17322

13141

3 Hours / 100 Marks   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 __FIVE__ of the following:**   **20**

a) Define each of following terms :

  i)   drift

  ii)   precision

  iii) reproducibility

  iv)   sensitivity

Marks

b) Explain working of attraction type moving iron analog measuring instrument.

c) i) Explain why multiplying factors are given on wattmeters.

   ii) Define multiplying factor.

d) Explain working of LCR meters.

e) i) Explain need of phase sequence indicator.

   ii) Draw and explain in short about any one type of phase sequence indicator.

f) Explain working of clip on meter.

g) State any one application of each of following.

   i) CRO

   ii) Function generator

2. **Attempt any <u>TWO</u> of the following:** **16**

a) Write difference between each of following :

   i) primary and secondary measuring instrument

   ii) indicating and integrating instrument

   iii) analog and digital instrument

   iv) dc potentiometer and ac potentiometer

b) i) State different errors in analog measurement instruments.

   ii) Explain three types of torques in analog measuring instruments.

c) State the purpose of calibration of measuring instruments. Explain the procedure of calibration of ammeter and voltmeter.

Marks

3. **Attempt any TWO of the following:** **16**

a) i) Explain why ranges of meters are extended.

   ii) A moving coil instrument has a resistance of 5 ohm and gives full scale deflection when carrying a current of 40 milli amp. Calculate value of resistances if a voltage of 500V and current of 50 amp is to be measured by this meter as series resistance and shunt respectively.

b) i) Explain working of PMMC instruments.

   ii) Explain why shunts have low resistance when used in ammeters.

c) i) Derive formula for calculating value of series resistance in a voltmeter for extending range of a voltmeter.

   ii) A voltmeter has four ranges as given below 0-75V, 0-150V, 0-300V, 0-600V. Show arrangement of resistances in series and meter showing in a internal connection diagram.

4. **Attempt any TWO of the following:** **16**

a) Explain working of single phase dynamometer type wattmeter with the help of neat sketch.

b) State any four errors in wattmeters. Explain how each of these errors are compensated.

c) i) Explain how reactive power is measured using wattmeter.

   ii) Explain how individual reading of ammeter depends on power factor in power measurement by two wattmeter method.

Marks

5. **Attempt any TWO of the following:**   **16**

a) Phase voltage and current of a star connected inductive load in 300V and 20 Amp. power factor of a load is 0.8 log. Calculate reading of two wattmeters in power measurement of by two wattmeter method.

b) Explain working of induction type energymeter by drawing neat diagram.

c) i) An energymeter with meter constant of 400 rev/kwh. Rating of meter is 20 amp, 250 V. During a test at full load 4000 watt, the disc makes 50 revolutions in 80 seconds. Calculate % of error in meter.

   ii) Explain any four types of errors in energymeter. Also write how each of these errors are compensated.

6. **Attempt any TWO of the following:**   **16**

a) Explain working of Kelvin's Double Bridge method for resistance measurement.

b) Explain with neat diagram working of a Megger.

c) i) Explain working of single phase power factor meter.

   ii) Draw block diagram of sinusoidal wave generator.

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