

University of Mumbai

S.E Second Year 2013 - 2014 May

Semester 4 (SE Second Year)

Principles of Communication Engineering

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- N.B.: (1) Question No. 1 is compulsory.  
 (2) Attempt any four questions out of remaining six questions.  
 (3) Assume suitable data if required.

1. Answer the following :— 20
  - (a) What is Quantization ? Explain types of quantization.
  - (b) AM is the waste of power and bandwidth. Justify the statement.
  - (c) Explain why FM is more immune to noise.
  - (d) Explain double spotting in radio receivers.
  
2. (a) State advantages of SSB over DSB. Explain any one method to generate SSB. 10  
 (b) Explain the following with reference to radio receivers :— 10
  - (i) Sensitivity
  - (ii) Fidelity.
  - (iii) Selectivity
  - (iv) Dynamic Range.
  
3. (a) Derive Mathematical expression for FM wave and its modulation index. 10  
 (b) One input to a conventional AM modulator is a 500 kHz carrier with amplitude of 20Vp. The second input is a 10 kHz modulating signal that is of sufficient amplitude to cause a change in output wave of  $\pm 7.5$  Vp. Determine : 10
  - (i) Upper and lower sideband frequencies.
  - (ii) Modulation co-efficient and percentage modulation.
  - (iii) Expression of modulated wave.
  - (iv) Draw output spectrum.
  - (v) Sketch output envelope.
  
4. (a) Explain Indirect method of FM generation. 10  
 (b) With the help of neat circuit diagram explain the generation and detection of Pulse Position Modulation (PPM) signal. 10
  
5. (a) What are the drawbacks of delta modulation ? How adaptive delta modulation solve these problem ? 10  
 (b) State and prove sampling theorem for low pass signal. 10
  
6. (a) Draw the following data waveforms for the bit stream 11010010 : 10
  - (i) Unipolar NRZ
  - (ii) Bipolar RZ
  - (iii) Bipolar NRZ
  - (iv) Bipolar RZ-AMI
  - (v) Unipolar RZ
  
- (b) Draw the block diagram of Pulse code modulation and explain each block. 10
  
7. Explain the following (any four) :— 20
  - (a) Automatic Gain Control
  - (b) Pre-emphasis and De-emphasis
  - (c) Squetch circuit