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Class: XII
Subject: Physics
Topic: Communication System
No. of Questions: 20
Duration: 60 Min
Maximum Marks: 60

1. Modem communication systems use
   a. analog circuits
   b. digital circuits
   c. combination of analog & digital circuits
   d. radio circuits

   Ans. B

2. An optical communication system is operating at a wavelength of 800 nm, it's optical source frequency is
   a. 3.8×10^{14}Hz
   b. 3.8×10^{12}Hz
   c. 3.8×10^{10}Hz
   d. 3.8×10^{9}Hz

   Ans. A

   Solution:

   $c = n\lambda \Rightarrow n=c/\lambda$

3. A 1000 kHz carrier is simultaneously modulated with 300Hz, 800 Hz and 2 kHz audio waves. The frequencies present in theoutput are
   a. 999.7 kHz, 1000.3kHz, 999.2kHz
   b. 1000.8kHz, 998 kHz 1002kHz
   c. 1002.8 kHz, 996kHz, 1106 kHz
   d. Both (1) and (2)

   Ans. D
   Solution:
   Frequencies in output are $f_c - f_m$ & $f_c + f_m$

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4. As the e.m.waves travel in free space
   a. absorption takes place
   b. attenuation takes place
   c. refraction takes place
   d. reflection takes place

   Ans. B

5. The most commonly employed analog modulation technique in satellite communication is the
   a. amplitude modulation
   b. frequency modulation
   c. phase modulation
   d. amplitude & phase modulation

   Ans. B

6. A band width of 15MHz is available for transmission. If maximum signal frequency used for modulating the carrier is 15kHz, the number of stations which can broadcast without any interference with each other in this band is
   a. 300
   b. 400
   c. 457
   d. 1000

   Ans. D
   Solution;

$$n = \frac{\text{band width}}{\text{signal band width}}$$

7. At certain distance from a transmitting tower a receiver tower of height 20 m is used to receive direct signal. Another tower is installed beyond the first along the same line of sight to receive the signals from the same transmitter. Its height is 44% more than the first receiving tower. Then the separation between the two receiving towers is
   a. 6.4 km
   b. 3.2 km
   c. 1,6km
   d. 0.8 km

   Ans. B
   Solution:
   Distance between transmitter and first receiver is x and between transmitter and second receiver is y.

$$x = \sqrt{2Rh_T} + \sqrt{2Rh_1}$$

$$y = \sqrt{2Rh_T} + \sqrt{2R(1.44h_1}$$

$$find \;\; y - x$$

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8. The frequency above which radiation of electrical energy is practical is
    a. 0.2 kHz
    b. 2 kHz
    c. 20 kHz
    d. 20 Hz

    Ans. C

9. Modulation is used to
    a. reduce the bandwidth
    b. to separate the transmission of different users
    c. to ensure that intelligence may be transmitted to long distances
    d. to allow the uses of practical antenna

    Ans. A

10. The frequency band used for radar relay systems & T.V is
    a. UHF
    b. VLF
    c. VHF
    d. EHF

    Ans. A

11. The short wave Radio broadcasting band is
    a. 7 MHz to 22 MHz
    b. 88 MHz to 108 MHz
    c. 30 KHz to 300 KHz
    d. 3 GHz to 30 Hz

    Ans. A

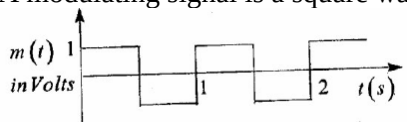
12. Frequency ranges for micro waves are
    a. 3×10^{9} to 3×10^{4} HZ
    b. 3×10^{13} to 3×10^{9} HZ
    c. 3×10^{14} to 3×10^{9} HZ
    d. 3×10^{11} to 3×10^{9} HZ

    Ans. B

13. A digital signal
    a. is less reliable than analog signal
    b. is more reliable than analog signal
    c. is equally reliable as the analog signal
    d. Not at all reliable

    Ans. B

14. A modulating signal is a square wave as shown in the figure



The carrier wave is given by c(t)=2sin(8πt) volts. The modulation indexes

a. 2
b. 0.75
c. 0.5
d. 1.5

Ans. C
Solution:

$$\mu = \frac{A_m}{A_c} = \frac{1}{2} = 0.5$$

15. The attenuation of a signal is compensated by
    a. Rectifier
    b. Oscillator
    c. Modulator
    d. Amplifier

    Ans. D
16. A transmitting antenna is at a height of 20m and receiving antenna is at a height of 80m. The maximum distance between them for Satisfactory communication is
    a. 18km
    b. 32 km
    c. 48 km
    d. 96km

    Ans. C
    Solution:

$$D = \sqrt{2Rh_T} + \sqrt{2Rh_R}$$

17. High frequency waves are
    a. absorbed by F layer
    b. reflected by the E layer
    c. capable of use for long distance transmission
    d. affected by the solar cycle

    Ans. B
18. For transmitting audio signal properly
    a. it is first superimposed on high frequency carrier wave
    b. it is first superimposed on low frequency carrier wave
    c. It is sent directly without superimposing on any wave
    d. it is superposed with carrier wave of high velocity

    Ans. A

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19. A: The maximum range of coverage by the ground wave propagation is limited upto a few MHz.
R: The attenuation of ground wave increases very rapidly with frequency.
Instructions for the following question:
In each of the following questions a statement of Assertion (A) is given followed by corresponding statement of Reason (R) just below it. Of the statements mark the correct answer

    a. Assertion and reason are true and reason is the correct explanation of assertion
    b. Assertion and reason are true but reason is not correct explanation of assetion
    c. Assertion is true but reason is false
    d. Assertion is false but Reason is true

    Ans. A

20. The waves relavent to telecommunications are
    a. visible light
    b. infrared
    c. ultraviolet
    d. microwave

    Ans. D