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B.Tech DEGREE EXAMINATION, MAY 2024

First & Second Semester

18EES101J - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

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: 100**

PART - A (20 × 1 = 20 Marks)

Answer **all** Questions

		Marks	BL	CO
1.	The junction point where two (or) more than two network elements meet in a circuit is (A) Node (B) Branch (C) Loop (D) Mesh	1	1	1
2.	A 1 Ohm resistor having 4 Ampere current will dissipate the power of (A) 16 W (B) 4 W (C) 25 W (D) 14 W	1	3	1
3.	If a circuit contains 3 Resistors R1, R2 and R3 in series and V is total voltage and I is total current then Voltage across R3 is (A) V*(R3/(R1+R2+R3)) (B) V*(R2/(R1+R2+R3)) (C) V*(R1/(R1+R2+R3)) (D) IR	1	2	1
4.	According to Ohms law, with the known values of V and R, I can be computed as (A) I = VR (B) I = R/V (C) I=R*R*V (D) I=V/R	1	1	1
5.	The peak factor of an alternating voltage is _____ (A) V_{rms}/V_{avg} (B) V_m/V_{rms} (C) V_{avg}/V_{rms} (D) V_{rms}/V_m	1	1	2
6.	The function of brushes in a DC generator is (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	1	1	2
7.	Voltage of a coil when it has (di/dt)= 10 mA/s and L=4 H is (A) 2.5 mV (B) 40 mV (C) 0.4 mV (D) 0.16 mV	1	3	2
8.	In a circuit with pure inductive (L), the current _____ by a voltage of 90 degree. (A) leads (B) lags (C) in phase (D) greater than or equal	1	1	2
9.	A pointer of an instrument deflected and returns to zero position, when the current is removed is known as (A) Damping Torque (B) Mass of the pointer (C) Controlling Torque (D) Action of gravity	1	1	3
10.	An instrument which is not used for the measurement of direct current quantity is (A) Moving iron-attraction type (B) Moving coil permanent magnets type (C) Hotwire type (D) Induction type	1	1	3

11.	The number of 2-way switches used in staircase wiring (A) 2 (B) 3 (C) 1 (D) 4	1	1	3
12.	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	3
13.	Choose the correct abbreviation of LVDT (A) Linear variable differential transducer (B) Linear variable differential transformer (C) Linear variable different transformer (D) Linear viable differential transformer	1	1	4
14.	The increase in resistance in stain gauge is due to (A) Increase in length and cross-sectional area of wire (B) Increase in length and decrease of its cross-sectional area of wire (C) Decrease in length and increase of its cross-sectional area of wire (D) Decrease in length and cross-sectional area of wire	1	2	4
15.	Seeback effect is used as a working principle of which transducer? (A) Phototransistor (B) Thermistor (C) Thermocouple (D) Strain Gauge	1	1	4
16.	Photo diode will be generally connected in (A) Forward bias (B) Reverse bias (C) No biasing required (D) Neutral	1	1	4
17.	In Frequency Modulation the Amplitude Carrier Wave Remains (A) constant (B) varies exponentially (C) varies linearly (D) zero	1	1	5
18.	The output of gate is low, when at least one of its inputs is low. This is true for (A) AND (B) NAND (C) OR (D) NOR	1	1	5
19.	On a K-Map, grouping the 0s produces (A) SoP expression (B) PoS expression (C) a don't care condition (D) AND expression	1	1	5
20.	Which among the following is SOP? (A) (A+B)(C+D) (B) (AB)(CD) (C) ABC (D) ABC+ACD	1	1	5

PART - B (5 × 4 = 20 Marks)

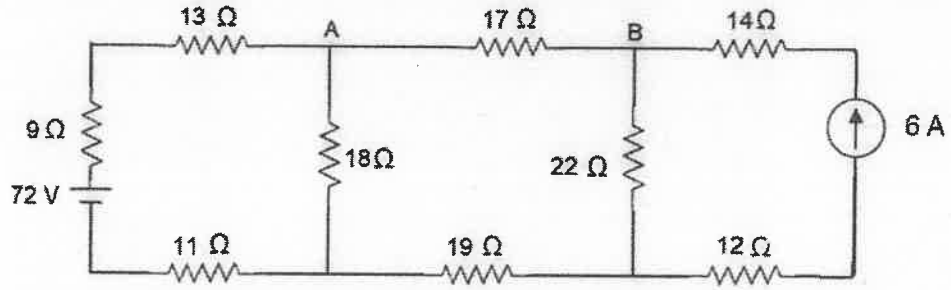
Answer **any 5** Questions

		Marks	BL	CO
21.	A circuit comprises of two resistors connected in parallel. The total effective resistance is 5Ω. If one of the resistors is 10Ω, what is the value of another resistor?	4	3	1
22.	A 100 Ω is coupled in series with a 50 μF capacitor. When the voltage supplied is 200 V, 50 Hz, what is the value of power factor?	4	3	2
23.	Explain the construction of squirrel cage induction motor with neat sketch.	4	2	2
24.	What is the purpose of Zener diode? How is it different from PN junction diode?	4	4	3
25.	Explain fluorescent lamp wiring with its relevant diagram.	4	2	3
26.	Elaborate on the working of piezoelectric transducer.	4	2	4
27.	Write the truth table for (i) NAND gate (ii) NOR gate (iii) XOR gate (iv) X-NOR gate	4	1	5

PART - C (5 × 12 = 60 Marks)

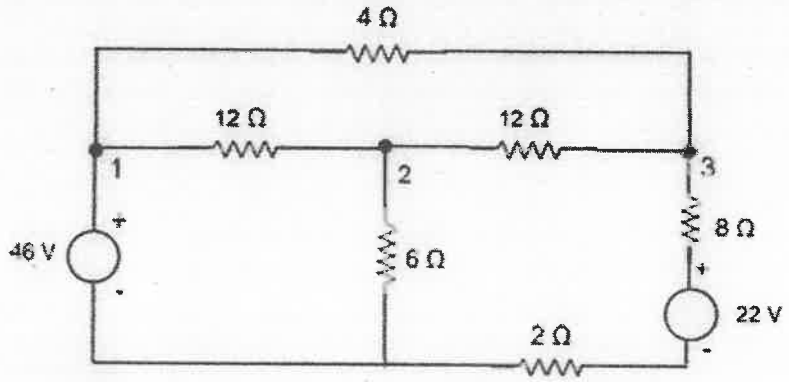
Answer **all** Questions

		Marks	BL	CO
28.	(a) Using Superposition theorem, calculate the current through the 17 Ω resistor.	12	4	1



(OR)

(b) Using mesh analysis, calculate the current through the 4 Ω resistor.



29.	(a) Explain the working of a full wave rectifier with neat sketch. Also, derive the average value, RMS value, peak factor, and form factor for the same.	12	2	2

(OR)

(b) Explain the working principle of a DC generator. Also, mention its applications.

30.	(a) Explain the construction and operation of moving iron attraction type instrument with its relevant figure.	12	2	3

(OR)

(b) Enumerate in brief the construction and operation of NPN type bipolar junction transistor with its characteristics.

31.	(a) With diagrams, discuss the operation of following transducers (i) LVDT (ii) Thermocouple	12	2	4

(OR)

(b) Write detailed notes on
(i) Phototransistor
(ii) LED

32.	(a) Find the minimal sum of products for the boolean expression given below. Also, implement them using gates. $Y(A, B, C, D) = \sum m(0, 2, 4, 6, 8, 10, 12, 13, 14)$	12	3	5

(OR)

(b) Explain the principles of amplitude modulation with the necessary equations and relevant figure.

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