Communication

1. What are the three basic units of a communication system?
2. Identify the parts X and Y in the following block diagram of a generalized communication system?
3. Name two types of signals
4. What is meant by modulation?
5. What is meant by band width of information signal?
6. Name the types of modulations in analog communication.
7. What characteristic of modulated carrier wave does vary in amplitude modulation?
8. What characteristic of modulated carrier wave does vary in frequency modulation

2 MARKS QUESTION

9. Why is shortwave band used for long distance radio broadcast?
10 Name two uses of optical transmission.
11 Why is the transmission of signals through a co-axial cable not possible for frequencies greater than 20 MHz?
12 Derive an expression for covering range of TV transmission tower.
13. In TV transmission name the type of modulation of (i) picture and synchronizing pulse and (ii) the sound.
14 What is ionosphere? What is its use in radio broadcast?
15 What is amplitude modulation/ Represent the process graphically. Write its two limitations and two advantages.
16. State two factors by which the range of TV signal can be increased?
17 Distinguish between 'point to point' and 'broadcast' communication modes, Give one example of each.
18. We do not choose to transmit an audio signal by just directly converting it to an e.m. wave of the same frequency. Give two reasons for the same.

3 marks question

19   Explain the following terms:
(i)   ground waves
(ii) space waves and
(iii) sky waves
20 Why cannot the (i) ground waves (ii) space waves and (iii) sky waves be sustained for long distance communication beyond 10 to 20 MHz?
21 What is meant by critical frequency for sky wave propagation? Write an expression for the critical frequency in terms of the maximum electron density of the ionosphere. What is the range of variation of frequency for this critical frequency?
22 Define the term 'critical frequency' in relation to sky wave propagation of electro-magnetic waves. On a particular day, the maximum frequency reflected from the ionosphere is 10MHz. On another day, it was found to decrease to 8 MHz. Calculate the ratio of the maximum electron densities of the ionosphere on the two days.
23. Draw a block diagram of a simple amplitude modulation, explaining briefly how amplitude modulation is achieved.
24. What does the process of detection of amplitude wave mean? The amplitude modulated carrier wave of angular frequency ωc, ($\omega c - \omega m$ and $\omega c + \omega m$) and ($\omega c - \omega m$), where ωm is the angular frequency of the modulating signal. Discuss, in brief, with the help of a block diagram the essential details of a simple method used for 'detecting' the modulating signal from this modulated carrier wave.
25. A transmitting antenna at the top of a tower has a height 32 m and the height of the receiving antenna is 50 m. What is the maximum distance between them for satisfactory communication in LOS mode? Given radius of earth 6.4×10^6 m.
26 A message signal of frequency 10 kHz and peak voltage of 10 volts is used to modulate a carrier of frequency 1 MHz and peak voltage of 20 volts. Determine (a) modulation index, (b) the side bands produced.

27   A carrier wave of peak voltage 12V is used to transmit a message signal. What should be the peak voltage of the modulating signal in order to have a modulation index of 75%?

5 marks question

28   Define the term modulation. Explain the need of modulation. Name three different types of modulation used for a message signal using a sinusoidal continuous carrier wave. Explain the meaning of any one of them.

29   What does the term LOS communication mean? Name the types of waves that are used for this communication. Give typical examples, with the help of suitable figure of communication: It means "Line of sight communication".

30   What is space wave propagation? Which two communication methods make use of this mode of propagation? If the sum of the heights of transmitting and receiving antennas in line of sight of communication is fixed at h, show that the range is maximum when the two antennas have a Height h/2 each.