Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

First Semester B.Tech Degree Regular and Supplementary Examination December 2022 (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 State and explain Kirchhoff's laws. (4)

2 Differentiate between ideal and real current sources with circuit representation. (4)

3 Compare electric and magnetic circuits with circuit diagram. (4)

4 A coil of 200 turns carries a current of 4A. The magnetic flux linkage with the coil is 0.02Wb. Calculate the self-induced emf in the coil. (4)

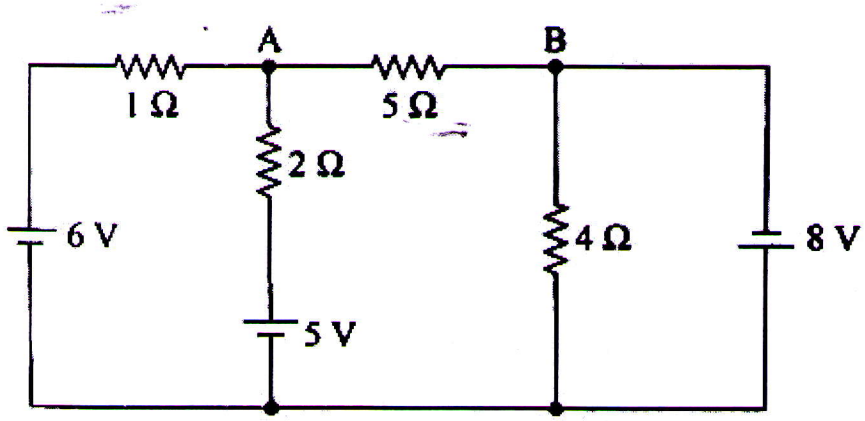
5 A delta-connected load of 12Ω resistance and 16-Ω reactance are connected across a 100V, 50 Hz supply. Find line current, phase current and power factor. (4)

PART B

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

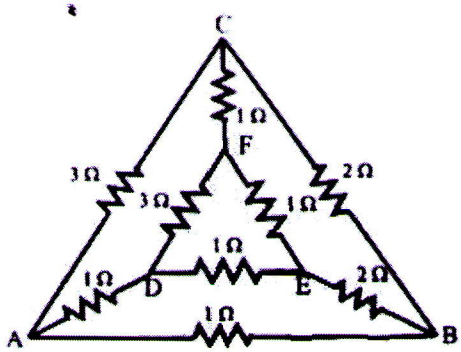
MODULE 1

6 Calculate the current flowing through 5Ω resistor using the nodal method. (10)



OR

7 Find the resistance between points A and B in network shown. (10)



MODULE 2

8 a) Two identical coils 1 and 2 are wound on the same magnetic core. Current in coil 1, which is changing at the rate of 600 A/s, induces emf of 12 V in coil 2. Calculate the mutual inductance between the coils. If the self-inductance of each coil is 50mH, calculate the coefficient of coupling between coils. (7)

b) Define a) MMF b) Field Strength c) Flux Density (3)

OR

9 a) An alternating current is given by 14.14Sin377t. Find the (a) rms value of current (b) Average value of current (c) frequency (d) form factor (e) peak factor (f) instantaneous value of current when t=3ms. (6)

b) Explain the terms statically induced emf and dynamically induced emf. (4)

MODULE 3

10 A capacitor having a capacitance of 20μF is connected in series with a non – inductive resistance of 200Ω across 220V, 50 Hz supply. Calculate the following 1) Impedance 2) Current 3) Power Factor 4) Power drawn from supply. (10)

OR

11 Show that the power consumed by three identical single-phase loads connected in delta is equal to three times the power consumed when the phase loads are connected in star. (10)

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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 Explain any four resistor specifications. (4)

13 Compare the three transistor configurations. (4)

14 Why does voltage gain of an RC coupled amplifier decrease at low and high frequencies? (4)

15 Describe the working of a full wave bridge rectifier. (4)

16 What is the basic principle of cellular communication? (4)

PART B

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

MODULE 4

17 a. Describe the principle of operation of an NPN transistor. (5)

b. What is an inductor? How does an inductor work? (5)

OR

18 a. For an NPN transistor, α=0.95 and I_E=10mA. Find I_B and I_C. (5)

b. With necessary diagram, explain the V-I characteristics of PN junction diode. (5)

MODULE 5

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

b. Give the circuit diagram of an RC coupled amplifier. Explain its working. (5)

OR

20 a. Give the circuit diagram of a simple zener voltage regulator. Explain its working. (5)

b. With necessary block diagram, explain an electronic instrumentation system. (5)

MODULE 6

21 Explain the principle and block diagram of GSM. (10)

OR

22 a. With necessary block diagram explain the principle of super heterodyne receiver. (5)

b. Compare amplitude and frequency modulation. (5)

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