17322

11819

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

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

(7) Use of steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. Attempt any FIVE : **20**

(a) Define measurement and state the significance of electrical measurement system.

(b) List three advantages & one disadvantage of PMMC instrument.

(c) Draw the labelled diagram of dynamometer type wattmeter showing its construction.

(d) Draw the connection diagram of one wattmeter method to measure active power in three phase circuit. State one limitation of this method.

(e) List four main parts of operating mechanism of induction type energy meter.

(f) Classify the resistances from the point view of measurements.

(g) What is CRO ? List three uses of it.

2. Attempt any FOUR : **16**

(a) Compare PMMC & MI instruments on the basis of :

(i) suitability (ii) power consumption

(iii) scale (iv) cost

(b) Draw the labelled diagram of PMMC instrument.

(c) List four electrical effects used in measuring instruments.

(d) List three torques used in analog instruments. Also state the function of any one torque.

(e) Define :

(i) accuracy (ii) precision

(iii) sensitivity (iv) reproducibility

(f) List four advantages of electronic instruments over other instruments.

3. Attempt any FOUR : **16**

(a) Draw the connection diagram of voltmeter & ammeter to measure voltage & current in single phase ac circuit.

(b) Draw the labelled diagram of MI attraction type instrument.

(c) PMMC instrument is not suitable to measure AC. Why ?

(d) State the reason for :

(i) PMMC instrument has linear scale

(ii) MI instrument has non-linear scale.

(e) A PMMC instrument gives full scale deflection of 5 mA when a voltage of 50 mV is applied across it. Calculate :

(i) Value of R_{sh} for full scale defection of 50 A.

(ii) Value of R_s for full scale deflection of 500 V.

(f) A 1 mA PMMC meter with internal resistance of 100 Ω is to be converted into 100 mA ammeter. Calculate value of shunt resistance required.

4. Attempt any FOUR : **16**

(a) Draw the impedance triangle for

(i) R-L circuit (ii) R-C circuit

(b) Explain the meaning of multiplying factor of wattmeter. Why it is required ?

(c) Define active, reactive & apparent power stating their equations with units.

(d) Explain how the range of wattmeter can be extended.

(e) Explain the effect of power factor on wattmeter reading in two wattmeter method for (i) unity p.f. (ii) zero p.f.

(f) In case of active power measurement in 3-phase ckt by two wattmeter method :

(i) Draw the connection diagram

(ii) State the formula for active & reactive power

(iii) List two advantages

(iv) If one wattmeter reads 2000 W & other reads 1500 watt, calculate power factor of load.

5. Attempt any FOUR : **16**

(a) (i) Draw the connection diagram of dynamometer type wattmeter showing measurement of power in single phase AC circuit.

(ii) Draw the connection diagram of measurement of reactive power in 3 phase circuit by one wattmeter method.

(b) (i) Define electrical energy & state its unit.

(ii) Draw the circuit diagram to calibrate single phase energy meter by direct loading.

(c) (i) Draw the block diagram of digital energy meter.

(ii) List two advantages of digital energy meter over induction type energy meter.

(d) (i) Draw the labelled connection diagram of 1-phase induction type energy meter.

(ii) What is creeping in energy meter ? State any remedy by which it can be avoided.

(e) Explain with diagram simple V-I method to measure medium resistance.

(f) Draw connection diagram of earth tester to show its construction.

P.T.O.

6. Attempt any FOUR : **16**

(a) Explain how megger can be used for measurement of high resistances.

(b) Compare analog multimeter v/s digital multimeter on

(i) accuracy (ii) power requirement

(iii) cost (iv) portability

(c) Draw the connection diagram of Weston type of frequency meter.

(d) Explain with diagram working of phase sequence indicator.

(e) State the function of synchroscope. Also state the purpose of synchronizing.

(f) Explain the use of function generator.
