Sem IV / Communication System / Inst / 04-06-14

QP Code : NP-19800

(3 Hours) [Total Marks : 80

N.B. : (1) Question No. 1 is **Compulsory.**
(2) Attempt any **three** questions from the remaining **five** questions.
(3) Assume **suitable** data if **necessary.**

1. (a) Derive the power relationship in AM signal. 5
   (b) Explain pre-emphasis and De-emphasis in FM systems. 5
   (c) Compare PAM, PWM and PPM. 5
   (d) Explain the linear delta modulation system. What are the errors associated with DM. 5

2. (a) Explain the phase shift method of SSB generation with neat block diagram. 10

   (b) A transistor class c amplifier has maximum permissible collector dissipation of 20 watts and collector efficiency of 75%. If it is collector modulated to a depth of 90% then calculate, 5
   (i) Maximum unmodulated carrier power
   (ii) The power in sidebands.

   (c) Compare wideband FM and narrowband FM. 5

3. (a) Explain any one method of F.M. generation with necessary equations and Waveforms. 10

   (b) When the modulating frequency in an FM system is 400 HZ and the modulating voltage is 2.4v, the modulation index is 60. Calculate the maximum deviation. What is the modulation index when the modulating frequency is reduced to 250 HZ and the modulating voltage is simultaneously raised to 3.3 V? 10

4. (a) Explain in brief :— 10
   (i) Quaternary Amplitude modulation (QAM)
   (ii) Frequency shift keying (FSK)

   (b) (i) Explain the various noises that affect communication. 6
   (ii) An amplifier operating over a frequency range from 17 to 19 MHZ has a input resistance of 5 kΩ. What is the rms thermal noise voltage at the input of this amplifier? Assume the operating temperature as 17°c. 4

5. (a) What is Telemetry? Explain voltage telemetry and current telemetry with the help of a neat diagram. 10

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(b) Explain the various communication modes as simplex, half duplex, duplex in detail. 10

6. Write short notes on any **four** of the following :— 20
   (a) Multiplexing techniques
   (b) QPSK transmitter and receiver
   (c) PCM transmission system
   (d) Independent sideband transmission
   (e) FM Noise triangle
   (f) OSI reference model.
