

## TUTORIAL-1 QUESTIONS

### UNIT-1—CO1

- (a). A Sinusoidal signal with amplitude of 3.25 Volts is applied to a uniform Quantizer of the Mid-tread type whose Output takes on the values  $0, \pm 1, \pm 2, \pm 3$  Volts. Sketch the waveform of the resulting Quantizer output for one complete cycle of the input. **5M.**

(b). Repeat this evaluation for the case when the Quantizer is the Midrise type whose output takes on the values  $\pm 0.5, \pm 1.5, \pm 2.5, \pm 3.5$  volts. **5M.**
- Let a message Signal  $m(t) = 6 \sin(2\pi \times 10^3 t) + 4 \sin(4\pi \times 10^3 t)$  Volts with 't' in Seconds. Determine the minimum Pulse rate that will prevent Slope overload distortion, if the step size is 0.314 volts. **6M.**
- In PCM system, if the Quantization levels are increased from 2 to 8, **6M.**

  - Find the change in Signal to Quantization Noise ratio.
  - Find the change in Transmission Bandwidth.
- A  $\mu$ -law Compauder is defined as  $y = \pm \frac{\ln(1 + \mu |x|)}{\ln(1 + \mu)}$ ,  $|x| < 1$ , where x is input and y is output. Positive sign is used when x is positive and negative sign is used when x is negative. If the Peak input is 10 Volts and numbers of bits available for quantization are 8 then find the smallest and largest separation between levels. Consider  $\mu = 255$ . **10M.**