

Total No. of Questions : 8]

SEAT No. :

**P1004**

[4457]- 175

[Total No. of Pages : 2

**S.E. (Electrical)**

**ELECTRICAL MEASUREMENT & INSTRUMENTATION**

**(Semester - I) (2012 Course) (203144)**

*Time : 2 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, and Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of logarithmic table, slide rule, Mollier chart, electronic pocket calculator and steam table is allowed.
- 5) Assume suitable data, if necessary.

- Q1)** a) Which three forces are required for satisfactory operation of an analog indicating instruments? State the function of each force. [6]
- b) Draw circuit diagram of Kelvin's double bridge. Derive expression for unknown resistance with usual notations. [6]

OR

- Q2)** a) Explain the following terms related to instrument transformer: [6]
- Transformation ratio.  
Nominal ratio.  
Burden.
- b) With a circuit diagram derive the equation for an unknown self inductance measurement using Maxwell's inductance bridge. [6]

- Q3)** a) State and explain errors in dynamometer type wattmeter. Also state the compensation for each type of error. [6]
- b) The constant for a three phase, three element energymeter is 0.12 revolution of disc per kWh. If the meter is normally used with a potential transformer of ratio 22000/110V and a current transformer of ratio 500/5 A. Find the error expressed as a percentage of the correct reading from the following test figures. Line voltage =110V, current = 5.25A, power factor = 1, Time to complete 40 revolutions =61 seconds. [6]

OR

**P.T.O.**

- Q4)** a) A wattmeter reads 5.54kW when its current coil is connected in R phase and its pressure coil is connected between neutral and R phase of a symmetrical 3 phase system supplying a balanced load of 30 A at 400 V. What will be the reading of the instrument if the current coil connections remain unchanged and pressure coil is connected between B and Y phases? The phase sequence is RYB. [6]
- b) With a block diagram explain working of digital energy meter. What are the advantages of digital energy meter? [6]

- Q5)** a) In an experiment, the voltage across 1 kW resistor is applied to C.R.O. The screen shows a sinusoidal signal of total vertical occupancy 3 cm and total horizontal occupancy of 2 cm. The front panel controls volts/div and time/div are on 5V/div and 5 ms/div respectively. Calculate the maximum, rms values of voltage across resistance and current through resistance. Also find its frequency. [6]
- b) Give detail classification of transducers. [7]

OR

- Q6)** a) Explain the following terms associated with CRO: [6]
- i) Volts/division.
  - ii) xy-mode.
  - iii) Invert.
- b) Explain measurement of pressure using Mcleod gauge. [7]

- Q7)** a) Explain ultrasonic flow meter with neat diagram. [6]
- b) Explain construction and working of LVDT with neat diagram. [7]

OR

- Q8)** a) Explain level measurement by mechanical method. [6]
- b) Give types of strain gauges. Explain foil strain gauge. [7]

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