Reg. No.															

B.Tech. / M.Tech. (Integrated) DEGREE EXAMINATION, DECEMBER 2023
First and Second Semester

21EES101T – ELECTRICAL AND ELECTRONICS ENGINEERING
(For the candidates admitted from the academic year 2022-2023)

Note:
(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part – B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours Max. Marks: 75

PART – A (20 × 1 = 20Marks)
Answer **ALL** Questions

	Marks	BL	CO	PO
1. The expression for rms voltage of an AC sinusoid is given by (A) $\frac{V_m}{2}$ (B) $\frac{V_m}{\sqrt{2}}$ (C) $\frac{V_{dc}}{\sqrt{2}}$ (D) $\frac{V_{dc}}{\sqrt{3}}$	1	1	1	1
2. The law proposed by ohm is relevant in condition with (A) Temperature constant (B) Pressure constant (C) Volume constant (D) Constant pressure and temperature	1	1	1	1
3. In a pure inductive circuit (L), the current _____by a voltage of 90 degree. (A) Leads (B) Lags (C) In phase (D) Greater than and equal	1	1	1	1
4. According to superposition theorem, while considering an individual source, all other voltage sources can be (A) Replaced by current sources (B) Short circuited (C) Open circuited (D) Replaced by external resistor	1	1	1	1
5. The diode is used in (A) Uncontrolled rectifiers (B) Stepping down AC voltage circuits (C) Stepping up AC voltage circuits (D) Controlled rectifiers	1	1	2	1
6. The voltage controlled semiconductor device is (A) Zener diode (B) BJT (C) PN diode (D) MOSFET	1	1	2	1
7. The logical expression Y=AB+AC is known as (A) Standard sum of product form (B) Sum of product form (C) Standard product of sum form (D) Product of sum form	1	1	2	1

8. The input X-NOR gate gives high output 1 1 2 1
   (A) When one input is high and other is low (B) Only when both inputs are low
   (C) When both inputs are same (D) Only when both the inputs are high

9. The material used for the yoke of a DC machine is to provide a 1 1 3 1
   (A) Current path (B) Flux path
   (C) Mechanical support (D) Conversion from AC to DC

10. Rotor windings are not present in 1 1 3 1
   (A) DC shunt motor (B) DC series motor
   (C) Squirrel cage induction motor (D) Slip ring induction motor

11. Which of the following motor is more suitable for EV applications? 1 1 3 1
   (A) BLDC motor (B) Stepper motor
   (C) DC shunt motor (D) Induction motor

12. Latest E-vehicle launched by Tata motors is 1 1 3 1
   (A) Tigor EV (B) Kona
   (C) Chetak (D) Nexon EV

13. In LVDT, when the iron core is exactly at centre, then net output of transducer is 1 1 4 1
   (A) Zero (B) Maximum
   (C) Average (D) Unpredictable

14. Which type of transducer is most commonly used in testing of structural load bearing limitations? 1 1 4 1
   (A) Thermocouple (B) Thermistor
   (C) LDR (D) Strain gauge

15. The current flow in photodiode when light fall on its junction is called 1 1 4 1
   (A) Knee current (B) Saturation current
   (C) Photo current (D) Pinchoff current

16. Which transducer is used for light spectrum detection? 1 1 4 1
   (A) Laser (B) Photo transistor
   (C) LED (D) LVDT

17. Earth wire is made up of 1 1 5 1
   (A) Copper (B) Iron
   (C) Aluminium (D) Galvanized steel

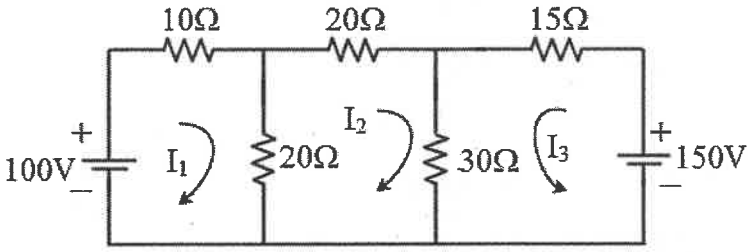
18. Solar efficiency will be commonly in the range of 1 1 5 1
   (A) 3% to 5% (B) 90% to 95%
   (C) 40% to 50% (D) 10% to 20%

19. The most widely used material for solar cell fabrication is 1 1 5 1
   (A) Germanium (B) Silicon
   (C) Aluminium (D) Silver

20.	The predominant material used for PV cell manufacturing is (A) Silicon (B) Titanium (C) Arsenide (D) Gallium	1	1	5	1

PART – B (5 × 8 = 40 Marks)

Answer **ALL** Questions

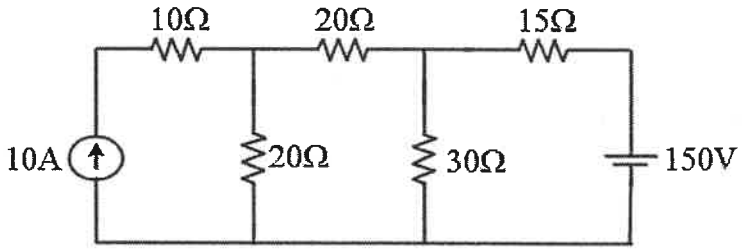
		Marks	BL	CO	PO
21. a.	Using Mesh analysis, find mesh current in first loop (I_1).  	8	2	1	2
	(OR)				
b.	A resistor of 10Ω, an inductance of 100 mH and a capacitance of 150 mF are connected in series and supplied by 200V, 50 Hz supply. Calculate, (i) Inductive reactance (ii) Capacitive reactance (iii) Impedance (iv) Current	8	2	1	2
22. a.i.	For the Boolean function given below, obtain the canonical SOP form and canonical POS form $Y(A,B,C) = A + B'C$.	4	2	2	2
ii.	Draw the output characteristics of common emitter configuration and name three regions.	4	1	2	1
	(OR)				
b.	Explain the operating characteristics of SCR with relevant diagrams.	8	1	2	1
23. a.	Explain in detail about the construction and principle of operation of a DC generator.	8	1	3	1
	(OR)				
b.	With a neat diagram, describe the working of BLDC motor. List out the advantages, disadvantages and applications of it.	8	1	3	1
24. a.	Explain the principle, construction and working of permanent magnet moving coil instrument.	8	1	4	1
	(OR)				
b.	Write short notes on		1	4	1
	(i) Piezoelectric transducer	4			
	(ii) Inductive proximity sensor	4			
25. a.	Explain in detail about hybrid electric vehicle and plug in hybrid electric vehicle with neat sketches.	8	1	5	1
	(OR)				

b.i.	What is the necessity of earthing? Explain pipe earthing with a neat diagram.	4	1	5	1
ii.	Draw the single line diagram of a typical generation, transmission and distribution of AC power system.	4	1	5	1

PART – C (1 × 15 = 15 Marks)

Answer **ANY ONE** Questions

		Marks	BL	CO	PO
26.	Simplify the following expression using k-map and draw logic diagrams for the simplified expressions. (i) $Y(A,B,C,D)=\sum m(0,1,2,4,5,8,9,10,12,13)$ (ii) $F(A,B,C,D)=\Pi M(0,2,4,14,15)$ Obtain the logic diagram for the above expressions.	15	2	2	2
27.	Using nodal analysis find all the node voltages.	15	2	1	2



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