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# SARDAR PATEL UNIVERSITY
## M.Sc. (Semester II) (CBCS) EXAMINATION 2015
Tuesday, 21st April 2015

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### Analog and Digital Communication

Time: 02:30 PM TO 5:30 PM
Total Marks: 70

**Q1** Choose the correct answer.

[08]

1  _____ is the process in which the analog signal is converted into a corresponding sequence of samples that are uniformly spaced in time.
   a) Integrator         b) Compander         c) Predictor         d) Sampling

2  $m_f =$ _____
   a) $\omega_m/\Delta\omega$         b) $\omega_m.\Delta\omega$         c) $\Delta\omega/\omega_m$         d) none

3  Quantizing noise occurs in
   a) FDM         b) PCM         c) TDM         d) PWM

4  Indicate Which of the following System is analog.
   a) PWM         b) PCM         c) DM         d) NONE

5  $\delta = K_f E_m$ is called_____.
   a) Instantaneous Freq.
   c) Modulation Index
   b) Frequency Modulation
   d) Frequency Deviation

6  Bandwidth of AM wave is _____
   a) $f_m$         b) $f_m/2$         c) $2 f_m$         d) $f_m^2$

7  When the absolute value of $m_a$ is multiplied with 100 is known as_____
   a) Modulation         b) Percentage Modulation         c) AM         d) FM

8  The AM wave has _____ varying amplitude.
   a) Time
   c) Both
   b) Frequency
   d) None

**Q2** Answer in short. [ANY SEVEN]. [14]
1 Define: The term modulation
2 Draw the simple block diagram for AM.
3 A modulating signal $10\sin(2\pi \times 10^3 t)$ is used to modulate a carrier signal $20\sin(2\pi \times 10^3 t)$. Find modulation index and Percentage modulation.
4 Define: Huffman coding
5 Define: Modulation index for AM and FM.
6 State advantages of DM & PCM.
7 State the expression for maximum frequency of FM wave.
8 Draw PCM transmitter's block diagram.
9 State the types of detectors used for AM wave.

**Q3** A State the Detection Method of DSB-SC & explain in Detail. [08]
**Q3** B Sketch the waveforms for i) Split Phase Manchester ii) Unipolar NRZ iii) Unipolar RZ [04]

**OR**

**Q3** B Sketch the waveforms for AM wave. [04]

**Q4** A Determine the Huffman code for the following messages with their Probabilities given: (6) [06]

| X1 | X2 | X3 | X4 | X5 | X6 | X7 |
|------|------|-----|------|------|-----|-----|
| 0.05 | 0.15 | 0.2 | 0.05 | 0.15 | 0.3 | 0.1 |

**Q4** B Give in detail Mathematical Expression for FM. [06]

**OR**

**Q4** B Encode the following binary data stream into various PAM formats. [06]
Data stream: 10110100.

**Q5** A An FM transmission has a frequency deviation of 20 kHz. [08]
  i) Determine the percent modulation of this signal if it is broadcasted in the 88-108 MHz band.
  ii) Calculate the percent modulation if this signal is broadcasted as the audio portion of a television broadcast.
**Q5** B Write down some points of difference between AM &FM system. [04]

**OR**

**Q5** B Write down some points of difference between PM &FM system. [04]

**Q6** A Explain Types of Angle Modulation. [06]
**Q6** B Describe about Companding. [06]

**OR**

**Q6** B What is Delta modulation? Explain in brief. [06]

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