Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[5252]-545

S.E. (Electrical) (First Semester) EXAMINATION, 2017
ELECTRICAL MEASUREMENTS AND INSTRUMENTATION
(2015 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. :— (*i*) Neat diagrams must be drawn wherever necessary.

(*ii*) Figures to the right indicate full marks.

(*iii*) Use of logarithmic table, slide rule, Mollier chart, electronic pocket calculator and steam table is allowed.

(*iv*) Assume suitable data, if necessary.

1. (*a*) The resistance of a moving coil voltmeter is 12,000 Ω. The moving coil has 100 turns and is 4 cm long and 3 cm wide. The flux density in the airgap is 6×10^{-2} Wb/m². Find the deflection produced by 300 V if the spring control gives a deflection of one degree for a torque of 25×10^{-7} N–m. [6]

(*b*) Explain the working of earth tester for measurement of each resistance with neat diagram. [6]

Or

2. (*a*) Explain the following terms related to instrument transformer :

(*i*) Transformation ratio

(*ii*) Nominal ratio

(*iii*) Burden.

P.T.O.

(*b*) With a circuit diagram derive the equation for balance in the case of Anderson bridge. [6]

3. (*a*) Explain construction of low power factor wattmeter with neat diagram [7]

(*b*) A 220 V, 15 A single phase energy meter has a meter constant equal to 1,750 revolutions/kWh. The meter makes 350 revolutions in 275 seconds for rated load at 0.8 pf lagging. Find the error in meter reading. [6]

Or

4. (*a*) Find the reading of two wattmeters in the following cases : [6]

(*i*) The load is 20 kW at unity power factor

(*ii*) The load is 20 kW at 0.8 pf

(*iii*) The load is at 20 kW at 0.5 pf.

(*b*) Explain the working principle and construction of single-phase induction type of energy meter with neat diagram. [7]

5. (*a*) The voltage across a 10 kΩ resistor is applied to CRO. The screen shows a sinusoidal signal of total vertical occupancy 5 cm and total horizontal occupancy of 4 cm. The front panel controls of V/div and time/div are on 2 V/div and 1 ms/div respectively. Calculate the rms value of the voltage across the resistor and its frequency. Also find rms value of current.

[7]

(*b*) List out and explain basic requirements of transducers. [6]

Or

6. (*a*) Explain the working of Pirani Gauge for measurement of pressure. State its limitations. [7]

(*b*) Write down advantages and applications of digital storage oscilloscope. [6]

7. (*a*) Explain level measurement by mechanical method. [6]

(*b*) Describe the construction of foil type strain gauges and explain their advantages over wire wound strain gauge. [6]

Or

8. (*a*) Draw and explain the construction and working principle of LVDT. State *four* advantages of LVDT. [6]

(*b*) Mention electrical methods of level measurement and explain any *one* electrical method of level measurement with neat diagram. [6]