Reg. No.

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

21EES101T – ELECTRICAL AND ELECTRONICS ENGINEERING

(For the candidates admitted from the academic year 2021 - 2022 & 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. A 100 W lamp is connected across 220 V DC supply. Determine the value of current drawn by the lamp? (A) 2.5A (B) 10A (C) 0.45A (D) 5A	1	2	1	1
2. To neglect the voltage source in Thevenin's theorem, the terminal across the sources are _____. (A) Replaced by load resistance (B) Replaced by capacitance (C) Short circuited (D) Open circuited	1	1	1	1
3. In a circuit with pure inductance, the current _____ the voltage by 90°. (A) Leads (B) Lags (C) In phase (D) Greater than and equal	1	1	1	1
4. The nodal method of circuit analysis is based on _____. (A) Thevenin's theorem (B) Norton's theorem (C) Kirchoff voltage law (D) Kirchoff current law	1	1	2	1
5. The knee voltage of silicon diode is _____. (A) 0.2 V (B) 0.7 V (C) 0.8 V (D) 1.0 V	1	1	2	1
6. Which among the following is a current controlled device? (A) BJT (B) MOSFET (C) JFET (D) Diode	1	1	2	1
7. The algebraic function of XOR gate is _____. (A) $xy'+x'y$ (B) $xy+x'y'$ (C) $xy+x'y$ (D) $xy+xy'$	1	1	2	1
8. FPGA stands for _____. (A) Flexible Programmable Gate Array (B) Flexible Programmable Gate Acceleration (C) Field Programmable Gate Accelerator (D) Field Programmable Gate Array	1	1	2	1

1 1 3 1

9. The transformer core is made up of laminations to reduce
   (A) Eddy current losses (B) Iron losses
   (C) Stray losses (D) Hysteresis loss

1 1 3 1

10. The function of a commutator in DC generator is to _____.
   (A) Convert DC to DC (B) Convert AC to DC
   (C) Convert AC to AC (D) Convert DC to AC

1 1 3 1

11. In a three phase induction motor, the three phase winding R, Y, B are connected in _____.
   (A) Series (B) parallel
   (C) Series and parallel (D) Star

1 1 3 1

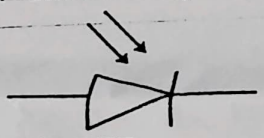
12. Stepper motor is a _____ device.
   (A) Mechanical (B) Analog
   (C) Incremental (D) Storage

1 1 4 1

13. Moving coil instruments are used to measure
   (A) DC quantity only (B) AC quantity only
   (C) Both AC and DC quantity (D) Either AC or DC

1 1 4 1

14. The below symbol represents _____ device.



   (A) LED (B) LCD
   (C) Photodiode (D) Laser diode

1 1 4 1

15. Which of the following represents active transducer?
   (A) Strain gauge (B) LVDT
   (C) Thermistor (D) Thermocouple

1 1 4 1

16. What is the principle employed in operation of LVDT?
   (A) Mutual inductance (B) Self inductance
   (C) Permeance (D) Reluctance

1 1 5 1

17. What is the frequency of AC supply followed in India?
   (A) 50 Hz (B) 60 Hz
   (C) 40 Hz (D) 75 Hz

1 1 5 1

18. Which of the following is a non-renewable energy resource?
   (A) Solar power (B) Wind power
   (C) Thermal power (D) Tidal power

1 1 5 1

19. Earthing is an essential protection to provide against _____.
   (A) Overloading (B) Voltage fluctuation
   (C) Heating issues (D) Danger of electric shock

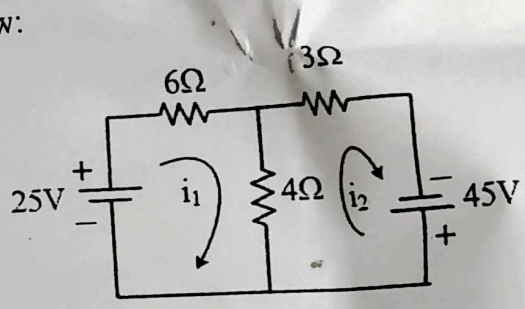
20. Electric vehicles and hybrid vehicles have the following components common EXCEPT: 1 1 5 1

(A) Battery
(B) Electronic control unit
(C) Motor
(D) Internal combustion engine

PART – B (5 × 8 = 40 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
21. a.	Applying mesh analysis, find the current in the various resistors in the circuit shown below:	8	2	1	2



(OR)

b.	An inductive coil takes 10A and dissipates 1000W when connected to a supply of 250V, 25Hz. Calculate the impedance, resistance, reactance and the power factor.	8	2	1	2
22. a.	Sketch the circuit diagram and output characteristics of JFET and explain its operation.	8	1	2	1

(OR)

b.	With neat circuit diagram, discuss the operation of linear voltage regulator.	8	1	2	1
23. a.	Describe the construction and working principle of BLDC motor with neat diagram.	8	1	3	1

(OR)

b.	Briefly explain the factors to be considered for the selection of drives for cranes.	8	1	3	1
24. a.	With neat sketch, comment on the construction and working principle of an instrument which is used to measure only dc quantities.	8	1	4	1

(OR)

b.	Write short notes on: (1) Thermistor (2) Thermocouple	8	1	4	1
25. a.	Describe the simple layout of electrical power system with neat sketch.	8	1	5	1

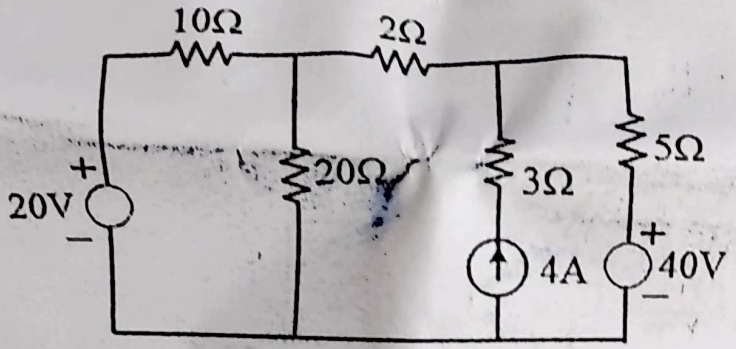
(OR)

b.	With neat diagram, explain the working of a fuel cell.	8	1	5	1

PART – C (1 × 15 = 15 Marks)
Answer ANY ONE Question

	Marks	BL	CO

26. Applying superposition theorem for the circuit shown below, determine the voltage drop across the 2Ω resistor. 15 2 1



27. Simplify the following Boolean expressions using k-map and implement the simplified expressions using logic gates. 15 2

$Y(A,B,C,D)=\sum_m(0,1,2,4,5,7,8,9,10,12,13)$

$Y(A,B,C,D)=\pi_M(3,6,11,14,15)$

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