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B.Tech / M.Tech (Integrated) DEGREE EXAMINATION, JANUARY 2024

First Semester

21EES101T - ELECTRICAL AND ELECTRONICS ENGINEERING

(For the candidates admitted during the academic year 2022-2023 onwards)

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 = 20 Marks)

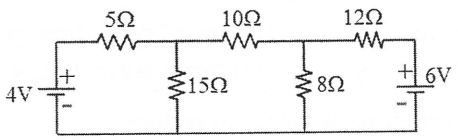
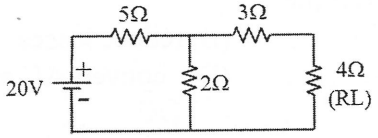
Answer **all** Questions

		Marks	BL	CO
1.	Thevenin's resistance is found by _____ (A) Shorting all voltage sources (B) Opening all current sources (C) Shorting all voltage sources and opening all current sources (D) Opening all voltage sources and shorting all current sources	1	1	1
2.	The internal resistance for the maximum transfer of power should be (A) equal to load resistance (B) greater than load resistance (C) zero (D) lesser than load resistance	1	1	1
3.	The 2ohm and 3 ohm resistor are in series the equivalent resistance is (A) 1.2 ohm (B) 5 ohm (C) 4.2 ohm (D) 9 ohm	1	3	1
4.	In a star connected system, the current flowing through the line is (A) Greater than the phase current (B) Equal to the phase current (C) Lesser than the phase current (D) zero	1	1	1
5.	How many AND gates are required to realize A.B+C.D+E (A) 2 (B) 4 (C) 3 (D) 1	1	1	1
6.	When both inputs are HIGH, output Y will be ___ (HIGH, LOW) and the LED will ____ (light, not light). (A) Low, Light (B) High, Light (C) High, Not Light (D) Low, Not Light	1	2	2
7.	The structure of the IGBT is a____ (A) P-N-P structure connected by a MOS gate (B) N-N-P-P structure connected by a MOS gate (C) P-N-P-N structure connected by a MOS gate (D) N-P-N-P structure connected by a MOS gate	1	1	2
8.	An SCR is a_____ (A) four layer, four junction device (B) four layer, three junction device (C) four layer, two junction device (D) three layer, single junction device	1	1	2
9.	Thin laminations are used in a machine in order to reduce (A) Eddy current losses (B) Hysteresis losses (C) Copper losses (D) Interference	1	1	3
10.	Commutator in DC generator is used for (A) collecting of current (B) reduce losses (C) increase efficiency (D) convert AC armature current in to DC	1	1	3

11.	The frame of an induction motor is usually made of (A) Silicon steel (B) Cast iron (C) Aluminum (D) Bronze	1	1	3
12.	An elevator drive is required to operate in_____ (A) one quadrant only (B) two quadrants. (C) three quadrants. (D) four quadrants.	1	1	3
13.	LEDs fabricated from the gallium arsenide emit radiation in the (A) Visible Range (B) Infrared Region (C) Ultra violet Region (D) Ultrasonic Region	1	1	4
14.	A device consists of a photo transistor and a led is_____ (A) Photo diode (B) Opto coupler (C) Opto isolator (D) Photo multiplier	1	1	4
15.	In Ultrasonic proximity sensors the distance between the sensor and the target is determined by (A) time taken by reflected light to reach back to sensor. (B) time taken by the sound to reflect back to the sensor. (C) measuring voltage at the output. (D) measuring changes in output current.	1	1	4
16.	_____ is the principle of operation of LVDT (A) Mutual inductance (B) Self-inductance (C) Permanence (D) Reluctance	1	1	4
17.	For proper earthing, what should be the maximum value of earth resistance while carrying out the testing of the earth's continuity path? (A) 1 ohm (B) 2 ohm (C) 5 ohm (D) 10 ohm	1	1	5
18.	Identify the device which is used to give the signal to the circuit breaker at the time of fault (A) Fuse (B) Isolator (C) Relay (D) CT	1	1	5
19.	Electric vehicles and inductionhybrid vehicles have the following components in common except ____ (A) Battery (B) ECU (C) Generator (D) internal combustion engine	1	1	5
20.	The highest transmission voltage used in India is (A) 230 kV (B) 1100 kV (C) 765 kV (D) 400 kV	1	1	5

PART - B (5 × 8 = 40 Marks)

Answer **all** Questions

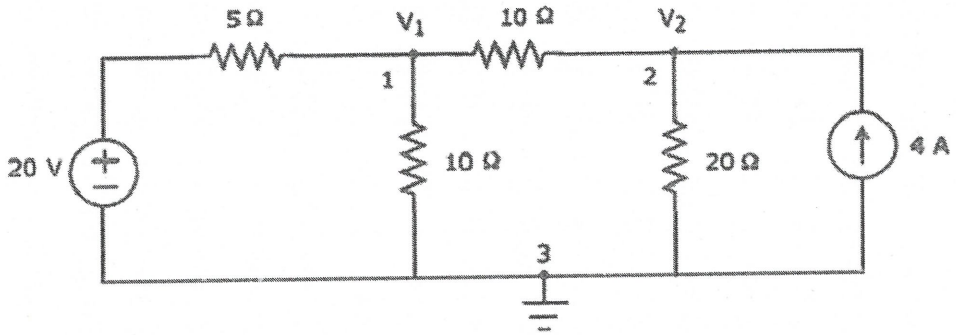
		Marks	BL	CO
21.a.	Determine the value of current in the 8Ω resistor, using mesh analysis for the given circuit. 	8	2	1
	(OR)			
b.	Define Thevenin's theorem. And find the current flow through the load resistance RL using Thevenin's theorem in the circuit given below. 	8	3	1

22.	(a) With a neat diagram, explain in detail about the construction, working and characteristics of Bipolar Junction Transistor	8	5	2
	(OR)			
	(b) Design a logic circuit that consists of 4 inputs (A, B, C, D) and two outputs. Output F1=1 if the input binary number is 9 or more than 9. Output F2=1 if the input binary number is 5 or less than 5.			
23.	(a) With neat sketch, explain the construction and working of servo motor.	8	3	3
	(OR)			
	(b) Explain the principle, construction and working of induction motor with a neat diagram			
24.	(a) Illustrate the construction and working of LVDT and mention its advantages and disadvantages	8	3	4
	(OR)			
	(b) Explain the construction and working of photo voltaic cell with a neat sketch			
25.	(a) Explain the need of Smart grid and its operation .	8	3	5
	(OR)			
	(b) Explain the different Types of Earthing with a neat diagram			

PART - C (1 × 15 = 15 Marks) — **Marks BL CO**

Answer **any 1** Questions

26.	Find the value of V1 and V2 using Nodal Analysis.	15	5	1



27.	Using the K-map method obtain the minimal SOP & POS expressions for the function F(x,y,z,w)=∑(1,3,4,5,6,7,9,12,13)	15	5	2

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