

- N.B. :** (1) Question No.1 is compulsory.  
(2) Attempt any four questions from remaining six questions.

1. Attempt any four questions :- 20
  - (a) Explain active and passive transducers with examples.
  - (b) Why is delay line used in the vertical section of the oscilloscope ?
  - (c) Explain the working principle of Q-meter.
  - (d) Write about the various performance parameters of DAC.
  - (e) What resolution, total frequency display and dynamic range would be available from an input signal which is sampled for 4 seconds at sampling rate of 20 KHz using 10 bit conversion.
  
2. (a) Explain the elements of a Digital FFT analyzer with a suitable block diagram. 10  
(b) What is the basic principle of ADC ? Explain the operation of Successive Approximation type of ADC. 10
  
3. (a) What is a photoelectric transducer ? Explain the various types giving the operating principle and applications. 10  
(b) Explain the significance of a signal analyzer. Describe the principle of operation of a wave analyzer. 6  
(c) An 8 bit ADC outputs all '1' when  $V_i$  is 5.1 V. find - 4
  - (i) Resolution
  - (ii) Digital output when  $V_i = 1.28$  V.
  
4. (a) Explain the principle of working of LVDT. How do stray magnetic fields effect the performance and how it can be protected. 10  
(b) Write a note on Universal counter ? 6  
(c) How is the electron beam focussed to a fine spot on the face of a CRT ? 4
  
5. (a) Draw and explain the block diagram of a general purpose CRO. 10  
(b) Write a note on digital modulation techniques. 6  
(c) Explain the principle of operation of capacitive sensors. 4
  
6. (a) How does the digital storage oscilloscope differ from a conventional oscilloscope ? Explain the principle, features and applications of DSO. 10  
(b) Write a short note on Automatic Test Equipment. 6  
(c) A coil with resistance of  $5 \Omega$  is directly connected to test terminals of Q-meter. For a  $130 \text{ pF}$  capacitance of a tuning capacitor, resonance is obtained at oscillator frequency of 1 MHz. Calculate % error introduced in calculated value of Q by  $0.01 \Omega$  insertion resistance. 4
  
7. (a) What is meant by True RMS meter ? Explain with a circuit. Also give reason of why there is an error in reading a voltmeter calibrated to read RMS values when it is used to read signals other than sine wave. 10  
(b) Explain the need of data transmission and telemetry. What are the different modulation methods used in RF Telemetry Systems ? 10