Reg. No.															

B.Tech. / M.Tech. (Integrated) DEGREE EXAMINATION, JULY 2023
First / 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 60 Watts lamp is connected across 120 V D.C. supply. Determine the value of current drawn by the lamp. (A) 0.75A (B) 0.5A (C) 0.25A (D) 1A	1	1	1	2
2. For a three phase star connected system with a line voltage of 400V, calculate the value of phase voltage. (A) 210.54V (B) 275.28V (C) 331.33V (D) 230.94V	1	1	1	2
3. To neglect the current source in Thevenin's theorem, the terminals across the sources are _____ (A) Replaced by source resistance (B) Replaced by capacitance (C) Short circuited (D) Open circuited	1	1	1	1
4. For a purely resistive circuit, the power factor is _____. (A) 1 (B) 0.75 (C) 0.5 (D) Zero	1	1	1	1
5. Among the following, which transistor has silicon dioxide insulating layer? (A) Diode (B) BJT (C) FET (D) MOSFET	1	1	2	1
6. A combination of AND function and NOT function is results in _____. (A) AND (B) OR (C) NAND (D) NOR	1	1	2	1
7. In an NPN transistors, the majority carriers in the base are _____. (A) Free electrons (B) Holes (C) Both holes and electrons (D) Neither holes nor electrons	1	1	2	1
8. The knee voltage (cut-in voltage) of silicon diode is _____. (A) 0.2 V (B) 0.5 V (C) 0.7 V (D) 1 V	1	1	2	1

9. Among the following, which motor has permanent magnets in their rotor construction? 1 1 3 1

(A) DC motor (B) Transformer
(C) Induction motor (D) BLDC motor

10. A chopper is a device that converts _____. 1 1 3 1

(A) Fixed AC to variable AC (B) Fixed DC to variable AC
(C) Fixed AC to variable DC (D) Fixed DC to variable DC

11. Fleming left hand rule is applicable to _____. 1 1 3 1

(A) DC motor (B) Transformer
(C) DC generator (D) AC motor

12. Stepper motor is a _____ device. 1 1 3 1

(A) Mechanical (B) Analog
(C) Incremental (D) Storage

13. In PMMC instruments, the damping torque is provided by _____. 1 1 4 1

(A) Air friction (B) Magnetic damping
(C) Gravity (D) Eddy current damping

14. Moving iron instruments are mainly preferred to measure _____ quantities. 1 1 4 1

(A) DC (B) AC
(C) Both AC and DC (D) Neither AC nor DC

15. The commonly used material in fabricating solar cell is _____. 1 1 4 1

(A) Germanium (B) Silicon
(C) Aluminium (D) Silver

16. Thermocouple is working under _____ effect. 1 1 4 1

(A) Peltier (B) Seebeck
(C) Thomson (D) Hall

17. Which one is the most common fuel used in fuel cells? 1 1 5 1

(A) Water (B) Hydrogen
(C) Nitrogen (D) Sulphur

18. Which types of battery is highly preferred for EVs? 1 1 5 1

(A) Lithium-ion battery (B) Lead-acid battery
(C) Nickel-cadmium battery (D) Sodium-sulphur

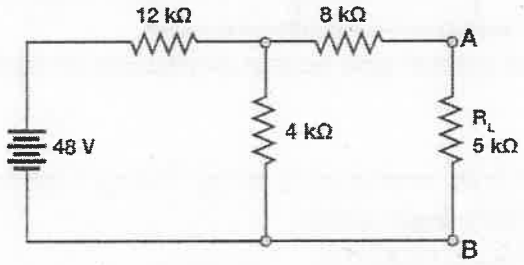
19. The size of the earth wire is determined on the basis of _____. 1 1 5 1

(A) The atmospheric condition (B) The voltage of the service wire
(C) The ampere capacity of the service wire (D) The frequency range of the service wire

20.	What is the frequency range of AC supply followed in Indian standard? (A) 50 Hz (B) 60 Hz (C) 100 Hz (D) 1000 Hz	1	1	5	1

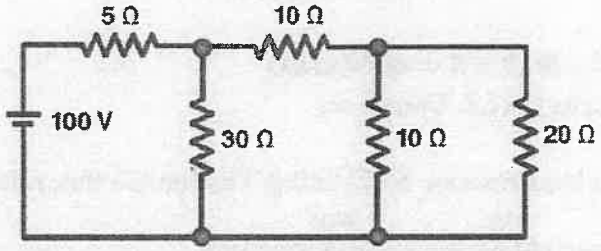
PART – B (5 × 8 = 40 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
21. a.	Find the current through load resistor 5 kΩ using Thevenin's theorem.  	8	2	1	2
	(OR)				
b.	A coil of resistance 10Ω, inductance 0.1H and capacitance 150μF are connected in series across 200V, 50 Hz supply. Determine inductive reactance, capacitive reactance, impedance, current and power factor.	8	2	1	2
22. a.	Demonstrate BJT operation in common emitter configuration. Show the input and output characteristics with neat diagrams.	8	1	2	1
	(OR)				
b.	Discuss the working of an SMPS with a neat block diagram.	8	1	2	1
23. a.	Explain the construction and working principle of single-phase transformer with neat diagram.	8	1	3	1
	(OR)				
b.	Discuss the working operation of chopper fed dc drive with neat block diagram.	8	1	3	1
24. a.	With neat sketch, comment the construction and working principle of attraction type moving iron instrument.	8	1	4	1
	(OR)				
b.	With neat diagram, describe the operation of LVDT with its characteristic curve.	8	1	4	1
25. a.	Draw the single-line diagram of 11 kV/400 V indoor substation and explain the operation.	8	1	5	1
	(OR)				
b.	Write short notes on EV Charging station with necessary components.	8	1	5	1

PART – C (1 × 15 = 15 Marks)

Answer **ANY ONE** Questions

		Marks	BL	CO	PO
26.	 Apply mesh analysis to find current and power dissipation in each resistor for the given circuit.	15	2	1	2
27.	Simplify the following Boolean expressions using k-map and implement the simplified expressions using logic gates.		2	2	2
	(i) Y(A,B,C,D)=Σm(1,5,6,7,9,11,12,13,15)	9			
	(ii) Y(A,B,C,D)=Πm(0,3,6,7)	6			

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