

Communication Systems

Question1

A carrier wave of peak voltage 16 V is used to transmit a signal. If the modulation index is 75%, the peak voltage of the modulating signal is

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Options:

- A. 18V
- B. 12V
- C. 6V
- D. 24V

Answer: B

Solution:

Modulation Index

$$(MI) = \frac{\text{Peak voltage of modulating signal } (V_m)}{\text{Peak voltage of carrier signal } (V_c)}$$

Given, MI = 75% and $V_c = 16$ V

$$\therefore V_m = MI \times V_c = \frac{75}{100} \times 16 = 12 \text{ V}$$

Question2

In communication system, a repeater is used to extend the range to transmission. It is the combination of

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Options:

- A. IF stage and amplifier
- B. rectifier and detector
- C. receiver and transmitter
- D. modulator and power amplifier

Answer: C

Solution:

A repeater is a combination of at least one transmitter, one receiver and one carrier operated relay (COR) configured in a manner where a signal is received and transmitter rebroadcasts the received signal on another frequency.

Question3

In amplitude modulation, the amplitude of carrier wave is A_c and that of the modulating signal is A_m . In practice, the ratio of A_m to A_c is kept less than or equal to one, to avoid

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Options:

- A. distortion
- B. attenuation
- C. fading
- D. noise

Answer: A

Solution:

Modulation index, $\mu = \frac{A_m}{A_c} \leq 1$ is carried by the carrier wave, i.e. there is no signal distortion.

Question4

In frequency modulated wave

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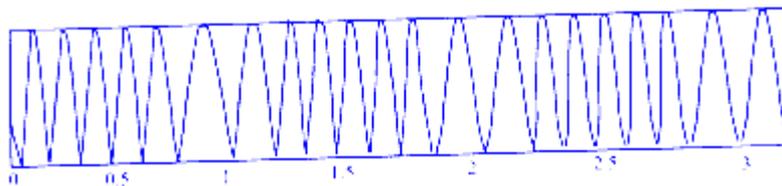
Options:

- A. frequency varies with time
- B. both frequency and amplitude vary with time
- C. amplitude varies with time
- D. both frequency and amplitude are constant

Answer: A

Solution:

In frequency modulated wave, only frequency varies with time, while the amplitude remains constant. This wave can be shown as



It is used in FM broadcasting, telemetry and RADAR etc.

Question5

A layer of atmosphere that reflects medium frequency radio waves which is ineffective during night, is



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Options:

- A. F-layer
- B. E-layer
- C. stratosphere
- D. thermosphere

Answer: B

Solution:

The atmospheric *E* region or *E* layer is above the *D*-region and below the *F*-region. It exists at altitude between 100 to 125 km above the earth surface *E*-layer assists in long distance radio communication.

In this layer, gases like oxygen and nitrogen are ionized due to photo-ionization by energy released from the sun during day time which facilitates in radio communication so, this layer does not work during in the night time.

