PHYSICS

BOOKS - OSWAAL PUBLICATION

PHYSICS (KANNADA ENGLISH)

COMMUNICATION SYSTEM

Topic 1 Communication Systems Very Short Answer Type Questions

1. What is attenuation in communication system ?

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2. What are sky waves ?

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3. How does effective power radiated depend on the wavelength ?

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4. What is attenuation in communication system ?

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5. Give one example of point-to-point communication mode.

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6. The figure given below shows the block diagram of a generalized communication system. Identify the element labelled 'X' and write its function.

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Topic 1 Communication Systems Very Short Answer Type Questions I

1. Draw block diagram of a reciever

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2. Draw the block diagram of a generalised communication system.

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3. Write the functions of the following in communication systems:

(i) Transducer (ii) Repeater

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4. Distinguish between 'Analog and Digital signals'.

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5. Mention the function of any two of the following used in communication system :

(i) Transducer

(ii) Repeater

(iii) Transmitter

(iv) Bandpass filter

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6. In the given block diagram of a receiver, identify the boxes labelled as X and Y and write their functions.

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7. Which mode of wave propagation is suitable for television broadcast and satellite

communication, and why ? Draw a suitable diagram depicting this mode of propagation of wave.

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8. (a) Identify the boxes, 'P' and 'Q' in the block diagram of a receiver shown in the figure :

Write the functions of the blocks 'P' and 'Q.

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9. Why sky wave propagation is not possible for wave having frequency more than 30 MHz ?

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10. Write the functions of the following in communication systems:

(i) Transducer (ii) Repeater

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Topic 1 Communication Systems Very Short Answer Type Questions Ii

1. Describe briefly, by drawing suitable diagrams, the (i) sky wave and (ii) space wave modes of propagation. Mention the frequency range of the waves in these modes of propagation.

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2. Distinguish between 'sky waves' and 'space waves' modes of propagation in communication system. (a) Why is sky wave mode propagation restricted to frequencies upto 40 MHz ?

(b) Give two examples where space wave mode of propagation is used.

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3. Name the type of waves which are used for the 5 line of slight (LOS) communication. What is the range of their frequencies ?

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

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4. Mention three different modes of propagation used in communication system. Explain with the help of a diagram how long distance communication can be achieved by ionospheric reflection of radio waves.

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5. Draw a schematic diagram showing the

(i) ground wave,

(ii) sky wave and (iii) space wave propagation modes for EM waves.

Write the frequency range for each of the following:

(i) Standard AM broadcast

(ii) Television

(iii) Satellite communication

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6. What is space wave propagation ? Give two examples of communication system which use space wave mode.

A TV tower is 80 m tall. Calculate the maximum

distance upto which the signal transmitted from the tower can be received.

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7. Which mode of propagation is used by short wave broadcast services having frequency range from a few MHz upto 30 MHz ? Explain diagrammatically how long distance communication can be achieved by this mode. Why is there an upper limit to frequency of waves used in this mode?

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Topic 1 Communication Systems Numerical Problem

1. A transmitting antenna at the top of a tower has a height of 32 m and the height of the receiving antenna is 50 m. What is the maximum distance between them for satisfactory communication in LOS mode? Given radius of earth $6.4 \times 10^6 m$.

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Topic 2 Modulation Very Short Answer Type Questions

1. What is demodulation ?

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2. The carrier wave is given by

$C(f) = 2\sin(8\pi t)$ volt.

The modulating signals is a square wave as

shown. Find modulation index.

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3. In the given diagram C(t) stands for the carrier wave and m(t) for the signals to be transmitted. What name do we give to the wave labelled as $C_m(t)$ in the diagram ?

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Topic 2 Modulation Short Answer Type Questions I

1. Write the block diagram of a detector for AM signal.

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2. A message signal of frequecy 10 kHz and peak voltage 10V is used to modulate a carrier wave of frequency 1 MHz and peak voltage 20V. Determine :

(i) The modulation index,

(ii) The side bands produced .

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3. A carrier wave of frequency 1.5 MHz and amplitude 50 V is modulated by a sinusoidal wave of frequency 10 kHZ producing 50% modulation . Calculate the amplitude of AM wave and frequencies of the side bands produced .

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4. 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% ?

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5. (a) Describe briefly the three factors which justify the need for translating a low frequency signal into high frequencies before transmission.

(b) Figure shows a block diagram of a detector for AM signal.

Draw the waveforms for the (i) input AM wave at A, (ü) output B at the rectifier, and (iii) output signal at C.

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6. In the block diagram of a simple modulator for obtaining an AM signal, shown in the figure, identify the boxes A and B. Write their

functions.

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7. 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% ?

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8. (i) Define modulation index.

(ii) Why is the amplitude of modulating signal kept less than the amplitude of carrier wave ?

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Topic 2 Modulation Short Answer Type Questions Ii

1. Write the block diagram of a transmitter.

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2. Write two basic modes of communication. Explain the process of amplitude modulation. Draw a schematic sketch showing how amplitude modulated signal is obtained by superposing a modulating signal over a sinusoidal carrier wave.

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3. A (sinusoidal) carrier wave

$$C(t) = A_c \sin \omega_c t$$

is amplitude modulated by a (sinusoidal) message signal

$m(t) = A_m \sin \omega_m t$

Write the equation of the (amplitude) modulated signal.

Use this equation to obtain the values of the frequencies of all the sinusoidal waves present in the modulated signal.

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4. Write three important factors which justify the need of modulating a message signal. Show diagrammatically how an amplitude modulated wave is obtained when a modulating signal is superimposed on a carrier wave.

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5. 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% ?

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Topic 2 Modulation Long Answer Type Questions

1. (a) Distinguish between sinusoidal and pulse shaped signals.

(b) Explain, showing graphically, how a sinusoidal carrier wave is superimposed on a

modulating signal to obtain the resultant amplitude modulated (AM) wave.

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Topic 2 Modulation Numerical Problem

1. A message signal of frequecy 10 kHz and peak voltage 10V is used to modulate a carrier wave of frequency 1 MHz and peak voltage 20V. Determine :

(i) The modulation index,

(ii) The side bands produced .

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2. An FM signal has a resting frequency of 105 MHz and highest frequency of 105.03 MHz when modulation by a signal of frequency 5kHz. Determine (i) frequency deviation and (ii) carrier swing.

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Topic 3 Internet Mobile And Gps Short Answer Type Questions I

1. Arrange the following networks in increasing order of the number of computers that may be present in the network:

Internet, LAN, WAN

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2. What is the minimum number of satellites that enables a Global Positioning System (GPS)

receiver to determine one's longitude/latitude position, i.e., to make a 2D position fix.

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