

17322

11920

3 Hours / 100 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (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.

Marks

- 1. Attempt any TEN of the following: **20****
- a) Define the following term
 - (i) Sensitivity
 - (ii) Reproducibility
 - b) State the meaning of absolute instrument and secondary instruments.
 - c) Write any two disadvantages of ammeter shunts.
 - d) Draw impedance triangle in series R.C circuit.
 - e) Name the meter used for measurement of
 - (i) Direct current
 - (ii) Alternating voltage
 - f) Define instrument transformer. List two errors in instrument transformer.
 - g) Define balanced and unbalanced load in a 3ϕ circuit.

P.T.O.

- h) State function of circuit coil and voltage coil in wattmeter. (One function each).
- i) State the function of break magnet used in energy meter.
- j) State two advantages of digital energy meter over analog energy meter.
- k) Name any two methods for measurement of high resistance.
- l) State four application of function generator.

2. Attempt any FOUR of the following: 16

- a) Compare PMMC and MI instrument (Any four points).
- b) List three types of errors in measuring instruments. Give reasons of occurring for any one of them.
- c) Name the different torque and their function in measuring instrument.
- d) Draw constructional features of dynamometer type wattmeter for 1ϕ power measurement and label them.
- e) How the range of voltmeter is extended using multiplier?
- f) Write equations for all powers. State their units. Draw the power triangle.

3. Attempt any FOUR of the following: 16

- a) Describe systematic error in measuring instrument.
- b) State the meaning of secondary instrument. Classify secondary instrument.
- c) A moving coil instrument with FSD of 25 mA and internal resistance of 50Ω is to be used as 0-10A ammeter and 0-500V voltmeter. Calculate necessary shunt / series resistance for it.
- d) Derive equation for shunt resistance calculation in ammeter range extension.
- e) If the readings on two wattmeters are 5 KW and 0.5 kW, the latter reading being obtained after reversal of the current coil, calculate the power and P.F of the load.
- f) Draw neat circuit diagram and phasor diagram for measurement of reactive power in 3ϕ balanced star connected load by one wattmeter method.

- 4. Attempt any FOUR of the following:** **16**
- a) A 3ϕ , 500V induction motor has a P.F of 0.4. The input power is 30KW. Calculate readings of the wattmeter in two wattmeter method used to measure the input power.
 - b) Compare analog and digital multimeter (Any four points).
 - c) List any four errors in induction type energy meter. Give the method of compensation for each type of error.
 - d) Draw a neat sketch of 3ϕ induction type energy meter and label the parts.
 - e) Explain working of Weston type frequency meter with neat sketch.
 - f) Mention the precaution to be taken while connecting CT and PT in the circuit.
- 5. Attempt any FOUR of the following:** **16**
- a) State any eight application to CRO.
 - b) Draw a neat labelled diagram to describe construction of megger.
 - c) Draw a neat sketch of attraction type moving iron instrument and label it.
 - d) Write working of L-C-R meter with suitable sketch.
 - e) State the effect of power factor variation on reading of wattmeter in two wattmeter method for 3ϕ circuit.
 - f) 1ϕ energy meter has a constant of 6000 rev/kwh. A test was carried out with a resistive load for 1 min. during which meter made 40 revolutions. The voltage was 110 volts and current 3A- find out the percentage error.

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

- a) With neat diagram, explain the working of clip-on ammeter.
 - b) Explain V-I method of measurement of medium resistance.
 - c) 'PMMC instrument is not suitable to measure AC quantity'. State the reason.
 - d) Draw the circuit diagram of wheatstone bridge and derive the formula for balanced load.
 - e) Draw a neat circuit to measure power of 3ϕ balanced star connected load used one wattmeter. Explain its working.
 - f) State the function of following in CRO
 - (i) Vertical deflection system
 - (ii) Horizontal deflection system
 - (iii) Blanking circuit
 - (iv) Synchronization circuit.
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