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Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1 (S,FE) S2 (S,FE) Examinations May 2026 (2019 Scheme)

Course Code: EST130

Course Name: BASICS OF ELECTRICAL AND ELECTRONICS
ENGINEERING

(2019 -Scheme)

- Use separate answer sheets for Part 1 and Part 2
- No separate minimum marks are required to pass.

Max. Marks: 100 marks

Duration: 3 Hrs

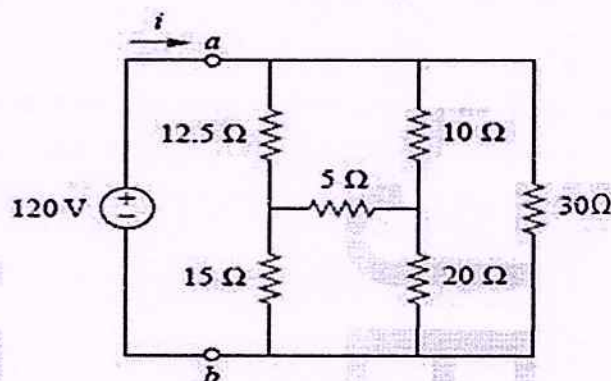
PART I: BASIC ELECTRICAL ENGINEERING**PART A***Answer all questions, each carries 4 marks*

Marks

- | | | |
|---|--|-----|
| 1 | State and explain Kirchhoff's laws. | (4) |
| 2 | Derive the expression for energy stored in an inductor. | (4) |
| 3 | Compare electric and magnetic circuits. | (4) |
| 4 | Derive the RMS value of a sinusoidal waveform. | (4) |
| 5 | Draw the power triangle and define active, reactive and apparent power in ac circuits. | (4) |

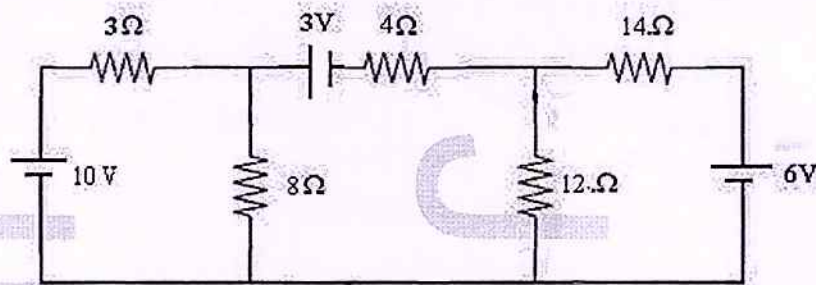
PART B*Answer one full question from each module, each question carries 10 marks.***MODULE 1**

- | | | |
|---|--|------|
| 6 | Obtain the equivalent resistance R_{ab} for the circuit in figure and use it to find current i . | (10) |
|---|--|------|



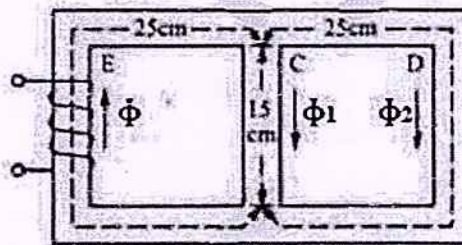
OR

- 7 For the circuit shown below, find current through 8Ω and 12Ω resistors using Nodal Analysis. (10)



MODULE 2

- 8 a) Define the terms (i) mmf, (ii) magnetic field intensity, (iii) magnetic flux density. (3)
 b) A cast steel magnetic structure made of a bar section $8\text{cm} \times 2\text{cm}$ shown in figure. Determine the current that the magnetising coil on the left limb carry so that a flux of 2 mWb is produced in the right limb. Take $\mu_r = 600$ and neglect leakage. (7)



OR

- 9 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. (10)

MODULE 3

- 10 When a voltage of 100V , 50Hz is applied to a choking coil A, the current taken is 8A and the power is 120W . When applied to a coil B, the current is 10A and the power is 500W . What will be the current and power when 100V , 50Hz supply is given to the coils connected in series? (10)

OR

- 11 A balanced delta connected RYB system with an effective voltage of 400V , has a balanced load with impedances $(3 + j4)\Omega$. Calculate (i) phase currents, (ii) line currents, (iii) power in each phase (iv) total power in the circuit if the load impedances are connected in star. (10)

PART 2: BASIC ELECTRONICS ENGINEERING

PART A

Answer all questions, each carries 4 marks

Marks

- 1 Write down the colour code of a resistor whose value is $1\text{M}\Omega \pm 5\%$ in four band coding. What is the expected maximum value of the resistor? (4)
- 2 How is avalanche breakdown different from Zener breakdown? (4)
- 3 What is the function of a transducer in an electronic instrumentation system? Give two examples of transducers. (4)
- 4 What is the function of IF amplifier in a super heterodyne receiver? (4)
- 5 Compare the characteristics of AM and FM (4)

PART B

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

MODULE 4

- 6 a) With the help of energy band diagram, explain the characteristics of insulators, conductors and semiconductors. (6)
- b) A diode acts as a closed switch in forward direction and an open switch in the reverse direction. Justify this behaviour giving reasons. (4)

OR

- 7 a) Sketch the output characteristics of a transistor in CE configuration and explain how output resistance could be obtained from the characteristics. (7)
- b) List the four operating modes of a transistor. Which mode is used for active operation? (3)

MODULE 5

- 8 a) Draw the circuit of a bridge rectifier and explain its working with the help of waveforms. If you connect a capacitor at the output of this circuit, what changes in the output waveforms can be observed? (7)
- b) Define PIV of a rectifier. How is it different from PIV of a diode? (3)

OR

- 9 a) Draw the block diagram of a public address system and explain different blocks. (7)
- b) Explain the need for properly biasing a transistor. (3)

MODULE 6

- 10 a) Why modulation is necessary in an electronic communication system? (5)
- b) Explain the principle of electromagnetic radiation from an antenna. (5)

OR

- 11 a) Draw the block diagram of GSM and explain the functions of BSS, BSC and NSS. (6)
- b) Explain the following terms related to cellular communication. (4)
- (i) Hand off
- (ii) Frequency reuse.
