14675

B. Tech 4th Semester Examination

Electronic Measurement & Measuring Instruments (O.S.)

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 each from section A, B, C & D. Section-E is compulsory.

SECTION - A

1. (a) Why is an electronic voltmeter more accurate than an ordinary voltmeter? Draw its block diagram and explain its principle of operation. (10)

(b) Explain the working of Q-meter. (10)

2. (a) Draw block diagram of a CRO and explain the function of each block. (12)

(b) Explain measurement of phase difference and frequency of sinusoidal voltage signals using cathode ray oscilloscope. (8)

SECTION - B

3. Differentiate between a current transformer and potential transformer. Discuss the theory of a potential transformer with phasor diagrams. Derive expressions for actual transformation ratio, ratio error and phase angle error of a PT. (20)

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4. (a) How does a wave analyzer differ from an harmonic distortion analyzer? Describe an Heterodyne wave analyzer with the help of its block diagram. (10)

(b) With the help of block diagram, explain the working of a spectrum analyzer. (10)

SECTION - C

5. (a) What is an X-Y recorder? How is it different from X-t or Y-t recorders? Describe its functioning giving suitable circuit diagram. Give its merits and demerits. (12)

(b) Describe the operation of an LVDT. (8)

6. (a) Explain the operating principle, construction and applications of photoelectric transducers. (10)

(b) Describe the working principle and construction of thermocouples. Describe the various types of compensations employed. Also give the merits, demerits and applications of thermocouples. (10)

SECTION - D

7. (a) Explain frequency division multiplexing and time division multiplexing. Compare their performance. (12+8=20)

(b) Explain operation of Nixie tube.

8. (a) Explain various methods of data transmission. (12)

(b) What are the various display devices? Explain operation of seven segment displays. (8)

SECTION - E (Compulsory)

9. Explain the following:

(1) What is the difference between recording and integrating instruments?
(2) Why there are two conditions of balance in a.c. bridges, whereas there is only one in d.c. bridges?

(3) What are electrical transducers?

(4) Why are TVMs preferred over VTVMs?

(5) What is meant by harmonic distortion?

(6) What happens if the secondary of a current transformer is open circuited, while the primary carries the rated current?

(7) Why is quartz crystal commonly used in crystal oscillators?

(8) What is an electronic galvanometer and how is it superior to ordinary galvanometer?

(9) Why phototransistor is much sensitive than a photodiode?

(10) Why is it necessary to make strain gauges of high resistance? (10×2=20)