

- d) With the help of neat block diagram, describe the operation of a wave analyzer.

Or

Draw and explain the block diagram of sweep generator covering entire frequency band.

Roll No.....

EI - 304

B.E. III Semester

Examination, December 2015

Measurement Science and Techniques

Time : Three Hours

Maximum Marks : 70

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
 ii) All parts of each question are to be attempted at one place.
 iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.
 iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) What will be the sensitivity of an ammeter which requires a change of 2 A in its coil to produce a change in deflection of the pointer by 5 mm.
- b) 0-50V voltmeter is specified to be accurate within $\pm 1\%$ of full scale. Calculate the limiting error when the instrument is 15V.
- c) What is measurement? State the two basic requirement of any measurement.
- d) Describe the loading effects due to shunt connected and series connected instruments.

Or

Two resistors $R_1 = 100 \pm 0.1\Omega$ and $R_2 = 50 \pm 0.03\Omega$ are connected in series and then in parallel. Calculate the uncertainty in the combined resistance for both series and parallel arrangement.

[2]

Unit - II

- a) Why is the graduation of scale of moving iron instrument not uniform through out?
- b) The damping of the ballistic galvanometer is kept very small. Give reasons.
- c) What are instrument transformers? How they differ from power transformer.
- d) Describe the principle of operation, construction, main features and application of moving coil instrument.

Or

Draw an illustrative diagram and explain the working of hot wire instrument.

Unit - III

- a) Why is vibration galvanometer widely used as detector for operation of ac bridge?
- b) Why shielding and grounding is employed in ac bridges.
- c) What are the limitations of Wheatstone bridge for measurement of resistance? Explain with justification.
- d) In an Anderson bridge for measurement of inductance L_x and resistance R_x in the arm AB, the arm CD and DA have resistances of 600Ω each and the arm CE has a capacitor of $1\mu\text{F}$ capacitor. With ac supply at 100Hz supplied across A and C, balance is obtained with a resistance of 400Ω in arm DE and 600Ω in arm BC. Calculate L_x and R_x .

Or

[3]

Explain with the help of connection diagram, how would you determine the value of low resistance shunt. What are the important precautions that are to be taken in such method? Discuss.

Unit - IV

4. a) What is the principle of sampling oscilloscope? Explain.
- b) Discuss the advantages of digital instruments with proper justifications.
- c) A Lissajous pattern on an oscilloscope is stationary and has 5 horizontal tangencies and 2 vertical tangencies the frequency of horizontal input is 1000 Hz . Determine the frequency of vertical input.
- d) Discuss in detail the working of the successive approximation DVM.

Or

Draw the labeled block diagram of general purpose CRO and mention its applications.

Unit - V

5. a) Write any three applications of wave analyzer.
- b) What is Harmonic Distortion?
- c) What is the dynamic range of spectrum analyzer with a 30kHz , 3 dB bandwidth, a noise figure of 15 dB and third order intercept of $+25\text{ dBm}$.