[Total No. of Questions - 9] [Total No. of Printed Pages - 4]
(2063)

823

B.Tech 4th Semester Examination

Electronic Measurement and Measuring Instruments

EC (ID)-4002

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt FIVE questions in all selecting one question from each section. Section E contains only one question which is compulsory.

SECTION - A

1. (a) Describe in detail major parts of cathode ray tube (CRT) and explain working Stages of CRO in brief. **(10)**

   (b) Explain functional block diagram of multimeter. **(10)**

2. (a) Derive an expression for the vertical deflection on the screen of a CRT in terms of length of plates, separation distance, accelerating voltage, deflecting voltage and distance of screen from the origin. **(10)**

   (b) Explain need of blanking circuit and synchronization in a CRO. **(5)**

(c) Explain measurement of frequency using cathode ray oscilloscope. **(5)**

SECTION - B

3. Draw the equivalent circuit of Current Transformer and explain its construction with its phasor diagram. Also derive the expressions for phase angle and transformation ratio. **(20)**

4. (a) A current transformer with a bar primary has 250 turns in its secondary winding. The resistance and reactance of secondary circuits are 1.4Ω and 1.1Ω respectively including the transformer winding. When 5A current flows in the secondary winding the magnetizing MMF is 80 AT and the iron loss is 1.1 W. determine ratio error (ii) phase angle error. **(8)**

(b) Give functional block diagram of spectrum analyzer. Explain each functional block. **(12)**

SECTION - C

5. (a) Define gauge factor of a strain gauge and obtain its expression. **(8)**

(b) Give necessity of recorders. What is a strip chart recorder? Describe its functioning giving suitable circuit diagram. Also give its merits and demerits. **(12)**

6. (a) A piezoelectric pick up has dimensions of 6 mm x 6mm x 1.5 mm and a voltage

sensitivity of 0.012 Vm/N. Relative permittivity of the crystal is 1,400 and modulus of elasticity of the crystal is 12 x 10^{10} N/m^2. Determine (i) the output voltage (ii) charge sensitivity (iii) strain (iv) charge generated and (v) the capacitance of the pick up. The force applied to the pick up is 10 N. **(10)**

(b) Give operation of magnetic tape recorder. **(10)**

SECTION - D

7. (a) What is telemetry and what are its basic components? Draw the block diagram of a typical telemetry system and explain the function of each component. **(10)**

(b) Explain operation of Nixie tube. **(10)**

8. (a) Explain various methods of data transmission. **(10)**

(b) What are the various display devices? Explain liquid crystal diode display. **(10)**

SECTION - E (Compulsory)

9. Explain the following:

(1) Explain the terms accuracy and resolution.

(2) What is the difference between recording and integrating instruments?

(3) Why there are two conditions of balance in a.c. bridges, whereas there is only one in d.c. bridges?

(4) What are active and passive transducers?

(5) What is meant by dummy strain gauge? What for it is used?

(6) Why are TVMs preferred over VTVMs?

(7) What is Q-meter and on what principle does it operate?

(8) What is meant by harmonic distortion?

(9) What is meant by phase shift oscillator?

(10) Why thermistor is well suited to precision temperature measurement and control? **(10×2=20)**