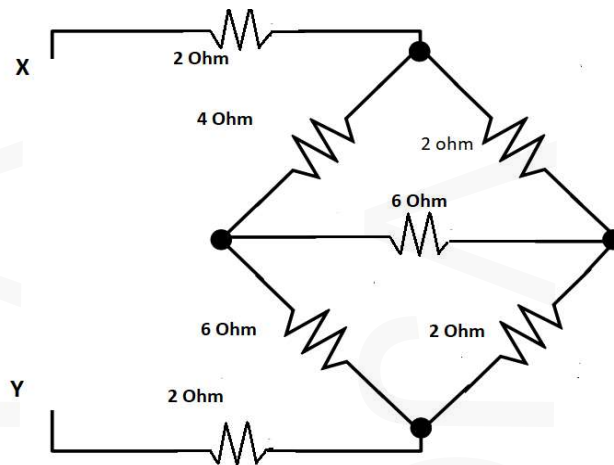
Module-I

6   Use nodal analysis to find voltages V_a , V_b , V_c , V_d .   (10)
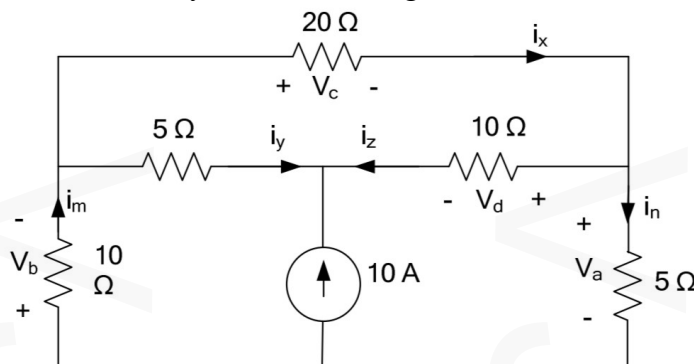
OR

7   Find the equivalent resistance between terminal X-Y in the network   (10)

Module-II

8   An iron ring has a cross section area of 3 cm^2 and a mean diameter of 25 cm. An air gap of 0.5mm is cut across the section of the ring. The ring is wound with a coil of 200 turns through which a current of 3A is passed. If the total magnetic flux is 0.28 mWb, find the relative permeability of iron, assuming no magnetic leakage.   (10)

OR

9   a)   The instantaneous value of an alternating voltage is given by v=110 sin 314t. Find the angular velocity, frequency, and time period of the voltage.   (6)

b)   Differentiate between statically and dynamically induced emfs.   (4)

Module-III

10   A resistance of 10Ω, an inductance of 0.3 H and a capacitance of 100μF are connected in series across 230V, 50 Hz single phase supply. Calculate:

i) the impedance of the circuit ii) Current through the circuit iii) Voltage across R, L and C, and iv) Power consumed by the circuit.   (10)

OR

11   A balanced delta connected 3 phase load is fed from a 3 phase, 400 V, 50 Hz power supply. The line current is 20A and the total power absorbed by the load is 10kW. Calculate (i) the impedance in each branch (ii) the power factor and (ii) the total power consumed if the same impedances are star connected.   (10)

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PART II: BASIC ELECTRONICS ENGINEERING

(2019 Scheme)

Max. Marks: 50   Duration: 90 min

PART A

Answer all questions, each carries 4 marks.

12   Find the capacitance values for the following codes (i) 2n2 (ii) 104K.

13   What do you mean by majority and minority carriers in a semiconductor?

14   Describe the block diagram of a public addressing system

15   Narrate the working of a capacitor filter.

16   Write the frequency range and typical applications of VHF and UHF   (5x4=20) frequency bands.

PART B

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

Module-IV

17   a)   Explain the formation of potential barrier in a P-N junction diode.   (5)

     b)   Draw and explain the V-I characteristics of a PN junction diode under forward and reverse bias.   (5)

OR

18   a)   Explain the working of an NPN transistor mentioning all current components.   (6)

     b)   The dc current gain of a transistor in common emitter configuration is 100. Find its dc current gain in common base configuration.   (4)

Module-V

19   a)   Sketch the block diagram of a DC power supply and explain the role of each block.   (5)

     b)   Draw and explain the working of a full wave bridge rectifier circuit.   (5)

OR

20   a)   Sketch the frequency response of a transistor amplifier and comment on the shape of the curve.   (7)

     b)   What is the role of emitter resistor in an RC coupled amplifier?   (3)

Module-VI

21   a)   State the merits and demerits of Amplitude Modulation.   (4)

     b)   Sketch the block diagram of a superheterodyne receiver and explain its working.   (6)

OR

22   a)   Describe the working principle of an antenna.   (3)

     b)   Draw the block diagram of a GSM system and explain its working.   (7)

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