[This question paper contains 4 printed pages.]

Your Roll No......

Sr. No. of Question Paper : 1218 **A**

Unique Paper Code : 32227613

Name of the Paper : Communication System

Name of the Course : **B.Sc. (Hons.) Physics – CBCS – DSE**

Semester : VI-Semester

Duration : 3 hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **FIVE** questions in all.
3. **All** questions carry equal marks.
4. Question No. **1** is compulsory.
5. Scientific (non-programmable) calculators are allowed.

1. Answer any **five** of the following questions : (5×3=15)

(a) Write the equivalence between frequency modulation (FM) and phase modulation (PM).

P.T.O.

(b) What is TRAI and write its functions.

(c) The frequency range of a signal extends from 10 MHz to 10.2 MHz. Find the minimum sampling rate and maximum sampling time.

(d) Draw PPM and PWM wave forms for a sinusoidal modulating signal.

(e) What do you understand by ASK? Explain with the help of suitable wave forms.

(f) Draw AM wave, if a carrier wave is given by $y_c = 5.0 \times \cos(6 \times 10^6 t)$

And amplitude modulated baseband signal is given by $y_m = 3.0 \times \cos(100t)$

(g) Explain the following satellite applications.

(i) GPS (ii) Satellite Navigational system.

(h) Briefly explain the principle of frequency re-use in cellular telephony system.

2. (a) Discuss the ideal modulation, under modulation and over modulation with the help of suitable AM waveforms and corresponding trapezoidal representation. Assuming that the signals used are pure sine wave. (8)

(b) Draw the block diagram of super heterodyne receiver and explain the function of each block. (7)

3. (a) Explain phasing method of single side band (SSB) signal generation using suitable block diagram and mathematical analysis in amplitude modulation (AM). (7)

(b) Discuss the principle of slope detection using suitable circuit diagram. Draw the characteristics of simple slope detector. (8)

4. (a) Explain the term multiplexing. How many types of Multiplexing are there. Explain FDM with suitable diagram. (7)

(b) Explain the generation of pulse amplitude modulation (PAM)signal by proper circuits and discuss about which is better modulator technique PAM, PWM and PPM. (8)

5. (a) Explain the principle of binary Phase Shift Keying. Why is PSK preferred over ASK? (7)

(b) What is frequency shift keying? Derive the expression for minimum bandwidth in FSK. (5)

P.T.O.

(c) Determine. (3)

(i) Peak frequency deviation

(ii) Minimum bandwidth

(iii) Baud for a binary FSK signal with a mark frequency of 51 KHz and an input bit rate of 2 Kbps.

6. (a) Explain satellite communication, its advantages and disadvantages. By using the block diagram explain the the working of a transponder in satellite communication. (10)

(b) What is understood by cellular telephony system? Discuss about various components and their working of Telephony system. (5)

7. (a) What is GPS. Using its block diagram explain its working , architecture in detail. What are latest update in this direction, its applications. (9)

(b) With the help of architectural block diagram of mobile communication network explain the concept of cell splitting. (6)