

Total No. of Questions : 4]

SEAT No. :

PC389

[6359]-509

[Total No. of Pages : 2

S.E. (Electrical Engg.) (Insem)

ELECTRICAL MEASUREMENTS & INSTRUMENTATION
(2019 Pattern) (Semester - III) (203144)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4.
- 2) Neat diagram must be drawn whenever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

Q1) a) What is meant by static and dynamic characteristics of measuring instruments? Explain the following characteristics. [7]

- i) Accuracy
- ii) Speed of response
- iii) Drifts
- iv) Linearity

b) Explain with a neat diagram how CT and PT are used to extend range of ammeter, voltmeter and wattmeter. State the advantages of instrument transformers for range extension. [8]

OR

Q2) a) Draw a neat schematic diagram of Permanent Magnet Moving Coil type instrument and explain deflecting, controlling and damping system used in it. Comment on scale used in PMMC instrument. [7]

b) What are the forces needed for satisfactory operation of indicating instrument? Explain how these forces are produced? [8]

P.T.O.

Q3) a) A voltmeter of resistance 500 ohm and a milli-ammeter of 1.0 ohm resistance are used to measure a resistance by ammeter voltmeter method. If the voltmeter reads 20V and milli-ammeter reads 100mA.

Calculate the true value of resistance

- i) If the voltmeter is connected across the supply and the milli-ammeter connected in series with the unknown resistance.
- ii) If the voltmeter is connected across the unknown resistance with ammeter connected on the supply side. [7]

b) With a circuit diagram derive the equation for an unknown self-inductance measurement using Maxwell's inductance bridge. [8]

OR

Q4) a) The arms of Anderson's bridge are as follows: [7]

Arm AB : Unknown impedance with R_1 , L_1 in series with variable resistor r_1

Arm BC : Pure resistance $R_3 = 100$ ohm

Arm CD : Pure resistance $R_4 = 200$ ohm

Arm DA : Pure resistance $R_2 = 250$ ohm

Arm DE : Variable pure resistance r

Arm EC : A loss free capacitor $C = 1\mu F$

Arm BE : A detector

A. C supply is connected between terminal A and C. Calculate resistance and inductance R_1 , L_1 , if $r_1 = 43.1$ ohm and $r = 229.7$ ohm under balance condition.

b) Draw the circuit diagram of a Kelvin's Double bridge and derive the condition of balance. [8]

* * *