Code No: **R31022/R10**

III B.Tech I Semester Supplementary Examinations, November - 2015

ELECTRICAL MEASUREMENTS

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) Discuss briefly the essential features of indicating instruments. [7]
b) Derive the equation for deflecting torque of PMMC instrument when it is spring controlled. [8]

2 Derive the expressions for ratio and phase angle error of a potential transformer. State the assumptions made for derivation of these errors. [15]

3 a) What is phantom loading? Explain with an example how it is more advantageous than testing with direct loading. [7]
b) Explain the construction and principle of operation of a dynamometer type Wattmeter. How it can be made to read DC as well as AC? [8]

4 a) A basic slide wire potentiometer has a working battery voltage of 3 volts with negligible internal resistance. The resistance of slide wire is 400Ω and its length is 200 cm. A 200 cm scale is placed along the slide wire. The slide wire has 1 mm scale divisions and it is possible to read upto a division. The instrument is standardized with 1.018 V standard cell with sliding contact at the 101.8 cm mark on scale. Calculate: i) Working current, ii) The resistance of series rheostat, iii) The measurement range and iv) The resolution of the instrument. [7]
b) Explain with the help of suitable diagrams, how a D.C. Potentiometer can be used for: i) Calibration of Voltmeter, ii) Calibration of Wattmeter. [8]

5 a) Why is Kelvin's double bridge superior to the Wheat-stone bridge for the purpose of low resistance measurement? [4]
b) How the difficulties associated with the measurement of very high resistance are over come? [4]
c) Why is the Voltmeter-Ammeter method unsuitable for the precise measurement of the low resistance? [4]
d) How the effects of contact resistance and resistance of the connecting leads are eliminated in the measurement of resistance by Kelvin's double bridge? [3]

6 a) Explain the working of Hay's bridge for measurement of inductance with a circuit diagram. [7]
b) A capacitor bushing forms arm AB of a Schering bridge and a standard capacitor of 500 pF capacitance and negligible loss, forms arm AD. Arm BC consists of a non-inductive resistance of 300Ω. When the bridge is balanced arm CD has a resistance of 72.6Ω in parallel with a capacitance of 0.148 μF. The supply frequency is 50 Hz. Calculate the capacitance and dielectric loss angle of capacitor. Derive the equations for balance and draw the phasor diagram under conditions of balance. [8]

7 a) Discuss any one method of measuring core loss of a magnetic material. [7]
b) Explain the operating principle of flux meter with a neat sketch. [8]

8 Explain the principle of operation of a successive approximation type of Digital voltmeter with a neat block diagram. [15]

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