PHYSICS

BOOKS - TARGET PHYSICS (MARATHI ENGLISH)

COMMUNICATION SYSTEMS

Classical Thinking

1. Major parts of communications systems are:

A. transmitter and receiver.

B. receiver and communication channel.

C. transmitter and communication channel.

D. transmitter, receiver and communication channel.

Answer: D

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2. A receiver reconstructs the original message after propagation through the channel. It

A. may be true

B. may be false

C. sometimes true and sometimes false

D. is certainly true

Answer: D

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3. Quality of transmission depends upon

A. nature of medium only

B. nature of signal only

C. both (A) and (B)

D. neither (A) nor (B)

Answer: C

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4. The lossof strength of a signal while propagating through a medium is known as

A. modulation

B. demodulation

C. attenuation

D. amplification

Answer: C

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5. Sound produced by a tining fork is a sort of :-

A. digital signal

B. analog signal

C. both (A) and (B)

D. neither (A) nor (B)

Answer: B

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6. A _____ convverts signal produced by source of information into suitable transmission form.

A. channel

B. transducer

C. transmitter

D. modem

Answer: C

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7. Modem is used to

A. modulate the digital signals

B. convert analog signals to digital ones

C. modulate amplitude

D. modulate frequency

Answer: B

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8. Point to point communication requires the use of

A. a guided medium only

B. unguided medium only

C. any medium

D. none of these

Answer: A

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9. Maximum distance between source and destination si called

A. band width

B. range

C. band energy

D. modulating index

Answer: B

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10. In amplification process,

A. amplitude of signal increases.

B. amplitude of signal decreases.

C. frequency of signal increases.

D. frequency of signal decreases.

Answer: A

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11. Range of communication is extended by using

A. transmitter

B. transducer

C. processor

D. repeater

Answer: D

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12. The radio waves from frequency 30 MHz to 300 MHz belong to

A. high frequency band.

B. very high frequency band.

C. ultra high frequency band.

D. super high frequency band.

Answer: B

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13. In optical fibre refractive index of core is

A. less than R.I of cladding

B. more than R.I of cladding

C. equal to R.I. of cladding

D. half of R.I. of cladding

Answer: B

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14. The frequency used in TV and radar system lies in

A. very high frequency

B. ultra high frequency

C. extremely low frequency

D. very low frequency

Answer: B

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15. Bandwidth of optical fibre communication is

A. 10^6 to 10^9 Hz

B. 10^{13} to 10^{15} Hz

C. 10^9 to 10^{11} Hz

D. none of these

Answer: B

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16. Downlink frequency bands in case of communication satellite are

A. 5 . 925 to 6 . 425 GHz

B. 88 to 108 MHz

C. 3 . 7 to 4 . 2 GHz

D. 174 to 216 MHz

Answer: C

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17. Audio signals cannot be directly transmitted into to space because

A. audio signals cannot propagate through air.

B. audio signal are high frequency signals.

C. audio signals need some external help for propagation.

D. a very high antenna is needed for their propagation.

Answer: D

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18. Which of the following is digital modulation technique?

A. PCM

B. PAM

C. PPM

D. PDM

Answer: A

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19. Which of the following is used for analog to digital conversion ?

A. Amplitude of modulation

B. Pulse code modulation

C. Frequency modulation

D. Phase modulation

Answer: B

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20. In pulse modulation of analog signals, common pulse systems employed are

A. Pulse amplitude modulation (PAM)

B. pulse position and pulse duration modulation (PPM and PDM).

C. pulse code modulation (PCM).

D. all of the above.

Answer: D

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21. Practical sampling is mostly done by

A. PCM

B. PDM

C. PAM

D. PPM

Answer: C

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22. The modulation as well as band-width increases in case of

A. AM

B. FM

C. VSB

D. DSB

Answer: B

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23. For efficient transmission, transmitting antenna has length comparable to

A. $\frac{\lambda}{2}$

B. $\frac{\lambda}{4}$

C. λ

D. $\frac{\lambda}{2}$ or integral multiple of $\frac{\lambda}{2}$

Answer: B

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24. Basically, the product modulator is

A. an amplifier

B. a mixer

C. a frequency separator

D. a phase separator

Answer: B

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25. What type of modulation is employed in india for radio transmission

A. Amplitude modulation

B. frequency modulation

C. Pulse modulation

D. Phase modulation

Answer: A

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26. When the modulating frequency is doubled, the modulation index is halved and the modulating voltage constant the modulation system is

A. amplitude modulation

B. phase modulation .

C. frequency modulation

D. all of the above.

Answer: C

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27. Which of the following is NOT the drawback of AM ?

A. Low efficiency

B. Noisy reception

C. Small operating range

D. High operating voltage

Answer: D

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28. In space communication, the sound waves can be sent from one place to another

A. through space.

B. through wires.

C. by superimposing it on undamped electromagnetic waves.

D. by superimposing it on damped electromagnetic waves.

Answer: C

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29. Long distance short-wave radio broadcasting uses

A. sky wave

B. ground wave

C. space wave

D. ionospheric wave

Answer: D

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30. Space wave propagation is used in

A. television communication

B. radar communication

C. microwave communication

D. all of these

Answer: D

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31. When electromagnetic waves enter the ionised layer of ionosphere, then the relative permittivity i.e. dielectric constant of the ionised layer

A. does not change

B. appears to increase

C. appears to decrease

D. sometimes appears to increase and sometimes to decrease

Answer: C

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32. The layer that adsorbs largest proportion of UV rays is

A. ozone layer

B. troposphere

C. ionosphere

D. mesosphere

Answer: A

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33. In the earth's atmosphere, the following order of layers are present for the propagation of E.M waves:

A. Troposphere, stratophere, appleton layer, thermosphere.

B. Stratosphere, appleton layer, thermosphere, troposphere.

C. Stratosphere, troposphere, thermosphere appleton layer.

D. Troposphere, mesosphere, thermosphere, appleton layer.

Answer: D

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34. Ozone layer above earth's atmosphere will not

A. prevent infrared radiations from sun reaching earth.

B. prevent infra red radiations originated from earth from escaping earth's atmosphere.

C. prevent ultraviolet rays from sun.

D. reflect back radio waves.

Answer: D

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35. Which of the following statements is correct ?

A. E-layer is the top layer in atmosphere.

B. F-layer is the top layer in atmosphere.

C. Ionosphere is not a combination of E and F layer.

D. Troposphere is the top layer.

Answer: B

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36. Which of the ionospheric layer disappears during night ?

A. F_1 layer

B. F_2 layer

C. E - layer

D. D-layer

Answer: D

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37. The region that contains free electrons, negative ions and positive ions is

A. troposphere

B. mesosphere

C. ionosphere

D. stratosphere

Answer: C

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38. UHF is used in

A. troposheric scatter

B. stratospheric scatter

C. ionospheric scatter

D. mesospheric scatter

Answer: A

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39. The maximum distance upto which TV transmission from a TV tower of height h can be received is proportional to

A. $h^{1/2}$

B. h

C. $h^{3/2}$

D. h^2

Answer: A

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40. Radio waves which are vertically polarised can travel as

A. space wave

B. sky wave

C. ground wave

D. carrier wave

Answer: C

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41. Energy loss in case of ground wave propagation is due to

A. reflection of ground wave.

B. refraction of ground wave.

C. induced current in ground.

D. induced positive charge in ground.

Answer: C

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42. Ground wave propagation is suitable for

A. low frequency and medium frepuency

B. high frequency

C. ultra frequency

D. infrafrequency

Answer: A

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43. Select the wrong statement.

EM waves

A. are transverse in nature.

B. travel in free space at a speed of light.

C. are produced by accelerating charges.

D. travel in all media with same speed.

Answer: D

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44. The EM waves when travel into different medium gets

A. refracted

B. transmitted

C. reflected

D. emitted

Answer: A

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45. Fading applies to:

A. tropospheric propogation

B. Faraday rotation

C. ionospheric propagation

D. atmospheric storms

Answer: A

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46. Through which mode of propagation, the radio waves can be sent from one place to another

A. Ground wave propagation

B. Sky wave propagation

C. Space wave propagation

D. All of these

Answer: D

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47. The component of the ground wave more likely to be attenuated by conducting earth is

A. horizontal

B. vertical

C. both horizontal and vertical

D. inclined at 45°

Answer: A

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48. Fading is the variation in the strenght of a signal at a receiver due to

A. interference of waves.

B. diffraction of waves.

C. polarisation of waves.

D. reflection of waves.

Answer: A

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49. In satellite communication, the communication satellite.

A. acts as a reflector for a beam of modulated microwave from transmitter sent directly towards it.

B. acts as a repeater for signal reanching there, without any change In frequency

C. receives the coming modulated returns it to earth at a different frequency .

D. none of these

Answer: C

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50. Which one of the following is correct ?

A. A single geostationary satellite can cover the whole part of the earth for microwave communication.

B. At least three geostationary satellites in the same orbit around earth can cover the whole part for microwave communication.

C. The first Indian communication satellite is Apple.

D. The satellite communication is not like the line of sight microwave communication .

Answer: B

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51. The satellite that seems stationary w.r.t. Earth is

A. intelsat satellite

B. geostationary satellite

C. telstar

D. marisat

Answer: B

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52. Speed of electromagnetic waves is given

A. $c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}$

B. $c = \sqrt{\mu_0 \varepsilon_0}$

C. $c = \frac{1}{\mu_0 \varepsilon_0}$

D. $c = \mu_0 \varepsilon_0$

Answer: A

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53. The highest frequency of radio waves which the when sent at some angle towards the ionosphere , gets reflected from ionosphere and returns to earth is called ..... .

A. critical frequency

B. maximum usable frequency

C. ultrahigh frequency

D. Very high frequency

Answer: B

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54. Broadcast band in which FM lies is

A. UHF

B. VHF

C. SHF

D. none of these

Answer: B

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55. The reception of television signals is possible by using

A. sky wave propagation.

B. communication geostationary satellite.

C. polar satellite.

D. tall antenna which may directly intercept the signals coming from transmitting antenna.

Answer: D

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56. General communication is NOT preferred over optical wire communication because

A. it can be easily tapped.

B. it is more efficient.

C. it has signal security.

D. it cannot be jammed as easily as radio waves.

Answer: A

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57. Assertion : communication in UHF/ VHF regions can be established by space wave of tropospheric wave .

Reason : Communication in UHF/ VHF regions is limited to line of sight distance.

A. Assertion is Ture, Reason in Ture : Reason is a correct explanation for Assertion

B. Assertion is Ture, Reason is True, Reason is not a correct explanation for Assertion .

C. Assertion is True, Reason is False .

D. Assertion is False but, Reason is True .

Answer: B

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58. Assertion: A dish antenna is highly directional.

Reason: This is because a dipole antenna omnidirectional.

A. Assertion is Ture, Reason is Ture : Reason is a correct explanation for Assertion .

B. Assertion is Ture, Reason is True, Reason is not correct explanation for Assertion .

C. Assertion is True, Reason is False .

D. Assertion is False but, Reason is True.

Answer: B

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Critical Thinking

1. The losses in transmission lines are

A. radiation losses

B. conductor heating

C. Dielectic heating

D. all of these

Answer: D

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2. Basic components of a transmitter are:

A. message singal generator and anternna.

B. modulator and antenna.

C. signal generator and modualator .

D. message signal generator, modulator and antenna.

Answer: D

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3. A communication between a fixed base station and several mobile units, located on ships or aircraft utilizing two way radio communication in the VHF and UHF is of frequency band

A. 3 to 30 MHz

B. 30 to 300 MHz

C. 30 to 470 MHz

D. 30 to 600 MHz

Answer: C

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4. Give an expression for band-width in AM transmission.

A. maximum frequency of audio signal

B. minimum frequency of audio signal.

C. twice the maximum frequency of audio signal

D. half the maximum frequency of audio signal.

Answer: C

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5. The bandwidth requirement of telephone channel is

A. 3 kHz

B. 5 kHz

C. 10 Hz

D. 15 kHz

Answer: A

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6. The transmission band width in wide band frequency modulation is

A. independent of massage band width.

B. dependent of message band width.

C. both (A) and (B)

D. none of these.

Answer: A

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7. In FM broadcast in VHF band, channel width is

A. 50

B. 100

C. 200

D. 400

Answer: C

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8. Satellite communication uses _____ frequency bands for uplink

A. 5.925 to 6.425 GHz

B. 3.7 to 4.2 GHz

C. 840 to 935 MHz

D. 420 to 890 MHz

Answer: A

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9. In optical fibre, propagation angle of light must be greater than or equal to

A. incident angle

B. refraction angle

C. reflection angle

D. critical angle

Answer: D

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10. In amplitude modulated wave, power content of the carrier is maximum when μ is

A. 0

B. 1

C. 0.2

D. 0.3

Answer: A

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11. A modulated signal is represented as

x(1) = 6 sin 1250 t + sin 10^8 t then the

mudulating index is

A. 10

B. 1250

C. 10^8

D. 6

Answer: D

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12. The number of AM broadcast stations that can be accomodated in a $300kHz$ band width for the highest modulating frequency $15kHz$ will be

A. 10

B. 5

C. 7

D. 12

Answer: A

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13. The audio signal used to modulate 30 sin $\left(2\pi \times 10^6 \text{ t }\right)$ is 15 sin 300 πt . The depth of modulation of

A. 0.15

B. 0.25

C. 0.3

D. 0.5

Answer: D

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14. What is the modulation index of an over modulated wave

A. 1

B. Zero

C. < 1

D. > 1

Answer: D

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15. If a number of sine waves with modulation indices $n_1, n_2, n_3...$ modulate a carrier wave, then total modulation index (n) of the wave is

A. $n_1 + n_2... + 2(n_1 + n_2.....)$

B. $\sqrt{n_1 - n_2 + n_3.....}$

C. $\sqrt{n_1^2 + n_2^2 + n_3^2.....}$

D. $\sqrt{n_1 + n_2 + ...}$

Answer: C

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16. Sinusoidal carrier voltage of frequency $1.5MHz$ and amplitude $50V$ is amplitude modulated by sinusoidal voltage of frequency $10kHz$ producing $50\,\%$ modualtion. The lower and upper side-band frequencies in kHz are

A. 1490, 1510

B. 1510, 1490

C. $\frac{1}{1490}, \frac{1}{1510}$

D. $\frac{1}{1510}, \frac{1}{1490}$

Answer: A

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17. In space communcation , the information can be passed from on place to another at a distance of 100 km in

A. 1 s

B. 0.5 s

C. 0.0033 s

D. 0.00033 s

Answer: D

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18. The maximum usable frequency in F-layer with original frequency in 50 MHz will be

A. 181 MHz

B. 150 MHz

C. 250 MHz

D. 300 MHz

Answer: A

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19. In which of the region of earth's atmosphere temperature decreases with height?

A. Troposphere

B. Mesosphere

C. Stratosphere

D. Ionsosphere

Answer: D

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20. If the frequency of E.M radiations is halved then the energy of EM radiation wil become

A. double

B. remains unchanged

C. becomes half

D. becomes one fourth

Answer: C

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21. The sky wave propagation is suitable for radio waves of frequency

A. upto 3 MHz

B. from 2 MHz to 30 MHz

C. from 3 MHz to 30 MHz

D. from 3 MH to 200 MHz

Answer: C

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22. mesosphere reflects which of them following type of wave, particularly at night ?

A. Low frequency

B. High frequency

C. Very high frequency

D. Ultra high frequency

Answer: B

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23. A geo-synchronous satellite is:

A. is located at a heigh of 34860 km ot ensure global coverage.

B. appears stationary over a place on earth's magnetic pole.

C. is not really stationary at all but orbits the earth within 24 hours.

D. is always at a fixed location is state and simply spins about its own axis.

Answer: C

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24. The height of a T.V. tower is 300 m. What is the maximum distance upto which T. V. signals can be received ? (R = 6400 km)

A. 50 km

B. 55 km

C. 62 km

D. 75 km

Answer: C

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25. Electromagnetic waves of frequencies higher than $9\sqrt{2}$ MHz are found to be not reflected by the ionosphere on a particular day at a place. The maximum electron density in the ionosphere is :

A. $\sqrt{2} \times 10^{12} / m^3$.

B. $\sqrt{5} \times 10^{12} / m^3$.

C. $2 \times 10^{12} / m^3$.

D. $3 \times 10^{12} / m^3$.

Answer: C

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26. The maximum line-of -sight distance d_M between two antennas having heights h_T and H_R above the earth is

A. $\sqrt{2R} \quad (h_T + h_R)$

B. $2R\sqrt{(h_T + h_R)}$

C. $\sqrt{2R(h_T + h_R)}$

D. $\sqrt{2R}\left(\sqrt{h_T} + \sqrt{h_R}\right)$

Answer: D

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27. A transmitting antenna at the top of a tower has a height of 50 m and the height of the receiving antenna is 32 m. What is the maximum distance between them for satisfactory communication in line of sight mode ?

(Radius of the earth (R) =6.4×10^6 m) ($\sqrt{10}$ =3.16)

A. 75.5 km

B. 65.5 m

C. 55.5 km

D. 45.5 km

Answer: D

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28. When an electromagnetic wave enters the ionised layer of ionosphere, the motion of electron cloud produces a space current and

the electric field has its own capacittive displacement current then.

A. The space current is in phase with displacement current.

B. The space current lags behind the displacement current by a phase of 180° .

C. the space current lages behind the displacement current by a phase of 90° .

D. the space current leads the displacement current by a phase of 90° .

Answer: D

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29. for the first pair of side band frequencies, band width required for amplitude modulation is

A. $f_c + f_m$

B. $f_c - f_m$

C. 2 f_m

D. none of these

Answer: C

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30. In FM, frequency deviation is

A. inversely proportional to amplitude of modulating signal.

B. Proportional to frequency of modulating signal .

C. directly proportional to amplitude and inversely proportional to the frequency of the modulating signal .

D. not in amplitude.

Answer: B

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31. Consider an optical communication system operating at $\lambda = 800nm$. Suppose, only $1\,\%$ of the optical source frequency is the available channel bandwidth for optical communication. How many channels can be accommondated for transmitting audio signals requiring a bandwidth of $8kHz$

A. 4.7×10^8

B. 48

C. 6.2×10^8

D. 4.8×10^5

Answer: A

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32. A telephone link operating at a center frequency of $10GHz$ is established. If 1% of this is a available then how many telephone channel can be simultaneously given when each telephone covering a band width of $5kHz$?

A. 2×10^4

B. 2×10^6

C. 5×10^4

D. 5×10^6

Answer: A

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33. Assertion : FM broadcast is preferred over AM broadcast .

Reason : Process of combining the message

signals with carrier wave is called demodulation .

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not correct explanation for Assertion

C. Assertion is true, Reason is false .

D. Assertion is false, Reason is true .

Answer: C

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34. Assertion : Higher the modulation index the reception will be strong and clear.

Reason : The degree, to which the carrier wave is modulated is called modulation index.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason in not a correct explanation for Assertion

C. Assertion is True, Reason is False .

D. Assertion is False but, Reason is True.

Answer: B

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Competitive Thinking

1. The process of regaining of information from carrier wave at the receiver is termed as

A. demodulation

B. modulation

C. attenuation

D. amplification

Answer: A

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2. In communication system, the process of superimposing a low frequency signal on a high frequency wave is known as

A. Repeater

B. Attenuation

C. Modulation

D. Demodulation

Answer: C

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3. The range of frequency of audio signal is _____.

A. 0 to 2 KHz

B. 20 Hz to 20 MHz

C. 20 Hz to 20 kHz

D. 20 kHz to 200 kHz

Answer: C

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4. The ratio waves of frequency $300MHz$ to $3000MHz$ belong to

A. High frequency band

B. very high frequency band.

C. ultra high frequency band.

D. super high frequency band.

Answer: C

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5. For television broadcasting, the frequency employed is normally

A. 30-300 MHz

B. 30-300 GHz

C. 30-300 KHz

D. 30-300 Hz

Answer: A

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6. Range of frequencies allotted for commercial FM radio broadcast is

A. 88 to 108 MHz

B. 88 to 108 kHz

C. 8 to 88 MHz

D. 88 to 108 GHz

Answer: A

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7. Consider telecommunication through optical fibres. Which of the following statement is not ture?

A. Optical fibres may have homogeneous core with a suitable cladding.

B. Optical fibres can be of graded refractive index.

C. Optical fibres are subjected to electromagnetic interference from outside.

D. Optical fibres have extremely low transmission loss.

Answer: C

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8. An optical fibre can offer a band width of _____.

A. 100 MHz

B. 100 GHz

C. 750 MHz

D. 250 MHz

Answer: B

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Watch Video Solution

9. the attenution in optical fibre is mainly due to

A. absorption

B. scattering

C. neither absorption nor scattering

D. both (A) and (B)

Answer: D

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10. 1000 kHz carrier wave is amplitude modulated by the signal frequency 200-4000Hz . The channel width of this case is

A. 8 kHz

B. 4kHz

C. 7.6 k Hz

D. 3.8 kHz

Answer: A

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11. Broadcasting antennas are generally

A. omnidirectional type

B. vertical type

C. horizontal type

D. oblique type

Answer: B

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12. Identify the incorrect statement from the following

A. AM detection is carried out using a rectifier and an envelope detector .

B. Pulse position denotes the time of rise or fall of the pulse amplitude .

C. Modulation index μ is kept $\geq$ 1, to avoid distortion.

D. Facsimile (FAX) scans the contents of the document to create electronic signals.

Answer: C

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13. Amplitude modulation has

A. one carrier with infinite frequencies.

B. one carrier with two side band frequencies.

C. one carrier with high frequency.

D. one carrier.

Answer: B

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14. In amplitude modulation

A. amplitude remains constant but frequency changes

B. both amplitude and frequency do not change

C. both amplitude and frequency change

D. amplitude of the carrier wave changes according to information signal

Answer: D

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15. In frequency modulation

A. the amplitude of modulated wave varies as frequency of carrier wave .

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 wavelength of modulating wave.

Answer: B

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16. In amplitude modulation, the bandwidth is

A. twice the audio signal frequency.

B. thrice the audio signal frequency .

C. thrice the carrier wave frequency.

D. twice the carrier wave frequency .

Answer: A

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17. Choose the correct statement:

A. In amplitude modulation, the frequency of the high frequency carrier wave is made to very in proportion to the amplitude to the audio signal.

B. In frequency modulation, the amplitude of the high frequency carrier wave is made to very in proportion to the amplitude of the audio signal.

C. In frequency modulation, the amplitude of the high frequency carrier wave is made to very in proportion to the frequency of the audio signal .

D. In amplitude modulation, the amplitude of the high frequency carrier wave is made to very in proportion to the amplitude of the audio signal .

Answer: D

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18. In amplitude modulation, sinusoidal carrier frequency used is denoted by ω_c and the signal frequency is denoted by ω_m. The bandwidth $(\Delta\omega_m)$ of the signal is such that $\Delta\omega_m << \omega_c$. Which of the following frequency is not contained in the modulated wave.

A. $\omega_m + \omega_c$

B. $\omega_c - \omega_m$

C. ω_m

D. ω_c

Answer: C

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19. A carrier wave of peak voltage 12 V 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%?

A. 9 V

B. 22 V

C. 16 V

D. 28 V

Answer: C

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20. A single of 5 kHz frequency is amplitude modulated on a carrier wave of frequency 2 MHz. The frequencies of the resultant signal is/are :-

A. 2 MHz only

B. 2005 kHz and 1995 kHz

C. 2005 kHz, 2000 kHz and 1995 kHz

D. 2000 kHz and 1995 kHz

Answer: C

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21. The amplitude of carrier wave is 12 . For modulation index of 50% the amplitude of modulating signal is _____V.

A. 3

B. 6

C. 12

D. 9

Answer: B

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22. The audio signal used to modulate $30 \sin\left(2\pi \times 10^6 \text{ t }\right)$ is $15 \sin 300\ \pi t$. The depth of modulation of

A. 0.5

B. 0.4

C. 0.25

D. 0.15

Answer: C

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23. A message signal of 12 kHz and peak voltage 20 V is used to modulate a carrier wave of frequency 12 MHz and peak voltage 30

V. Calculate the (i) modulation index (ii) side-band frequencies.

A. 0.32

B. 6.7

C. 0.67

D. 67

Answer: C

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24. An oscillator is producing FM waves of frequency $2kHz$ with a variation of $10kHz$. What is modulating index?

A. 0.20

B. 5.0

C. 0.67

D. 1.5

Answer: B

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25. When carrier wave of 2 . 5 MHz frequency is amplitude modulated, the resulting AM wave has maximum of 15 V and minimum amplitude of 10 V . The modulation index is _____.

A. 0.3

B. 0.2

C. 0.1

D. 0.4

Answer: B

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26. The equation of an FM signal is e = 6 sin $\left(10^6 \text{ t} + 4 \sin 10^3 \text{ t}\right)$. Then, the modulating frequency is

A. 1000 Hz

B. 500 Hz

C. 300 Hz

D. 159 Hz

Answer: D

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27. The distance of coverage of a transmitting antenna is 12 . 8 km . Then the height of the antenna is (Given that redius of earth = 6400 km)

A. 6.4 m

B. 12.8 m

C. 3.2 m

D. 16 m

Answer: B

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28. If a transmitting antenna of height 105 m is placed on a hill, then its coverage area is

A. 4224 km^2

B. 3264 km^2

C. 6400 km^2

D. 4864 km^2

Answer: A

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29. A radar has a power of $1kW$ and is operating at a frequency of $10GHz$ it is located on a mountain top of height$500m$ The maximum distance upto which it can detect object located on the surface of the earth (Radius of earth $= 6.4 \times 10^6 m$) is

A. 80 km

B. 16 km

C. 40 km

D. 64 km

Answer: A

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30. Height of T .V . Tower is h_T . The area of transmission of T . V . Waves is $\propto$ _____ .

A. h_T^2

B. $h_T^{1/2}$

C. $h_T^{1/3}$

D. h_T

Answer: D

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31. In an amplitude modulated wave for audio frequency of $500 \text{cycle} / \text{sec} \, ond$,the appropriate carrier frequency will be

A. 50 cycles/ s

B. 100 cycles/s

C. 500 cycles/s

D. 50, 000 cycles/s

Answer: D

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32. A modem is a

A. modulating device only .

B. demodulating device only

C. modulating and demodulating device.

D. transmitting device.

Answer: C

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33. The electromagnetic wave of frequency 3 MHz to 30 MHz are used

A. in ground wave propagation

B. in sky wave propagation

C. in microwave propagation

D. in satellite communication

Answer: B

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34. In which frequency range, space waves are normally propagated?

A. High frequency

B. Very high frequency

C. Ultra high frequency

D. Super high frequency

Answer: C

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35. Name the type of waves which are used for line of sight (LOS) communication. What is the range of their frequencies?

A transmitting antenna at the top of a tower

has a height of 20m and the height of the receiving antenna is 45m. Calculate the maximum distance between them for satisfactory communication in LOS mode. (Radius of the Earth $= 6.4 \times 10^6$ m)

A. sound waves

B. ground wave

C. sky waves

D. space waves

Answer: D

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36. The ionosphere is used for the propagation of

A. sky waves

B. space waves

C. ground waves

D. All

Answer: A

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37. The maximum frequency of transmitted radio waves above which the radio waves are no longer reflected back by ionosphere is (N = maximum electron density of ionosphere, g = acceleration due to gravity)

A. 9 N

B. $9N^2$

C. $9\sqrt{N}$

D. 9^2N_2

Answer: C

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38. For sky wave propagation of a $10MHz$ signal, what should be the minimum electron density in ionosphere?

A. $1.2 \times 10^{12} m^{-3}$

B. $10^{6} m^{-3}$

C. $10^{14} m^{-3}$

D. $10^{22} m^{-3}$

Answer: A

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39. A sky wave with a frequency 55 MHz is incidenet on D-region of earth's atmosphere at 45°, The angle of refraction is (electron density for D-region is 400 electron/c.c.

A. 60°

B. 45°

C. 30°

D. 15°

Answer: B

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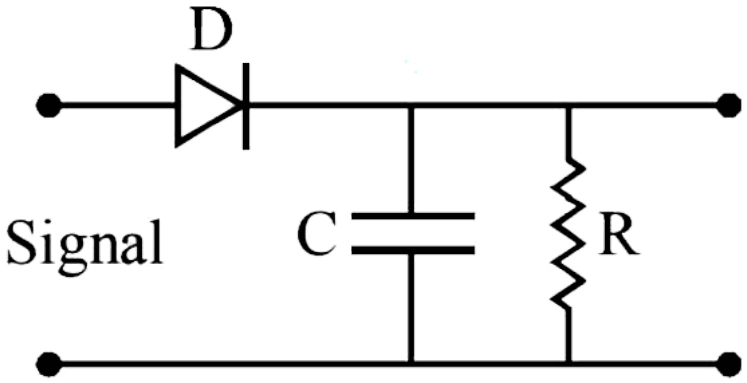
40. A diode detector is used to detect an amplitude modulated wave of 60% modulation by using a condense of capacity 250 picofarad in parallel with a load resistance 100 kilo ohm find the maximum modulated which could be find the maximum modulated

frequency which could be detected by it



A. 10. 62 MHz

B. 10. 62 kHz

C. 5. 31 MHz

D. 5. 31 kHz

Answer: B

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41. A telephonic communication service is working at carrier frequency of 10 GHz. Only 10% of it is utilized for transmission. How many telephonic channels can be transmitted simultaneously if each channel requires a bandwidth of 5 kHz ?

A. 2×10^5

B. 2×10^6

C. 2×10^3

D. 2×10^4

Answer: A

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42. A transmitting antenna of height h and the receiving antenna of height 45 m are separated by a distance of 40 km of satisfactory communication in line of sight mode. Then the value of h is (given radius of earth is 6400 km)

A. 15 m

B. 20 m

C. 30 m

D. 25 m

Answer: B

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43. In optical communication system operating at 1200nm, only 2% of the source frequency is available for TV t ransmission having a

bandwidth of 5 MHz. the number of TV channels that can be transmitted is

A. 2 million

B. 10 million

C. 0.1 million

D. 1 million

Answer: D

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44. Assertion : Electromagnetic waves with frequencies more than the critical frequency of ionosphere cannot be used for communication using sky wave propagation.

Reason : The refractive index of the ionosphere becomes very high for frequencies higher than the critical frequency .

A. Assertion is True . Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True , Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is Fase.

D. Assertion is False but, Reason is True .

Answer: B

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45. A message signal frequency ω_m is superpiosed on a carrier wave of frequency ω_c

to gent an amplitude modulated wave (AM).The frequency of the AM wave will be

A. equal to the amplitude of the carrier wave.

B. equal to the amplitude index of the carrier wave.

C. equal to the angular frequency of carrier wave .

D. equal to the modulation of the carrier wave.

Answer: C

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46. (a). Assertion (A) is true, Reason (R) is also true, Reason (R) is the correct explanation for assertion (A).

(b). Assertion (A) is true, Reason (R) is true, Reason (R) is not the correct explanation for Assertion (A).

(c). Assertion (A) is true, Reason (R) is false.

(d). Assertion (A) is false, Reason (R) is true.

Q. Assertion (A): to a solution of potassium chromate, if a strong acid is added, it changes its colour from yellow to orange.

Reason (R): The colour change is due to the change in oxidation state of potassium chromate.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True , Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is False .

D. Assertion is False but, Reason is True.

Answer: B

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Evaluation Test

1. The critcal frequency for sky wave propagation if maximum number density of electrons in ionosphere is $10^{10}m_{-3}$ is

A. 300 kHz

B. 600 kHz

C. 900 kHz

D. 1 MHz

Answer: C

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2. Frequencies higher than 5 MHz are found not to be reflected by the ionosphere on a

particular day at a place. The maximum electron density of the ionosphere is

A. $3 \times 10^{11} m^{-3}$

B. $4 \times 10^{11} m^{-3}$

C. $5 \times 10^{11} m^{-3}$

D. $6 \times 10^{11} m^{-3}$

Answer: A

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3. A TV tower has a height of 150m. By how much the height of tower be increased to double its coverage range ?

A. 250 m

B. 350 m

C. 450 m

D. 500 m

Answer: C

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4. How much time is taken by an information to pass from one place to another at a distance of 60 km in space communication ?

A. 1×10^{-3} s

B. 2×10^{-3} s

C. 2×10^{-4} s

D. 4×10^{-4} s

Answer: C

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5. Amplitude modulation is useful for broadcasting in communication systems because

A. receiver complexity can be avoided .

B. it is more prone to noise, than other modulation systems

C. it requires less transmitting power .

D. no other modulation system can give the necessary bandwidth for faithful transmission .

Answer: A

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6. Assertion : Communication in UHF/ VHF regions can be established by space wave or tropospheric wave.

Reason : Communication is UHF/VHF regions in not limited to line of sight distance but can be achieved for very large distances

A. Assertion is True. Reason is True, Reason is a correct explanation for Assertion

B. Assertion is Trure, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is False .

D. Assertion is False, Reason is True.

Answer: C

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7. In satellite communication

1. The frequency used lies between 5 MHz 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°.

In the above statements

A. Only (ii) and (iii)

B. All are true

C. Only (ii) true

D. Only (i) and (ii) true

Answer: A

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8. Assertion : A dish antenna is highly directional .

Reason : This is because a dipole antenna is omni directional.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is False .

D. Assertion is False, Reason is True.

Answer: C

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9. Assertion : Modulation index is the degree to which the carrier wave is modulated .

Reason : For the strong and clear reception, the value of modulation index should be very small.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not correct explanation for Assertion

C. Assertion is True, Reason is False .

D. Assertion is False, Reason is True.

Answer: B

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10. In an amplitude modulated wave for audio frequency of 400 cycles/second, the proper carrier frequency will be

A. 40 cycles/s

B. 80 cycles /s

C. 400 cycles/s

D. 40,000 cycles/s

Answer: D

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11. The minimum voltage in an amplitude modulated wave is 3 V and maximum voltage 11 V . The % modulation index is

A. $22.07\ \%$

B. $57.14\ \%$

C. $81.21\ \%$

D. $112.28\ \%$

Answer: B

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12. A 3000 kHz carrier is modulated with 500 Hz audio signals. The frequencies of first pair of side bands are

A. 3500 kHz and 2500 Hz

B. 500 Hz and 2500 kHz

C. 3000.5 kHz and 2999 . 5 kHz

D. 2000 . 6 kHz and 2000 kHz

Answer: C

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13. A sinusoidal carrier wave of frequency 1 MHz and amplitude 100 V is amplitude modulated by sinusoidal voltage of frequency

4 kHz producing 50% modulation. The frequencies of lower and upper side band terms are respectively,

A. 1000 kHz, 1100 kHz

B. 996 kHz, 1004 kHz

C. 990 kHz, 1010 kHz

D. 994 kHz, 1004 kHz

Answer: B

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14. The total population covered by the T . V . Tower of height 200 m, if the population density around the T . V tower is $10^3\ km^{-2}$ is (Radius of the earth is 6.4×10^6 m .)

A. 40 . 19 lakh

B. 80.38 lakh

C. 20 . 19 lakh

D. 10 . 19 lakh

Answer: B

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15. The number of AM broadcast stations that can be accommodated in a band width of 200 kKz for the highest modulating frequency 10 kHz will be

A. 10

B. 5

C. 7

D. 12

Answer: A

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