Total No. of Questions : 4]

SEAT No. :

PC389

[Total No. of Pages : 2

[6359]-509

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 R1, L1 in series with variable resistor r1

Arm BC : Pure resistance R3 = 100 ohm

Arm CD : Pure resistance R4 = 200 ohm

Arm DA : Pure resistance R2 = 250 ohm

Arm DE : Variable pure resistance r

Arm EC : A loss free capacitor C = 1μF

Arm BE : A detector

A. C supply is connected between terminal A and C. Calculate resistance and inductance R1, L1, 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]**

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