

Total No. of Questions : 12]

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**P1548**

**[3762]-134**

**S.E. (Electrical)**

**ELECTRICAL MEASUREMENTS AND  
INSTRUMENTATION**

**(203143) (2008 Course)**

*Time : 3 Hours]*

*[Max. Marks : 100*

*Instructions to the candidates:*

- 1) *Attempt any three questions from each section.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*

**SECTION I**

- Q1)** a) With a neat sketch describe construction and working of PMMC instrument. Derive the torque equation for this instrument. [12]
- b) Explain the terms – Accuracy, linearity, drift. [6]

OR

- Q2)** a) With a neat sketch describe construction and working of moving iron instrument. Derive the torque equation for this instrument. [12]
- b) What are shunts and multipliers? What are the disadvantages of shunt?[6]

- Q3)** a) Give classification of resistance. State the methods suitable for measurement of resistance for each category. [8]
- b) Draw circuit diagram of Kelvin's double bridge and derive expression for unknown resistance. [8]

OR

- Q4)** a) Draw circuit diagram of Anderson's bridge. Derive the expression for unknown inductance and draw the phasor diagram. [10]
- b) Write a short note on earth tester. [6]

*P.T.O.*

- Q5)** a) Explain two wattmeter method for measuring power in a (R + L) load. Draw the phasor diagram. [9]
- b) A wattmeter has current coil of  $0.1\Omega$  resistance and pressure coil of  $6500\Omega$  resistance. Calculate the percentage errors due to resistance only for the two methods of connection for following conditions – [8]
- i) 12 Amp at 250 volt with unity p.f.
- ii) 12 Amp at 250 volt with 0.4 p.f.
- Also state the different types of errors in wattmeters.

OR

- Q6)** Write a short note on any two : [16]
- a) Digital power factor meter.
- b) Digital power analyser.
- c) Digital multimeter.

SECTION II

- Q7)** a) Describe construction and working of single phase induction type energy meter with a neat diagram. Also draw the phasor diagram of energy meter showing respective quantities. [10]
- b) Explain the terms – transformation ratio, turns ratio, nominal ratio, burden. [8]

OR

- Q8)** a) With a block diagram explain working of digital energymeter. State different types of errors in induction type energymeter. [10]
- b) i) Derive torque equation of induction type energymeter. [6]
- ii) Draw connection diagram for measurement of power using a low range wattmeter and CT, PT. [2]

- Q9)** a) With a suitable sketch explain working of dual trace CRO. [8]
- b) Give detail classification of transducers. [8]

OR

- Q10)** a) Explain measurement of pressure using McLeod gauge. [8]
- b) Explain measurement of – voltage, current, phase angle, frequency using CRO. [8]

Q11)a) Give types of flow. Explain construction and working of Venturimeter. [8]

b) Explain nucleonic method for level measurement with a suitable diagram. [8]

OR

Q12)a) Explain construction and working of LVDT. [8]

b) Give types of strain gauges. Explain foil strain gauge. [4]

c) Explain construction and working of load cell. [4]

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