Student Exam No:-_____

GANPAT UNIVERSITY
B.TECH SEM-III (ELECTRICAL)
CBCS (NEW) REGULAR EXAMINATION NOV-DEC 2015
2EE302: ELECTRICAL MEASURMENT AND MEASURING INSTRUMENTS

Time: 3 Hours

Total Marks:-60

Instructions: - (1) This Question paper has two sections. Attempt each section in separate answer
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION-I

Q:1
(A) What are the problems associated with measurement of low resistance? How are they overcome through use of Kelvin's double bridge? **[05]**
(B) How resistances are classified? Suggest various methods for measuring them giving justification. **[05]**

OR

Q:1
(A) Describe briefly how Wein Bridge can be used for the measurement of frequency. **[05]**
(B) Explain Loss of charge method for measurement of high resistance. **[05]**

Q:2
(A) State the different methods for measurement of inductance. And explain Maxwell's inductance and inductance capacitance bridges with suitable diagram. **[05]**
(B) The four arms of Hay's bridge are arranged as follow. AB is coil of unknown impedances: BC is non inductive resistor of 1000Ω; CD is non inductive resistor of 833Ω in series with standard capacitor 0.38 μF; DA is non inductive resistor of 16800Ω. If the supply frequency is 50Hz, determine inductance and resistance at balanced condition. **[05]**

OR

Q:2
(A) Describe the construction and working of PMMC instruments. Derive the equation for deflection if the instrument is spring controlled. **[05]**
(B) The moving coil meter has 60 turns width of 2 cm and depth of 3 cm. it hangs in uniform magnetic field of 50 mWb/m^2. Find the turning movement of the coil when it is carrying current of 1mA. **[05]**

Q:3 **Attempt any two:** **[10]**
(A) With a neat diagram explain the working of LVDT.
(B) Derive the torque equation for D'Arsonval type galvanometer.
(C) What if flux meter? Explain with suitable diagram.

SECTION-II

Q:4

   (A) Classify various measuring Instruments and discuss absolute and secondary type [05]
instruments using suitable examples.

   (B) Define the following terms: Accuracy, Precision, Dead zone, Linearity. [05]

OR

Q:4

   (A) Using expression of torque in single phase induction type energy meter, show that the [05]
total no of revolutions made by its disc during a particular time is proportional to the
energy consumed.

   (B) 230 V, 1-ph energy-meter to load current of a 4 A, passing through it for 5 hours at [05]
unity power factor. If the meter makes 1104 revolution during this period. What is the
meter constant in rev/kwh. If the load power factor is of 0.8 what nos of revolutions
the disc will make in above time.

Q:5

   (A) Prove that the true power$= \dfrac{\cos \emptyset}{\cos \emptyset \cos \beta} \times$ actual wattmeter reading for [05]

electrodynamometer type wattmeter where $\cos \emptyset = power\ factor\ of\ the$ ckt.

   (B) The following data related to current transformer, [05]
No. of primary turns = single turn
No. of secondary turns = 240
Secondary winding current = 5A
External burden = 1.2Ω (Non-inductive load)
MMF = 96 AT for setting up flux in the core, cross section of core = 1200mm^2,
Supply frequency = 50 Hz. Neglecting effect of magnetic leakage, iron losses &
I^{2}R losses.
Calculate (1) Actual transformation ratio
          (2) Phase angle
          (3) Maximum flux density in core.

OR

Q:5

   (A) Using neat phasor diagram of a current transformer, derive the expressions for ratio [05]
and phase angle errors.

   (B) A wattmeter with its current coil in line R and pressure coil across Y and B reads 3.2 [05]
kW for a balanced load on 0.6 lagging p.f. the supply voltage is 400 V. determine
current, power and reactive volt amp of the load.

Q:6   **Attempt any two:** [10]

   (A) With a neat block diagram, explain the working of CRO.

   (B) With neat diagram explain the working of co-ordinate type of ac potentiometer.

   (C) Describe with the help of diagram the principle and working of a simple D.C.
potentiometer. Explain how this potentiometer is standardized.

   (D) Explain the working principle of Hot wire type instruments.

END OF PAPER