



PLOT 5C, 2ND FLOOR, GANAPATI COMPLEX, SEC-13, OPP. JAIPURIA
SCHOOL, VASUNDHARA, GHAZIABAD (U.P.)
COMMUNICATION SYSTEMS

1. Name the type of communication in which the signal is a discrete and binary coded version of the message of information.
2. Name the type of communication systems according to the mode of transmission.
3. What is a transponder?
4. The transmission of signals using ground waves are restricted upto a frequency of about 1500 kHz. Why?
5. Write the main function of modem.
6. Name the factor which decides the quality of reproduced document sent by fax.
7. What should be the frequency of carrier wave with reference to message signal for the process of modulation?
8. Define the term 'critical frequency' in relation to sky wave propagation of electromagnetic waves. On a particular day, the maximum frequency reflected from the ionosphere is 10MHz. Calculate the ratio of the maximum electron densities of the ionosphere on the two ways.
9. Define the term modulation. Name three different type of modulation used for message signal using a sinusoidal continuous carrier wave. Explain the meaning of any one of these.
10. The height of a T.V tower at a place is 400 cm. Calculate.
 - a. The maximum range upto which signals can be received from the tower and
 - b. Area covered by the transmission. (Radius of the earth = 6400 km).
11. Explain the three modulation techniques employed for transferring digital data into analog form, using diagrams.
12. Distinguish between frequency modulation and amplitude modulation. Why is an FM signal less susceptible to noise than an AM signal?
13. Consider an optical communication system operating at $\lambda \sim 800$ nm. Suppose, only 1% of the optical source frequency is the available channel band- width for optical communication. How many channels can be accommodated for transmitting?
 - a. Audio-signals requiring a band-width of 8kHz,
 - b. Video TV signals requiring an approximate band- width of 4.5 MHz?Support your answer with suitable calculations.
14. What is a pulse modulation? Distinguish between amplitude modulation and pulse duration modulation by drawing suitable modulated signals.
15. Explain the terms:
 - a. Ground waves
 - b. Space waves
 - c. Sky waves.
16. Show that the range of transmission 'd' of a T.V. $d = \sqrt{2rh}$, where r is the radius of the earth. A ground receiver station is receiving a signal at (a) 5 MHz, (b) transmitted from a ground transmitter at a height of 300 km located at a distance of 100 km. Identify whether it is coming via space, sky wave propagation of satellite transponder. Radius of the earth = 6.4×10^6 m; the maximum electron density per m^3 (N_{\max}) of ionosphere = 10^{12} .
17. A ground receiver station is receiving a signal at (a) 5 MHz and (b) 100 MHz, transmitted from a ground transmitter at a height of 300m located at a distance of 100 km. Identify whether it is coming via space wave or sky wave propagation or satellite transponder. (Given the value of radius of the earth is 6400 km and maximum electron density; $N_{\max} = 10^{12} m^{-3}$)
18. Explain the terms (a) pulse amplitude modulation (PAM) and (ii) pulse- code modulation (PCM). Which modulation is preferred in transmitting signals and why?

19. Differentiate between pulse amplitude modulation (PAM) and pulse duration modulation (PDM). Why is pulse code modulation (PCM) used for multi-channel telephone communication?
20. With the help of relevant diagrams, explain the following terms:
 - (i) Pulse – position modulation (PPM)
 - (ii) Pulse – duration modulation (PDM)
21. What is meant by the term ‘modulation’? Explain with the help of a block diagram, how the process of modulation is carried out in radio broadcasts.
22. What is dipole antenna? What role does it play in the communication system? How does the length of dipole antenna vary with the frequency of the carrier waves?
23. Name the two factors which determine the choice of a communication channel. Explain the use of coaxial cables as a communication channel with the help of its simple diagram.
24. Distinguish between analog and digital communication. Write any two modulation techniques employed for the digital data. Describe briefly one of the techniques used.
25. Why do we require a satellite for long distance TV transmission?

A FAX message is to be sent from new Delhi to New York via a geostationary satellite. Calculate the minimum time delay between the dispatch and its getting received. (Take height of the geostationary satellite = 36,000 km).
26. How do we make the choice of a communication channel? A message signal has a band width of 5MHz. Suggest a possible communication channel for its transmission.
27. Mention the frequency at which T.V. signals are transmitted.

Derive an expression for the range upto which signals transmitted by a T.V. tower can be received.
28. A T.V. tower has a height of 400 m at a given place. Calculate its coverage range, if the radius of the earth is 6400 km.

