Registration no:

6th Semester Regular / Back Examination 2016-17
COMMUNICATION ENGINEERING
BRANCH: EEE
Time: 3 Hours
Max Marks: 70
Q.CODE: Z174
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

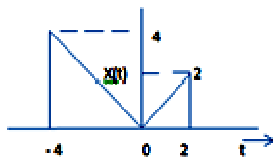**Q1**   **Answer the following questions:**   (2 x 10)

  a)

Figure 1(a)

signal x(t) is shown in figure 1(a). Sketch x(2t-4)

  b) Find the energy of the signal $x(t) = e^{-2t}u(t)$

  c) What is the difference between convolution and correlation?

  d) The noise figure of the individual stages of a two stage amplifier is 1.64 and 2.48 respectively. The available power gain of the first stage is 58. Calculate the overall noise figure.

  e) Why is the performance of an FM radio station is better than an AM station radiating the same total power?

  f) What is the difference between cros-stalk and inter-symbol interference?

  g) What is slope overload error in Delta Modulation?

  h) Define sensitivity and selectivity w.r.t. radio receiver.

  i) A Super Heterodyne radio receiver with an intermediate frequency of 455 KHz is tuned to a station operating at 1200 KHz. Find the image frequency associated with this receiver.

  j) Draw the waveform for the digital signal [10110101], while it is transmitted using Manchester coding format

Q2 a) Mention the different sources of noise in a communication system. What is the significance of White Gaussian noise in communication system?   **(5)**

  b) An angle modulated signal with carrier frequency $w_c = 2\pi \times 10^6$ is described by the equation $\emptyset(t) = 5 \cos(w_c t + 20 \sin 1000\pi t + 10 \sin 2000\pi t)$. Find the power of the modulated signal, frequency deviation and phase deviation.   **(5)**

Q3 **a)** Explain the principle of Armstrong method of FM generation. How is the **(5)** narrow band FM converted into wide band FM to achieve desired carrier frequency as well as deviation?

b) An AM transmitter has an unmodulated carrier power of 10 KW. It can **(5)** be modulated by a sinusoidal modulating voltage to a maximum depth of 40% without overloading. If the maximum modulation index is reduced to 30%, what is the extent up to which the unmodulated carrier power can be increased without overloading?

Q4 A signal m(t), bandlimited to 3 KHz is sampled at a rate of **(10)** $33\frac{1}{3}$ % higher than Nyquist rate. The maximum acceptable error in the sample amplitude is 0.5% of the peak amplitude m_p. The quantized samples are binary coded. Find the minimum bandwidth of a channel required to transmit the encoded binary signal.

If 24 such signals are time division multiplexed, find the minimum transmission bandwidth required to transmit multiplexed signals.

Q5 **a)** A PCM system has an uniform quantizer followed by a n-bit encoder. **(5)** Show that the r.m.s. signal to noise ratio is approximately given by (1.8 + 6n) dB. Assume a sinusoidal input.

b) Draw and explain the Pre-emphasis and De-emphasis circuit. What **(5)** are their uses?

Q6 **a)** What is Companding? Why is it needed in PCM systems? **(5)**

b) What is Quantization error? Show the mean-square quantization error **(5)** of a quantized signal is $s^2/12$, where S is the step size and error is within $\pm S/2$

Q7 **a)** Draw and explain in brief the Super Heterodyne Receiver. **(5)**

b) Draw and explain PAM demodulator using sample & hold circuit. **(5)**

Q8 **Write short notes on any two:** **(5 x 2)**
a) PLL
b) Comparison between FDM and TDM.
c) Capture Effect
d) Noise in AM system.