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B.Tech/M.Tech(Integrated) DEGREE EXAMINATION, DECEMBER 2023

Third Semester

21EIC202T - ELECTRICAL AND ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(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.	Which of the following method of measurement does a bridge circuit use? (A) Relative (B) Comparison (C) Absolute (D) Differential	1	1	1
2.	Which of the following is not a fundamental quantity? (A) Length (B) Angle (C) Time (D) Luminous intensity	1	1	1
3.	What is a moving coil galvanometer used for? (A) Measurement of voltage only (B) Measurement of resistance (C) Measurement of small currents (D) Measurement of electric field	1	1	1
4.	The secondary winding of which of the following listed transformers is always kept closed? (A) Step-up transformer (B) Step-down transformer (C) Potential transformer (D) Current transformer	1	1	1
5.	Power is _____ (A) Rate of doing work (B) Rate of producing voltage (C) Rate of generating current (D) Rate of overcoming friction	1	1	2
6.	In A.C. circuits, power consumed is _____ (A) Product of voltage and current (B) It depends on the power factor of the circuit in addition to voltage and current (C) It depends on the supply voltage (D) It depends on the magnitude of the circuit current	1	1	2
7.	A dynamometer type wattmeter consists of _____ (A) Only potential coil (B) Potential and current coils (C) Only current coil (D) No coils	1	1	2
8.	In a low power factor wattmeter, the compensating coil is connected (A) In series with the current coil (B) In parallel with the current coil (C) In series with the pressure coil (D) In parallel with the pressure coil	1	1	2
9.	Which of the following is used as a null detector in a Wheatstone bridge? (A) Ammeter (B) Galvanometer (C) Voltmeter (D) Wattmeter	1	1	3
10.	Which of the following devices is used for measuring low resistance value? (A) Wheatstone bridge (B) Hay bridge (C) Kelvin bridge (D) Owens bridge	1	1	3

11.	Which is more suitable to measure the perfect capacitor? (A) Owens bridge (B) Andersons bridge (C) De-Sautys bridge (D) Hays bridge	1	1	3
12.	Maxwell inductance capacitance bridge can be used for _____ (A) Measurement of inductance (B) Measurement of capacitance and inductance (C) Measurement of resistance (D) Measurement of voltage and current	1	1	3
13.	Digital voltmeters converts _____ (A) Analog to digital signal (B) Digital to analog signal (C) Current to voltage (D) Resistance to voltage	1	1	4
14.	Input range of DVM is _____ (A) 1 V to 1000 V (B) 0.1 V to 10 V (C) 0.01 V to 1 V (D) 0.001 V to 0.1 V	1	1	4
15.	An LCR meter is used to measure _____. (A) Current (B) Power (C) Inductance (D) Voltage	1	1	4
16.	The magnitude of flux in an energy meter varies _____ (A) Due to abnormal currents and voltages (B) Due to high resistance and inductance values (C) Due to changes in the transformer turns (D) Due to the induced e.m.f in the windings	1	1	4
17.	How is frequency related to time? (A) Square proportional (B) Not related (C) Directly proportional (D) Inversely proportional	1	1	5
18.	A light-emitting diode is _____ (A) Heavily doped (B) Lightly doped (C) Intrinsic semiconductor (D) Zener diode	1	1	5
19.	The full form of LCD is _____ (A) Liquid Crystal Display (B) Liquid Crystalline Display (C) Logical Crystal Display (D) Logical Crystalline Display	1	1	5
20.	Which of the following televisions delivers the best picture quality? (A) LCD (B) Plasma (C) LED (D) OLED	1	1	5

PART - B (5 × 8 = 40 Marks)

Answer **all** Questions

		Marks	BL	CO
21.	(a) Determine the torque equation for the PMMC-type instrument and draw its setup.	8	3	1
	(OR)			
	(b) Examine the working of the rectifier-type Instrument.			
22.	(a) Show the power measurement in DC circuits.	8	3	2
	(OR)			
	(b) Explain the general form of AC bridges.			

23.	(a) A Maxwell capacitance bridge is used to measure an unknown inductance compared to capacitance. the various values at balance $R_2 = 400$ ohms, $R_3 = 600$ ohms, $R_4 = 1000$ ohms, $C_4 = 0.5$ micro farad. Calculate the R_1, L_1, and storage factor (Q) values if the frequency is 1000 Hz.	8	3	3
	(OR)			
	(b) The arms of five node bridge are as follows Arm ab: an unknown impedance (R1, L1) in series with a non inductive variable resistor r1 Arm bc: a non inductive resistor R3 = 100 ohm Arm cd: a non inductive resistor R4 = 200 ohm Arm da: a non inductive resistor R2 = 250 ohm Arm de: a non inductive variable resistor r Arm ec: a loss-less capacitor C = 1 μF and Arm be: a detector. An A.C supply is connected between a and c. Determine the resistance and inductance R1, L1 when under balanced condition r1 = 43.1 ohm and r = 229.7 ohm			
24.	(a) Illustrate the working of digital frequency meters.	8	3	4
	(OR)			
	(b) Illustrate the working of digital energy meters.			
25.	(a) Summarize the working of LED.	8	3	5
	(OR)			
	(b) Summarize the working of waveform analyzers.			

	Marks	**BL**	**CO**
PART - C (1 × 15 = 15 Marks)			
Answer **any 1** Questions			
26. Outline the differences between current and potential transformers.	15	4	1
27. Illustrate the working of CRO.	15	4	5

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