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Question Paper Code : 30052

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

First Semester

Electrical and Electronics Engineering

EE25C03 — FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS
ENGINEERING

(Common to : Electrical and Computer Engineering)

(Regulations 2025)

Time : 3 hours

Maximum : 100 marks

CO – Course Outcomes

CO1	Explain core electrical engineering concepts.
CO2	Apply basic engineering calculations in electrical systems.
CO3	Identify common various components and its applications in various electrical circuits

BL – Bloom's Taxonomy Levels

(L1-Remember, L2-Understand, L3-Apply, L4-Analyze, L5-Evaluate, L6-Create)

Answer ALL questions.

PART – A (Total Marks = 40)

[Q. No. 1 to Q. No. 10 ; $10 \times 1 = 10$ Marks (Multiple Choice Questions)

Q. No. 11 to Q. No. 20; $10 \times 3 = 30$ Marks]

Q.No.	Questions	Marks	CO	BL
1.	Which element stores energy in an electric field? (A) Resistor (B) Inductor (C) Capacitor (D) Battery	1	1	1
2.	Kirchhoff's Current Law is based on: (A) Energy conservation (B) Charge conservation (C) Power conservation (D) Voltage law	1	1	2

3.	For a pure inductive circuit, the current: (A) Leads voltage (B) Lags voltage by 90° (C) Is in phase (D) Is zero	1	2	1
4.	The RMS value of a sinusoidal waveform is: (A) V_m (B) $V_m/2$ (C) $V_m/\sqrt{2}$ (D) $2V_m$	1	2	1
5.	The unit of magnetic flux is: (A) Tesla (B) Weber (C) Henry (D) Ampere	1	3	2
6.	Hysteresis loss occurs due to: (A) Flux leakage (B) Molecular friction (C) Resistance (D) Voltage drop	1	4	1
7.	Typical transmission voltage level is: (A) 230 V (B) 11 kV (C) 132 kV (D) 5 V	1	4	2
8.	Which wiring method is safest for modern buildings? (A) Cleat wiring (B) TRS wiring (C) Conduit wiring (D) Wooden casing	1	4	1
9.	A Zener diode is mainly used for: (A) Amplification (B) Rectification (C) Voltage regulation (D) Oscillation	1	5	2
10.	The output of an AND gate is 1 when: (A) Any one input is 1 (B) All inputs are 1 (C) All inputs are 0 (D) Inputs are unequal	1	5	1

11.	Define dependent and independent sources with examples.	3	1	1
12.	Briefly explain the concept of Kirchhoff's Voltage Law (KVL) with a simple example.	3	1	2
13.	A sinusoidal voltage has frequency 50 Hz. Calculate its angular frequency.	3	1	3
14.	Determine the form factor of a sinusoidal waveform given RMS and average values.	3	2	3
15.	Distinguish between hysteresis loss and eddy current loss.	3	2	4
16.	Define fringing effect and state its impact.	3	3	1
17.	State the operating voltage levels used in generation, transmission and distribution.	3	3	2
18.	Differentiate cleat wiring and conduit wiring.	3	4	4
19.	State the advantages of bridge rectifier over half-wave rectifier	3	5	5
20.	Construct the truth table of a D flip-flop.	3	4	6

PART – B (5 × 12 = 60 marks)

Q.No.		Questions	Marks	CO	BL
21.	(a)	A circuit consists of a $10\ \Omega$ resistor in series with a parallel combination of $20\ \Omega$ and $30\ \Omega$ resistors connected to a 20 V source. Find the total resistance, circuit current and current through each branch.	12	1	5
		OR			
	(b)	Explain and derive the expressions for RMS value, average value, peak value, and form factor of a sinusoidal waveform. Illustrate with relevant waveform.	12	1	4

22.	(a)	Describe the characteristics and losses in magnetic circuits, including hysteresis and eddy current losses.	12	2	4
	OR				
	(b)	Illustrate on fringing effect in magnetic circuits and explain how it affects flux distribution.	12	2	4
23.	(a)	Describe in detail the operation of a thermal power plant with a block diagram and explain the role of each component	12	3	4
	OR				
	(b)	Discuss in detail various types of distribution systems (radial, ring, and interconnected) and compare their advantages and disadvantages.	12	3	4
24.	(a)	Elucidate on different types of domestic wiring systems such as cleat, wooden/PVC casing, TRS, and conduit wiring with neat diagrams. Compare their advantages and limitations.	12	4	4
	OR				
	(b)	Explain the classification and properties of conducting and insulating materials used in electrical wiring systems.	12	4	5
25.	(a)	Explain the operation and V&I characteristics of a PN junction diode with a neat diagram. Discuss its behavior under forward and reverse bias.	12	5	4
	OR				
	(b)	Describe different types of JK flip-flop with logic diagrams and truth tables. Compare its operations with SR flip flop.	12	5	5