

17322

21819

3 Hours / 100 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Figures to the right indicate full marks.
(3) Assume suitable data, if necessary.
(4) Use of Non-programmable Electronic Pocket Calculator is permissible.
(5) 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) List different methods of developing damping torque.
 - b) Define:
 - (i) Precision
 - (ii) Accuracy
 - c) Name the material used for.
 - (i) Moving coil
 - (ii) Spring of PMMC instrument
 - d) List one method of range extension of D.C ammeter and a.c ammeter.
 - e) State the function of control spring.
 - f) A single phase wattmeter rated for 500 V, 10 A has full scale deflection of 1250 W. State the multiplying factor of wattmeter.
 - g) Enlist any four errors that occur in dynamometer type wattmeter.

P.T.O.

- h) State two advantages of two wattmeter method.
- i) Define electrical energy. State its unit.
- j) State the meaning of energy meter constant K. State its unit.
- k) Give ranges of low and high resistances.
- l) State the use of synchroscope.
- m) Give application of C.R.O.

2. Attempt any FOUR of the following: 16

- a) Describe different types of errors in analog measuring instruments.
- b) Write one advantage and one disadvantage each for spring control method and gravity control method.
- c) Compare PMMC and MI instrument (any four points)
- d) State any four merits of two wattmeter method for 3 ϕ power measurement.
- e) Draw power triangle. Name each side with relation and unit.
- f) Draw neat labelled diagram of PMMC instrument.

3. Attempt any FOUR of the following: 16

- a) Explain working of phase sequence indicator.
- b) Give significance and purpose of electrical measurement systems.
- c) Compare analog ammeter and voltmeter on:
 - (i) Connection in circuit
 - (ii) Resistance value
 - (iii) Circuit symbol
 - (iv) Power consumption
- d) Name the different torques and their function in measuring instrument.
- e) Draw block diagram of function generator, give its applications.
- f) Draw and describe weston-type frequency meter.

- 4. Attempt any FOUR of the following:** **16**
- a) A 50 A, 230 V energy meter makes 61 revolutions in 37 seconds. If the meter constant is 520 rev/kwh. State the percentage error in the energy meter.
 - b) Explain with diagram the range extension of D.C meter.
 - c) A moving coil instrument gives fSD of 15 mA and has a resistance of 100 Ω . Calculate the value of shunt resistance so that it can be used as 0-2.5-5A.
 - d) Explain the measurement of medium resistance by simple V-I method.
 - e) Explain dynamometer type instrument with neat diagram.
 - f) Draw circuit diagram and phasor diagram of R-L and R-C series circuit.
- 5. Attempt any FOUR of the following:** **16**
- a) Draw neat labelled diagram of megger. Explain its working.
 - b) Draw neat labelled diagram of attraction type MI instrument.
 - c) "Secondary of current transformer should not be open". Justify.
 - d) A 3-phase, 500 V motor load has a power factor of 0.4. Two wattmeters are connected to measure input. They show the input to be 30 kW. Find out reading of each wattmeter.
 - e) State the effect of power factor variation on reading of wattmeter in two wattmeter method for 3 ϕ circuit.
 - f) Explain L-C-R meter with neat diagram.

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

- a) Draw neat labelled diagram of single phase induction type energy meter.
 - b) Differentiate between analog and digital multimeter.
 - c) Draw neat labeled circuit diagram and phasor diagram of one wattmeter method of reactive power measurement in 3 phase balanced load.
 - d) Explain working of earth tester.
 - e) Explain electronic type energy meter.
 - f) Explain working of clip on ammeter.
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