

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

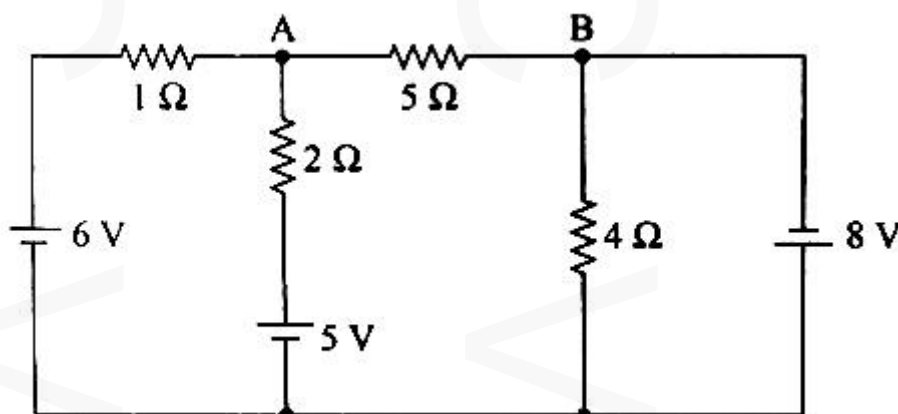
Duration: 90 min

**PART A***Answer all questions, each carries 4 marks*

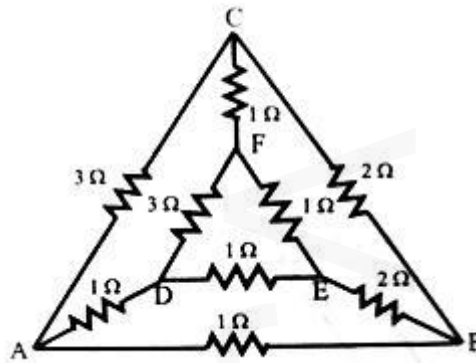
- |   |  | Marks |
|---|--|-------|
| 1 | State and explain Kirchhoff's laws.  | (4)   |
| 2 | Differentiate between ideal and real current sources with circuit representation.  | (4)   |
| 3 | Compare electric and magnetic circuits with circuit diagram.   | (4)   |
| 4 | A coil of 200 turns carries 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 $12\Omega$ resistance and $16\text{-}\Omega$ 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  $5\Omega$  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  $14.14\sin 377t$ . Find the (a) rms value of current (6)  
 (b) Average value of current (c) frequency (d) form factor (e) peak factor (f) instantaneous value of current when  $t=3\text{ms}$ .
- b) Explain the terms statically induced emf and dynamically induced emf. (4)

**MODULE 3**

- 10 A capacitor having a capacitance of  $20\mu\text{F}$  is connected in series with a non – inductive resistance of  $200\Omega$  across 220V, 50 Hz supply. Calculate the following (10)  
 1) Impedance 2) Current 3) Power Factor 4) Power drawn from supply.

**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,  $\alpha=0.95$  and  $I_E=10\text{mA}$ . 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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