R13

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a)   How can you extend the range of an ammeter?   [2]
  b)   Enlist the advantages of PMMC instrument.   [3]
  c)   Compare AC and DC potentiometers.   [2]
  d)   How can you measure unknown resistance using DC potentiometers?   [3]
  e)   What are the main sources of errors in energy meters?   [2]
  f)   Draw the circuit diagram of three phase power measurement using 2 wattmeters method.   [3]
  g)   What are the DC measuring bridges?   [2]
  h)   Draw the circuit diagram of Owen's bridge and write the application of its.   [3]
  i)   What are the applications of CRO?   [2]
  j)   What are the main characteristics the transducers?   [3]

PART - B

(50 Marks)

2.a)   A basic d' Arsonval meter movement with an internal resistance, Rm =100Ω and a full scale current of $I wm$ =1mA is to be converted in to a multi range D.C. voltmeter with ranges of 0-10V, 0- 50V, 0- 250V and 0-500V. Find the values of various resistances required for potential divider arrangement.
  b)   Explain the principle of operation of Quadrant electrometer type Electrostatic voltmeter and mention its applications.   [5+5]
OR
3.a)   Describe the construction and working principle of attraction type moving iron instrument.
  b)   How can you extend the range of Electro static Voltmeters? Explain.   [5+5]

4.a)   Explain the Principle of operation of Polar type AC potentiometer with a neat sketch.
  b)   What is the need of Potential transformer? And describe about different errors occurred in PTs.   [5+5]
OR
5.a)   Reduce the ratio error of current transfer with necessary sketches.
  b)   What are the types of instrument transformers? Compare them.   [5+5]

6.a) Prove that for electrodynamometer type wattmeter
true power = {cos Φ / [cos β cos (Φ – β]} x actual wattmeter reading
Where cos Φ = power factor of the circuit
β = tan-1 (ωL/R) where L and R are the inductance and resistance of the pressure coil of the circuit.
b) Explain the operation of induction type energy meter and explain how you can provide overload compensation to it. [5+5]

OR

7.a) How can you test energy meter by phantom loading? Explain with a neat sketch.
b) Explain the construction and working of three element wattmeter with a neat sketch. [5+5]

8.a) Draw the block diagram of wheatstone bridge with digital readout and explain its operation.
b) Draw the circuit diagram of Maxwells inductance bridge and derive a relation for unknown Inductance. [5+5]

OR

9.a) How could you measure insulation resistance using loss of charge method? Describe with the help of diagram.
b) Draw the circuit diagram of Schering bridge and derive a relation for unknown capacitance. [5+5]

10.a) Explain the working of CRT with a neat sketch.
b) What is the principle of strain guage? And derive a relation for gauge factor. [5+5]

OR

11.a) Explain the working principle of Thermisters, mention advantages and applications of them.
b) Describe the principles of operation of capacitive transducers and mention their applications. [5+5]

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