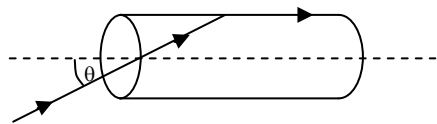


## COMMUNICATION SYSTEM

1. A message signal of frequency 10 kHz and peak voltage 10 volt is used to modulate a carrier of frequency 1 MHz and peak voltage 20 volt. Determine the modulation index
  - (a) 1
  - (b) 1.5
  - (c) 0.5
  - (d) 2
2. What should be the length of the dipole antenna for a carrier wave of frequency  $3 \times 10^8$  MHz?
  - (a) 0.5 m
  - (b) 50 m
  - (c) 0.05 m
  - (d) 5 m
3. A transmitting antenna at the top of a tower has a height 32 m and that of the receiving antenna is 50 m. The maximum distance between them for satisfactory communication in line of sight mode is given radius of earth is  $6.4 \times 10^6$  m.
  - (a) 50 km
  - (b) 45 km
  - (c) 40 km
  - (d) 55 km
4. The sky wave propagation is suitable for radiowave of frequency
  - (a) upto 2 MHz
  - (b) from 2 MHz to 20 MHz
  - (c) from 2 MHz to 30 MHz
  - (d) from 2 MHz to 50 MHz
5. Modulation is the process of superposing
  - (a) low frequency audio signal on high frequency waves
  - (b) low frequency radio signal on low frequency audio waves
  - (c) high frequency radio signal on low frequency audio signal
  - (d) high frequency audio signal on low frequency radio waves
6. When radio waves pass through ionosphere phase difference between space current and capacitive displacement current is
  - (a) 0 rad
  - (b)  $(3\pi/2)$  rad
  - (c)  $(\pi/2)$  rad
  - (d)  $\pi$  rad
7. Which of the following device is full duplex?
  - (a) Mobile phone
  - (b) Walky-talky
  - (c) Loud speaker
  - (d) Radio
8. A radiostation has two channels. One is AM at 1020 kHz and the other FM at 89.5 MHz. For good results you will use
  - (a) longer antenna for the AM channel and shorter for the FM
  - (b) shorter antenna for the AM channel and longer for the FM
  - (c) same length antenna will work for both
  - (d) information given is not enough to say which one to use for which
9. Which of the following statements is wrong?
  - (a) Ground wave propagation can be sustained at frequencies 500 kHz to 1500 kHz
  - (b) Satellite communication is useful for the frequencies above 30 MHz
  - (c) Sky wave propagation is useful in the range of 30 to 40 MHz
  - (d) Space wave propagation takes place through tropospheric space
10. A signal wave of frequency 12 kHz is modulated with a carrier wave of frequency 2.51 MHz. The upper and lower side band frequencies are respectively
  - (a) 2512 kHz and 2508 kHz
  - (b) 2522 kHz and 2488 kHz
  - (c) 2502 kHz and 2498 kHz
  - (d) 2522 kHz and 2498 kHz
11. In satellite communication
  1. The frequency used lies between 5 KHz and 10 MHz.
  2. The uplink and downlink frequencies are different.
  3. The orbit of geostationary satellite lies in the equatorial plane at an inclination of  $0^\circ$ .

In the above statements

  - (a) only 2 and 3 true
  - (b) all are true
  - (c) only 2 true
  - (d) only 1 and 2 true
12. A transparent solid cylindrical rod has a refractive index of  $\frac{2}{\sqrt{3}}$ . It is surrounded by air. A light ray is incident at the mid-point of one end of the rod as shown in figure. The incident angle  $\theta$  for which the light ray grazes along the wall of the rod is
  - (a)  $30^\circ$
  - (b)  $45^\circ$
  - (c)  $60^\circ$
  - (d)  $75^\circ$



- (a)  $\sin^{-1}(\sqrt{3}/2)$  (b)  $\sin^{-1}(2/\sqrt{3})$   
 (c)  $\sin^{-1}(1/\sqrt{3})$  (d)  $\sin^{-1}(1/2)$
13. Which range of frequencies is suitable for sky wave propagation?  
 (a) 1 kHz to 500 kHz  
 (b) 1 MHz to 2 MHz  
 (c) 2 MHz to 30 MHz  
 (d) above 50 MHz
14. In light modulation, which characteristics of the carrier light wave is varied?  
 (a) amplitude (b) frequency  
 (c) phase (d) intensity
15. A TV tower has a height of 80 m. The maximum distance upto which TV transmission can be received is equal to (radius of earth =  $6.4 \times 10^6$  m)  
 (a) 16 km (b) 32 km  
 (c) 80 km (d) 160 km
16. Arrange the following communication frequency bands in the increasing order of frequencies.  
 1. AM Broadcast  
 2. Cellular mobile radio  
 3. F.M. Broadcast  
 4. Television UHF  
 5. Satellite communication  
 (a) 1, 3, 4, 2, 5 (b) 1, 2, 3, 4, 5  
 (c) 5, 2, 4, 3, 1 (d) 1, 3, 2, 4, 5
17. If both the length of an antenna and the wavelength of the signal to be transmitted are doubled, the power radiated by the antenna  
 (a) is doubled  
 (b) is halved  
 (c) increases 16 times  
 (d) remains constant
18. Which of the following frequencies will be suitable for beyond the horizon communication?  
 (a) 10 kHz (b) 10 MHz  
 (c) 1 GHz (d) 1000 GHz
19. For sky wave propagation of a 10 MHz signal, what should be the minimum electron density in ionosphere?  
 (a)  $-1.2 \times 10^{12} \text{ m}^{-3}$  (b)  $-10^6 \text{ m}^{-3}$   
 (c)  $-10^{14} \text{ m}^{-3}$  (d)  $-10^{22} \text{ m}^{-3}$
20. The layer (or layers) which plays (or play) effective role in space communication at night is (or are):  
 (a) D-layer (b) E-layer  
 (c) F<sub>1</sub>-layer (d) F<sub>2</sub>-layer
21. Moon cannot be used as communication satellite of earth because:  
 (a) the distance between earth and moon is not proper  
 (b) the period of revolution of moon is 27.3 days  
 (c) the moon is not revolving in the equatorial plane of the earth  
 (d) none of the above
22. Audio signal cannot be transmitted, because  
 (a) the signal has more noise  
 (b) the signal cannot be amplified for distance communication  
 (c) the transmitting antenna length is very small to design  
 (d) the transmitting antenna length is very large and impracticable
23. A signal is a piece of information, which at a particle time has  
 (a) single value (b) maximum value  
 (c) minimum value (d) two value
24. Communication systems may be  
 (a) electrical (b) electronic  
 (c) optical (d) Any of these
25. Some of the important communication channels are  
 (a) air (b) transmission line  
 (c) free space (d) all of these
26. An 'antenna' is  
 (a) inductive  
 (b) capacitance  
 (c) resistive above its resonance frequency  
 (d) none of the above
27. Which of the following is not transducer?  
 (a) Loudspeaker (b) Amplifier  
 (c) Microphone (d) All of the above
28. What should be length of a dipole antenna for a carrier wave having frequency  $3 \times 10^8$  Hz?  
 (a) 0.3 m (b) 0.4 m  
 (c) 0.5 m (d) 0.6 m

29. The length of a half wave dipole antenna is 0.5 m. The optimum transmission frequency is  
 (a) 100 MHz (b) 200 MHz  
 (c) 300 MHz (d) 400 MHz
30. For a good transmission, for given antenna length  
 (a) frequency should be high  
 (b) frequency should be low  
 (c) wavelength should be high  
 (d) does not depend upon wavelength or frequency
31. The length of quarter wave antenna for transmission frequency of 20 MHz is  
 (a) 3.70 m (b) 3.75 m  
 (c) 3.80 m (d) 3.85 m
32. If wavelength of a carrier wave is doubled keeping length of antenna same, power radiated by antenna will become  
 (a) half (b) double  
 (c) one-third (d) one-fourth
33. The process of superimposing signal frequency on the carrier wave is known as  
 (a) transmission (b) reception  
 (c) modulation (d) detection
34. In frequency modulation  
 (a) the amplitude of modulated wave varies as frequency of carrier waves  
 (b) the frequency of modulated wave varies as amplitude of modulating wave  
 (c) the amplitude of modulated wave varies as amplitude of carrier wave  
 (d) the frequency of modulated wave varies as frequency of modulating wave
35. An audio signal of amplitude 0.1 V is used in amplitude modulation of carrier wave of amplitude 0.2 V. The modulation index is  
 (a) 0.2 (b) 0.3  
 (c) 0.4 (d) 0.5
36. Modulation index determines  
 (a) strength of transmitted signal  
 (b) quality of transmitted signal  
 (c) ratio of amplitude of modulating to amplitude of carrier wave  
 (d) all of the above
37. A message signal of frequency 10 kHz and peak voltage 10 V is used to modulate a carrier of frequency 1 MHz and peak voltage 20V. The modulation index is  
 (a) 0.3 (b) 0.5  
 (c) 0.7 (d) 0.9
38. A 2000 kHz carrier is modulated with 2 kHz audio sine waves. The side band frequencies of the first pair are  
 (a) 1998 kHz to 2002 kHz  
 (b) 1990 kHz to 2000 kHz  
 (c) 1995 kHz to 2300 kHz  
 (d) 1997 kHz to 2001 kHz
39. A transmitter transmits a power of 20 kW, when modulation is 50%. The power of carrier wave is  
 (a) 17.00 kW (b) 17.67 kW  
 (c) 17.78 kW (d) 17.87 kW
40. When a broadcast amplitude modulation transmitter is 50% modulated, its antenna current is 12 A. What would be carrier current?  
 (a) 11.1 A (b) 11.2 A  
 (c) 11.3 A (d) 11.4 A
41. A broadcast amplitude modulation transmitter radiates 50 kW of carrier power. The radiated at 85% modulation is  
 (a) 68.0 kW (b) 68.1 kW  
 (c) 68.2 kW (d) 68.3 kW
42. In a diode detector, output circuit consists of  $R = 1 \text{ M}\Omega$  and  $C = 1 \text{ pF}$ . The carrier frequency that it can detect  
 (a)  $V_c \gg 0.2 \text{ kHz}$  (b)  $V_c \gg 0.5 \text{ MHz}$   
 (c)  $V_c \gg 1 \text{ kHz}$  (d)  $V_c \gg 1 \text{ MHz}$
43. The radiowaves of frequency 300 MHz to 3000 MHz belong to  
 (a) high frequency band  
 (b) very high frequency band  
 (c) ultra high frequency band  
 (d) super high frequency band
44. The sound waves after being converted into electrical waves are not transmitted as such because  
 (a) they travel with the speed of sound  
 (b) the frequency is not constant  
 (c) they are very heavily absorbed by the atmosphere  
 (d) the height of the antenna has to be increased several times

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| <p>45. The space wave which are affected seriously by atmospheric conditions are</p> <p>(a) MF (b) HF</p> <p>(c) VHF (d) UHF</p> <p>46. Through which mode of propagation, the radio waves can be sent from one place to another</p> <p>(a) ground wave propagation</p> <p>(b) sky wave propagation</p> <p>(c) space wave propagation</p> <p>(d) All of the above</p> <p>47. The wavelength of electromagnetic wave employed for space communication is in the range of</p> <p>(a) 1 mm to 30 m (b) 1 mm to 300 m</p> <p>(c) 1 mm to 3 km (d) 1 mm to 30 km</p> <p>48. The frequencies of electromagnetic waves employed in space communication vary over range of</p> <p>(a) <math>10^4</math> Hz to <math>10^7</math> Hz (b) <math>10^4</math> Hz to <math>10^{11}</math> Hz</p> <p>(c) 1 Hz to <math>10^4</math> Hz (d) 1 Hz to <math>10^{11}</math> Hz</p> | <p>49. In short wave communication, waves of which of the following frequencies will be reflected back by the ionospheric layer having electron density <math>10^{11} \text{ m}^{-3}</math>?</p> <p>(a) 2 MHz (b) 10 MHz</p> <p>(c) 1.2 MHz (d) 2.8 MHz</p> <p>50. In ground or surface wave propagation, the loss of power of a signal wave is due to</p> <p>(a) induced charges in earth which travel in ground along with the wave resulting the alternating currents in the earth's surface</p> <p>(b) interference of waves</p> <p>(c) diffraction of waves</p> <p>(d) high frequency of signal wave</p> |
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