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/m^2. 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]