

Muzummo
Date: 01/12/2015.

Student Exam No: _____

GANPAT UNIVERSITY
B.TECH SEM-III (ELECTRICAL)
CBCS(NEW) REGULAR EXAMINATION NOV-DEC 2015
2EE302: ELECTRICAL MEASUREMENT 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) Give the classification of analog type instruments with necessary diagrams. [05]
(B) List out the static characteristics of instruments & also define (i)Accuracy (ii)Dead zone (iii)Range/Span (iv)Drift (v)Sensitivity [05]

OR

- Q:1** (A) Explain the constructional details of resistance standard cell. [05]
(B) Distinguish between (i) primary standard (ii) secondary standard (iii) international standard (iv) working standards. [05]
- Q:2** (A) What are the problems associated with measurement of low resistance? How are they overcome through use of Kelvin's double bridge? [05]
(B) A balanced 1kHz bridge has the following configuration: [05]
Arm AB: $R_1=1000\Omega$ in parallel with $C_1=0.053 \mu\text{f}$; $R_2=1500 \Omega$ in series with $C_2=0.53\mu\text{F}$; CD: the unknown, DA: pure capacitance= $0.265\mu\text{F}$.
Determine R and L constants of unknown. Draw the phasor diagram of the bridge at above frequency.

OR

- Q:2** (A) Describe the method for precise measurement of self-inductance using Anderson's bridge [05]
(B) Show that the wein frequency bridge will be balanced at only one frequency given by [05]

$$f = \frac{1}{2\pi\sqrt{C_1 C_2 R_1 R_2}}$$

- Q:3** **Attempt any two:** [10]
- (A) Using expression for torque in single phase induction type energy meter, show that the total no of revolutions made by its disc during a particular time is proportional to the energy consumed.
- (B) List the various errors and compensations in single phase induction type energy meter & explain any two in detail.
- (C) Describe the constructional details of an electrodynamicometer type wattmeter.& also derive the expression for torque when the instrument is used on a.c. supply.

SECTION-II

Q:4 (A) Describe the construction and working of PMMC instruments. Derive the equation for deflection if the instrument is spring controlled. [05]

(B) Explain the Hot wire instrument with the help of a neat diagram and magnification of expansion. [05]

OR

Q:4 (A) Explain the working of (a) attraction type and (b) repulsion type moving iron instruments with the help of neat diagram. [05]

(B) Derive torque equation of electro-dynamometer for mutual induction between fixed coil and moving coil. [05]

Q:5 (A) Explain the construction and working of D'Arsonval type galvanometer. [05]

(B) What is CRO? Explain briefly with suitable diagram. [05]

OR

Q:5 (A) Write a short note on Spectrum Analyzer. [05]

(B) With the help of neat diagram explain the working of co-ordinate type of ac potentiometer. [05]

Q:6 Attempt any two: [10]

(A) Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expressions for ratio and phase angle errors.

(B) Describe the effect of the following on the characteristics of a potential transformer (i) burden (VA) of secondary winding circuit (ii) power factor of secondary winding circuit (iii) frequency (iv) supply voltage.

(C) A 1000/5 A, 50 Hz current transformer has secondary burden comprising a non-inductive impedance of 1.6Ω . The primary winding has one turn. Calculate the flux in the core and ratio error at full load. Neglect leakage reactance and assume the iron loss in the core to be 1.5 W at full load. The magnetizing mmf is 100 A.

END OF PAPER

Best of Luck