Reg No.:_____ Name:_____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester B.Tech Degree Examination July 2021 (2019 scheme)

Course Code: EST130

Course Name: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

(2019 Scheme)

PART I: BASIC ELECTRICAL ENGINEERING

Max. Marks:50 Duration:90min

PART A Marks

Answer all questions, each carries 4 marks.

1 A conductor of length 0.5m kept at right angles to a uniform magnetic field of flux density $2Wb/m^2$ moves with a velocity of 75 m/s at an angle of 60^0 to the field. Calculate the emf induced in the conductor. (4)

2 Define mutual inductance. Two coupled coils of self inductance 0.8H and 0.35H have a coefficient of coupling 0.9. Find the mutual inductance between the coils. (4)

3 State and explain Kirchhoff's laws with examples (4)

4 Find the trignometrical, exponential and polar forms of the vector 8+j6. (4)

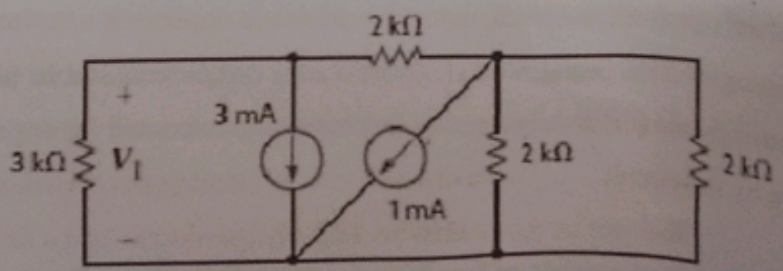
5 Define (i) active power, (ii) reactive power, (iii) apparent power and (iv) power factor of an ac circuit. (4)

PART B

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

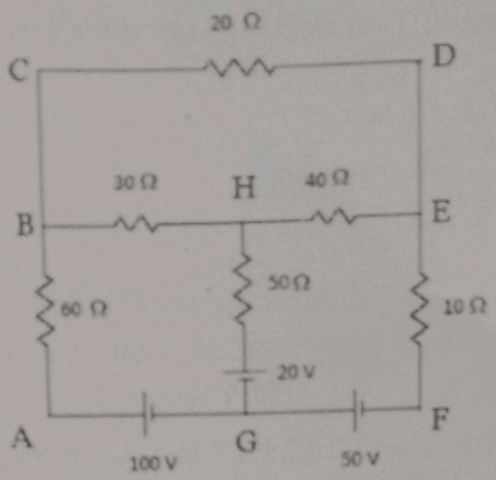
Module-I

6 Use nodal analysis to find V_1 in the given circuit. (10)



OR

7 Find the current in each branch of the following circuit using mesh analysis? (10)

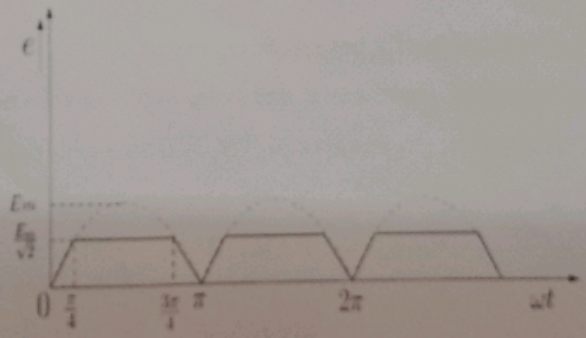


Module-II

8 An iron ring of cross sectional area $1cm^2$ is wound with a coil of 2000 turns. Calculate the magnetising current required to produce a flux of 0.1 mWb in the iron path if mean length of the path is 30cm and relative permeability of iron is 2500. Neglect magnetic leakages and fringing. (10)

OR

9 A full wave rectified sine function is clipped at 0.707 of its maximum value as shown in figure. Find the average and rms values of the function. (10)



Module-III

10 A sinusoidal voltage V=230∠15 of frequency 50 Hz is applied to a series RL circuit consisting of R=5 Ω and =0.1 H. Calculate (i) rms current and its phase angle (ii) power factor (iii) average power (iv) reactive power and (v) apparent power drawn by the circuit. (10)

OR

11 A balanced 3 phase load consists of 3 coils each of resistance 6 Ω and inductive reactance of 8 Ω. Determine the line current and power absorbed when the coils are (i) star connected (ii) delta connected across 400V, 3 phase supply. (10)

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PART II: BASIC ELECTRONICS ENGINEERING

Max. Marks: 50 Duration: 90 min

Marks

PART A

Answer all questions, each carries 4 marks.

12 In a 4 band resistor the last colour in the colour band is gold. If the upper range of resistance is 3.465Ω find its colour code. (4)

13 Differentiate between Avalanche breakdown and Zener breakdown? (4)

14 Draw and explain the block diagram of a public address system. (4)

15 Give reasons for decrease in transistor amplifier gain at low frequencies and high frequencies. (4)

16 Explain the relevance of Intermediate Frequency in a superheterodyne receiver. (4)

PART B

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

Module-IV

17 a) What are the different types of inductors? Give two typical applications of inductor. (5)

b) Describe the VI characteristics of PN junction diode. (5)

OR

18 a) Derive the relation between common base current gain and common emitter current gain, (4)

b) Sketch the output characteristic of a transistor and explain different regions of operation. (6)

Module-V

19 a) Explain the working of a full wave bridge rectifier. (5)

b) Explain the working of an RC coupled amplifier. (5)

OR

20 a) Describe the working of a zener diode voltage regulator. (5)

b) Draw and explain the frequency response of an RC coupled amplifier. (5)

Module-VI

21 a) Draw the frequency spectrum of an amplitude modulated (AM) wave. Given that modulating signal is of frequency fm and amplitude Vm and carrier is of frequency fc and amplitude Vc. Take modulation index as m. What is the bandwidth requirement of this AM wave? (5)

b) With a neat sketch explain AM super heterodyne receiver. (5)

OR

22 a) Describe the principle and block diagram of a GSM system. (5)

b) Explain the concept of cells and frequency reuse in cellular communication. (5)

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