

Total No. of Questions : 8]

SEAT No. :

P3856

[Total No. of Pages : 3

[5057] - 2035

S.E. (Electrical)

ELECTRICAL MEASUREMENT & INSTRUMENTATION
(2015 Pattern)

Time : 2 Hours]

[Max. Marks : 50

Instructions to the candidates :-

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of logarithmic table, slide rule, Mollier chart, electronic pocket calculator and steam table is allowed.*
- 4) *Assume suitable data, if necessary.*

Q1) a) What are the different methods of damping used in analog indicating instruments? List their advantages and disadvantages. [6]

b) Explain the construction and working of a meggar with the help of a neat diagram. [6]

OR

Q2) a) Two ammeters X and Y have resistances of 1.2Ω and 1.5Ω respectively and they give full scale deflection with 150 mA and 250 mA respectively. The ranges have been extended by connecting shunts so as to give full scale deflection with 15 A. The ammeters along with shunts are connected in parallel and then placed in a circuit in which the total current flowing is 15 A. Calculate the current in amperes indicated by ammeter X. [6]

b) With a circuit diagram derive the equation for balance in the case of Maxwell's inductance bridge. Draw the phasor diagram for balance conditions. [6]

Q3) a) When two wattmeters method is used for measurement of power in a three phase balanced circuit, comment upon the readings of the two wattmeters under following conditions. [6]

- i) When the power factor is unity.
- ii) When the power factor is zero.
- iii) When the power factor is 0.5 lagging.

P.T.O.

- b) A three phase, two element energy meter has a constant of 0.2 revolutions of disc per kwh. The meter is being used with a potential transformer of ratio 22 kV/220 V and a current transformer of ratio 100/5 A. If the line voltage is 220 V, current is 10 A, time to complete 10 revolutions is 30 seconds on unity power factor, determine the error expressed as a percentage of the correct reading. [7]

OR

- Q4)** a) A wattmeter reads 5.54 kW when it's current coil is connected in the red phase and it's voltage coil is connected between red phase and neutral of a symmetrical three phase system supplying a balanced load of 30 A at 400 V. What will be the reading of the instrument if the connection of current coil remains unchanged and voltage coil is connected between yellow and blue phases? The phase sequence is RYB. [7]
- b) Explain how the following adjustments are made in a single phase induction type energy meter.
- Lag adjustment
 - Adjustment for friction compensation
 - Creep
 - Overload compensation

- Q5)** a) Draw and explain block diagram of Digital Storage Oscilloscope. [7]
- b) Explain capacitive transducers for pressure measurement with a neat diagram. [6]

OR

- Q6)** a) Describe briefly how the following measurements can be made with the use of CRO. [6]
- Frequency
 - Phase angle
 - Voltage
- b) Explain Mcleod gauge for measurement of pressure. [7]

- Q7)** a) Explain nucleonic method for level measurement with a suitable diagram. [6]
- b) What are the types of strain gauge? Explain foil strain gauge. [6]

OR

- Q8)** a) Explain hydraulic method for measurement of level. [6]
- b) Explain the construction and principle of working of a Linear Variable Differential Transformer (LVDT). Explain how the magnitude and direction of displacement of core of an LVDT detected? [6]

