22325

Seat No. ☐☐☐☐☐☐☐☐

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

(8) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. **Attempt any <u>FIVE</u> of the following:** **10**

a) State the significance of measurement of electrical quantities.

b) List any four advantages of permanent magnet moving coil instrument.

c) A moving coil instrument has resistance of $10\,\Omega$ and gives full scale deflection when carrying current of 50 mA. Show how it can be used to measure voltage upto 750 volts.

d) State the reason of using fixed coils as current coils in an Electrodynamometer wattmeters.

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e) Two wattmeters connected to measure the input to a balanced three phase circuit indicate 2000 w and 500 w respectively. Find the power factor of circuit when both the readings are positive.

f) State the working principle of single phase electronic energy meter.

g) ''Electronic energy meter is also called as static energy meter.'' Justify the statement.

2. **Attempt any THREE of the following:** 12

a) Describe the corrective measures employed to eliminate or to reduce undesirable effects which are responsible for Environmental Errors.

b) Compare Absolute and Secondary instruments on the basis of following points.

    i) The method of determining the magnitude of the quantity being measured.

    ii) Requirement of calibration.

    iii) Place of application and

    iv) Example.

c) Draw neat labelled diagram and describe the process of calibration of Ammeter using D. C. Potentiometer.

d) A moving coil ammeter has a fixed shunt of $0.02\,\Omega$. With a coil resistance of $R = 1000\,\Omega$ and a potential difference of 500 mV across it, full scale deflection is obtained.

    i) Calculate the value of R to give full scale deflection when shunted current I is 10 A.

    ii) With what value of R is 40% deflection obtained with $I = 100$ A?

Marks

3.   **Attempt any <u>THREE</u> of the following:**   **12**

     a)   Draw neat labelled diagram and describe the working of full wave rectifier type A.C. voltmeter.

     b)   A three phase 500V motor load has a power factor of 0.4. Two wattmeters are connected to measure the input. They show the input to be 30kW. Find the reading of each wattmeter.

     c)   One wattmeter of range 20A/300V is to be used to measure the power in variable load single phase circuit. Suggest the connection of wattmeter with sketch for measurement of power in case of
        i)   Lower and

        ii)   Higher value of load.

     d)   Describe the constructional features of single phase electronic energy meter with relevant sketch.

4.   **Attempt any <u>THREE</u> of the following:**   **12**

     a)   Describe any two errors and their compensation, related to three phase electronic energy meter.

     b)   Draw neat labelled diagram showing the controls available on front panel of general purpose CRO.

     c)   Describe the working of signal generator.

     d)   Describe the construction of Electrical resonance type (Ferrow dynamic) Frequency meter with labelled diagram.

     e)   Describe the use of CRO for measurement of
        i)   Voltage

        ii)   Frequency

Marks

5. **Attempt any TWO of the following:** **12**

a) Describe the construction of Repulsion type moving iron instrument with a labelled sketch.

b) Explain the working of maximum demand indicator with a neat sketch.

c) Draw neat labelled block diagram of function generator and describe the function of each block.

6. **Attempt any TWO of the following:** **12**

a) Describe with sketch the process of calibration of single phase electronic energy meter using direct loading.

b) i) Draw a neat labeled diagram of Kelvin double bridge.

   ii) A Kelvin double bridge is balanced with following constants

   Outer ratio arms 100Ω and 1000Ω

   Inner ratio arms 99.92Ω and 1000,6Ω

   Resistance of link = 0.1Ω,

   Standard resistance 0.00377Ω

   Calculate the value of unknown resistance.

c) Draw neat labeled diagram and describe the construction and working of Earth tester.

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