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M.Tech. (Integrated) DEGREE EXAMINATION, JULY 2022

Second Semester

21EES101T – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(For the candidates admitted from the academic year 2021 – 2022 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** should be answered in answer booklet.

Time: 2½ Hours

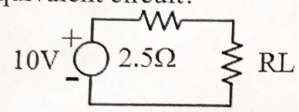
Max. Marks: 75

PART – A (25 × 1 = 25 Marks)

Marks | BL | CO | PO

Answer **ALL** Questions

1. Find the maximum power transferred to the load for given Thevenin's equivalent circuit? — 1 | 2 | 1 | 2



(A) 5W (B) 2.5W
(C) 10W (D) 25W

2. The nodal method of circuit analysis is based on — 1 | 1 | 1 | 1
(A) Kirchhoff current law (B) Kirchhoff voltage law
(C) Thevenin's theorem (D) Norton's theorem

3. For a three phase star connected system with a line voltage of 400V, calculate the value of phase voltage. — 1 | 2 | 1 | 2
(A) 210.54 V (B) 275.28 V
(C) 331.33 V (D) 230.94 V

4. A 100 Watts lamp is connected across 220V DC supply. Find the value of current drawn by the lamp? — 1 | 3 | 1 | 2
(A) 2.2A (B) 0.454A
(C) 10A (D) 5A

5. According to superposition theorem, while considering an individual source, all other voltage sources can be substituted as — 1 | 1 | 1 | 1
(A) Current sources (B) Short circuit
(C) Open circuit (D) External resistor

6. Which of the following is not a terminal of BJT? — 1 | 1 | 2 | 1
(A) Gate (B) Base
(C) Emitter (D) Collector

7. JFET is _____device. — 1 | 1 | 2 | 1
(A) Voltage controlled (B) Current controlled
(C) Impedance controlled (D) Frequency controlled

8. Which of the following device is used to convert AC to DC supply? 1 1 2 1

(A) Rectifier (B) Inverter
(C) Cyclo converter (D) Chopper

9. The output of a logic gate is '1' when all its input is at logic '0'. The gate is _____ 1 2 2 2

(A) AND (B) EX-OR
(C) OR (D) EX-NOR

10. Simplify the following Boolean expression $Y(A,B,C)=\Sigma_m(0,1,2,3,6)$ 1 2 2 2

(A) $Y=\overline{A}+B\overline{C}$ (B) $Y=A+B\overline{C}$
(C) $Y=\overline{A}+BC$ (D) $Y=BC$

11. The function of brushes in a DC generator is _____ 1 1 3 1

(A) To increase the voltage (B) To increase the current
(C) To bring the power developed to the load (D) To provide flux density in air gap

12. A wave completed one cycle in 10 m.sec, its frequency will be _____kHz. 1 2 3 2

(A) 1 (B) 50
(C) 100 (D) 10

13. The stator frame of an induction motor is usually made of _____ 1 1 3 1

(A) Silicon steel (B) Cast iron
(C) Aluminum (D) Bronze

14. The efficiency of an induction motor is about _____ 1 1 3 1

(A) 100% (B) 80 – 90%
(C) 50 – 60% (D) Less than 50%

15. Which of the following is not an advantage of BLDC motor over conventional DC motor? 1 1 3 1

(A) Less maintenance (B) Long life
(C) No risk of explosion or possibility of RF radiation (D) Low cost

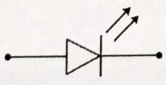
16. Which of the following represent active transducer? 1 1 4 1

(A) Strain gauge (B) Thermistor
(C) LVDT (D) Thermocouple

17. What is the principle of operation of LVDT? 1 1 4 1

(A) Mutual inductance (B) Self-inductance
(C) Permanence (D) Reluctance

18. The symbol represents _____device. 1 2 4 1



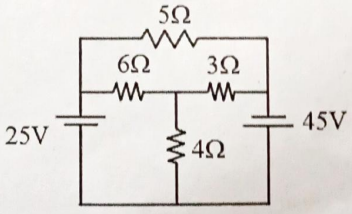
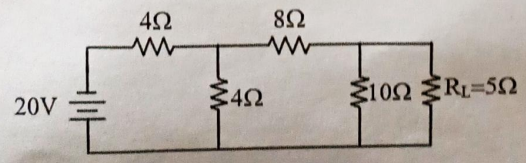
Anode cathode.

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

19.	The photodiode will be generally connected in _____ (A) Forward bias (B) Reverse bias (C) No biasing required (D) Neutral	1	2	4	1
20.	A device is an adjustable resistor whose resistance differs inversely with the concentration of light? (A) Photoresistor (B) Thermistor (C) Photo transistor (D) Thermocouple	1	3	4	1
21.	Earthing is an essential protection to provide against. (A) Danger of electric shock (B) Overloading (C) Voltage fluctuation (D) High temperature of the conductors	1	1	5	1
22.	The size of the earth wire is determined by (A) The atmospheric conditions (B) The voltage of the service wire (C) The ampere capacity of the service wire (D) The frequency range of service wire	1	1	5	1
23.	Electric vehicles and hybrid vehicles have the following components common except _____ (A) Battery (B) ECU (C) Generator (D) Internal combustion engine	1	1	5	1
24.	Photovoltaic cell or solar cell converts _____ (A) Thermal energy into electricity (B) Solar radiation into electricity (C) Solar radiation into thermal energy (D) Solar radiation into kinetic energy	1	2	5	1
25.	What is the frequency range of AC supply followed in Indian standard? (A) 50 Hz (B) 60 Hz (C) 40 Hz (D) 75 Hz	1	2	5	1

PART – B (5 × 10 = 50 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
26. a.	Find the current in 5Ω resistor from the given circuit using Mesh analysis.  	10	2	1	2
	(OR)				
b.	Calculate the current through the load resistance (R_L=5Ω) using Thevenin's theorem.  	10	3	1	2

27. a. Describe the following with neat diagram.

(i)	SMPS	5	1	2	1
(ii)	NPN transistor	5	1	2	1

(OR)

b. Simplify the following expression using K-map.

(i)	$Y(A,B,C,D)=\Sigma_m(0,1,2,4,5,7,8,9,10,12,13)$	5	2	2	2
(ii)	$F(A,B,C,D)=\Sigma_m(0,2,4,14,15)$	5	2	2	2

28. a. With neat diagram, explain briefly about construction of DC machines. 10 1 3 1

(OR)

b.i. Describe the working of stepper motor with neat sketch. 7 1 3 1

ii. Draw the block diagram of chopper fed DC drives. 3 1 3 1

29. a. Explain the working concept of moving coil instrument with neat diagram. 10 1 4 1

(OR)

b. Explain the following transducers:

(i)	LVDT	5	1	4	1
(ii)	Thermocouple	5	1	4	1

30. a. With neat layout, explain the concept of generation, transmission and distribution of power in electrical supply system. 10 1 5 1

(OR)

b. List out the importance of earthing. And discuss about different types of earthing methods. 10 1 5 1

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