Total No. of Printed Pages:2

SUBJECT CODE NO:- H-366
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EE/EEE/EEP)
Electrical Measuring Techniques
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   i) Q.1 and Q.6 are compulsory.
             ii) Attempt any two questions from remaining questions in each section.
             iii) Assume suitable data if necessary.

Section A

Q.1   Answer the following (Any five)   10

  i)   What are the different types of secondary instruments? Give example of each.
  ii)   What are the different types of damping systems? Which is the most effective?
  iii)   What is dead zone?
  iv)   Differentiate between reproducibility and repeatability.
  v)   What is Hysteresis in relation with instruments?
  vi)   Draw schematic diagram of Maxwell's bridge. What is its use?
  vii)   Which bridge is used for measurement of very low resist. Draw its diagram.
  viii)   Which type of instruments are used for d.c. measurements? Why?

Q.2   (a) Draw schematic diagram and explain working of wheatstone's bridge   08
       (b) Explain the method of measurement of insulation resistance when power is on.   07

Q.3   (a) Derive the expression for torque or moving iron type of instruments and hence state   08
           nature of scale.
       (b) A moving coil voltmeter with a resistance of 20Ω gives a full scale deflection of 120°   07
           when a potential difference of 100 MV is applied across it. The moving coil has
           dimensions of 30mm x 25mm and is wound with 100 turns. The control spring constant is
           0.375×10^6 Nm/deg. Find the flux-density in the air gap. Find also the diameter of copper
           wire of coil winding if 30 percent of instrument resistance is due to coil winding. The
           specific resistance of copper = 1.7×10^8 Ωm.

Q.4   (a) With the help of neat diagram explain working of scheming bridge. Draw vector diagram at   08
           balanced bridge condition.
       (b) A bridge is used to measure the properties of a sample of sheet at 2 KHz. At balance, arm ab   07
           is test specimen; arm bc is R_3=100Ω; arm cd is C_4=0.1μf and arm da is R_2=834 Ω in series
           with C_2=0.214 μF. Derive balance conditions and calculate the effective impedance of the
           specimen under test conditions.

Q.5   (a) Describe different types of errors in dynamometer type of Wattmeter. How are they reduced?08
       (b) Explain the use of shunts and multipliers for extension of range of ammeters and voltmeters. 07

1

H-366

Section B

Q.6   Answer the following (Any five)   10

    i)   Differentiate between analog and digital transducer giving suitable example.
    ii)   Explain principle of capacitive transducer.
    iii)   What is LVDT? What is its use?
    iv)   State the transducer used for temperature measurement. What is its principle?
    v)   What are the applications of CRO.
    vi)   For a current transformer define the following
            (a) Burden
            (b) Ratio correction factor
    vii)   What are advantages of electrical transducer.
    viii)   AØ5A, 230V meter on full load unity p.f. test makes 90 revolutions in 420 sec. The
            normal disc speed is 600 rev/KWH. What is the percentage error?

Q.7   (a) With the help of neat block diagram explain working of electronic energy meter.   08
        (b) A 230V, single phase watt hour meter has a constant load of 5A passing through it for   07
        8 hrs. at unity p.f. If the meter disc makes 2400 revolutions during this period, what is the
        meter constant in revolutions per KWH. Calculate power factor of the load if the number
        of revolutions made by the meter are 1648 when operating at 230 V and 6A for 4 hours.

Q.8   (a) Explain working of Dual trace CRO with the help of block diagram.   08
        (b) What are different errors in single phase induction type energy meter? How are they   07
        compensated?

Q.9   (a) A 1000/5A, 50 Hz current transformer has a secondary burden comprising of non inductive 08
        impedance of 1.6 Ω. The primary winding has one turn. Calculate the flux in the core and
        ratio error at full load. Neglect leakage reactance and assume the iron loss in the core to be
        1.5W at full load. The magnetizing mmf is 100A.
        (b) Explain construction and working of energymeter. How is it corrected if moving fast.   07

Q.10   (a) Explain how is phase angle measured with the help of CRO.   08
        (b) Explain the use of instrument transformers. What are their advantages over shunts and   07
        multipliers?