Sixth Semester Back Examination – 2015

COMMUNICATION ENGINEERING

BRANCH : EEE

QUESTION CODE : M 179

Full Marks – 70

Time : 3 Hours

Answer Question No. **1** which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions :   2×10

    (a) Find the Fourier transform of sin (ωt).

    (b) In an FM wave, the frequency deviation is 25 kHz. What is the maximum phase deviation does this present if the modulation signal is 100 Hz ?

    (c) State the sampling theorem.

    (d) Define Signal to noise ratio and Noise figure of a receiver.

    (e) Define power and energy signals.

    (f) What is the difference between TDM and FDM ?

    (g) What is the function of a matched filter ?

    (h) What is adaptive delta modulation ?

    (i) A transmitter radiates 9 kW of power with carrier unmodulated and 10.125 kW when modulated. Calculate the depth of modulation.

    (j) How do you measure the performance of a digital communication system ? Justify.

2. The message signal $m(t) = 10 \sin(400t)$ frequency modulates the carrier $c(t) = 100 \cos(2(pi).f_c.t)$. The modulation index is 6. 10

   (a) Write the expression for modulated signal $u(t)$.

   (b) What is the maximum frequency deviation ?

   (c) What is the power content of the modulated signal ?

3. Derive the signal to noise ratio at the output of AM receiver and FM receiver. Hence comment on why FM receivers provide better performance than AM receiver under similar input noise conditions.

   Analyze the principle of operation of any types of antennas. 10

4. (a) Discuss about the roles of Pre-emphasis and de-emphasis in FM system. 5

   (b) The signal to noise of an AM system is 25 dbs. The highest audio frequency transmitted is 30 kHz. If the transmitted carrier power is reduced by one-tenth and FM with a deviation of $\pm$ 15 kHz is employed, what signal to noise ratio is obtained ? 5

5. (a) The message signal $m(t) = a \cos(2\pi f_m t)$ is used to either carrier frequency modulate or phase modulate the carrier $Ac \cos(2\pi f_c t)$. Find the modulated signal in each case. 5

   (b) Explain in detail the generation, advantages and disadvantages of PCM. 5

6. What is the difference between PCM and DPCM ? Briefly explain the operation of the DPCM system with a neat diagram. 10

7. (a) What are the advantages of frequency modulation ? Show how a varactor can be used to produce a FM signal. 5

   (b) Explain the term amplitude modulation of carrier wave. Illustrate with the help of simple sketches 50% and 100% modulation. 5

8. Write short notes any **two** of the following : 5×2

   (a) Delta Modulation

   (b) PLL

   (c) Interference in AM and FM system

   (d) Intersymbol Interference.

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