

Class: 12
Subject: Physics
Topic: Communication Systems
No. of Questions: 20

1. What is remote control? How has it been used in T.V. working? Name the main types of remote control receivers.
2. What do you understand by AM range of radio communication? Can these waves pass through atmosphere?
3. Is it necessary to use satellite for long distance T.V. transmission? Give reasons.
4. Why is communication using line of sight mode limited to frequencies above 40 MHz?
5. Would sky waves be suitable for transmission of TV signals of 60 MHz frequency?
6. Ground/surface wave propagation is a mode of propagation in which the signal wave glides over the surface of earth, while going from transmitter to receiver. In this mode, there is a loss of power (i.e., attenuation) of signal wave due to diffraction and absorption of signal wave energy by ground. The attenuation of ground/surface wave signal increases very rapidly with the increase in its frequency. Therefore, the ground/surface wave propagation is not suitable for the propagation of high frequency signal wave and for very long range communication.
Read the above passage and answer the following questions:
 - (i) What is the frequency range of a signal wave employed for the ground wave propagation?
 - (ii) For what purpose the ground wave propagation is used?
 - (iii) What does the study of ground wave propagation imply in day to day life?
7. Satellite communication is a mode of communication of signal between transmitter and receiver through satellite. The satellite communication is like the line of sight microwave communication. A communication satellite is a space craft placed in an orbit around the earth provided with microwave transmitting and receiving equipment called Radio transponder. The range of microwave frequency used in satellite communication for uplink is 5.925 GHz to 6.425 GHz and for downlink is 3.7 GHz to 4.2 GHz.
Read the above passage and answer the following questions:
 - (i) How is the line of sight microwave communication possible through satellite?
 - (ii) Why can't a single satellite cover the whole earth for microwave communication?
 - (iii) What is the practical utility of satellite communication?

8. What is an active satellite? How is it different from a passive satellite?
9. Why is a AM signal likely to be more noisy than a FM signal upon transmission through a channel?
11. In a transistor amplifier,
- A. the power dissipated at the base-collector junction is much higher than that dissipated at the emitter-base junction
 - B. the power dissipated at the base-collector junction is much lower than that dissipated at the emitter-base junction
 - C. the power dissipated is the same at both the junctions.
 - D. there is no power dissipation at any junction.
12. In an npn transistor, the p-type crystal acts a
- A. base only
 - B. emitter only
 - C. collector only
 - D. either base or emitter or collector
13. In a transistor circuit, the collector current is 50 mA and the base current is 1 mA. The current gain α is
- A. $\frac{51}{50}$
 - B. $\frac{49}{50}$
 - C. $\frac{51}{49}$
 - D. $\frac{49}{51}$
14. In a transistor amplifier, the two ac current gains α and β as defined as $\alpha = \frac{\delta I_C}{\delta I_E}$ and $\beta = \frac{\delta I_C}{\delta I_B}$. The relation between α and β is
- A. $\beta = \frac{1 + \alpha}{\alpha}$
 - B. $\beta = \frac{1 - \alpha}{\alpha}$
 - C. $\beta = \frac{\alpha}{1 - \alpha}$
 - D. $\beta = \frac{\alpha}{1 + \alpha}$

15. In a semiconductor, it is found that $\frac{4}{5}$ th of the total current is carried by electrons and the remaining $\frac{1}{5}$ th by the holes. If at this temperature, the drift speed of electrons is 2.5 times that of holes, then the ratio of the number densities of electrons and holes is

- A.
- B. $\frac{8}{5}$
- C. $\frac{5}{8}$
- D. $\frac{25}{8}$

16. For a transistor, current gain $\alpha = 0.96$. It is used as an amplifier in a common base circuit with a load resistance of $4\text{ K}\Omega$. If the dynamic resistance of the emitter-base junction is 48Ω , then the voltage gain is

- A. 40
- B. 80
- C. 120
- D. 160

17. A sample of n-type silicon

- A. contains an excess of free electrons, therefore it is negatively charged
- B. contains an excess of free electrons and it is electrically neutral
- C. predominantly contains trivalent impurities
- D. contains only tetravalent impurities

18. The width of depletion region in a pn junction diode

- A. increases when a reverse bias is applied
- B. increases when a forward bias is applied
- C. decreases when a reverse bias is applied
- D. remains the same, irrespective of the bias voltage

19. The dominant mechanisms for motion of charge carriers in forward and reverse biased silicon p-n junctions are

- A. drift in forward bias, diffusion in reverse bias
- B. diffusion in forward bias, drift in reverse bias
- C. diffusion in both forward and reverse bias
- D. drift in both forward and reverse bias.

20. Which of the following statements is not true?

- A. The resistance of intrinsic semiconductors decreases with increase of temperature.
- B. Doping pure Si with trivalent impurities gives p-type semiconductors.
- C. The majority carriers in n-type semiconductors are holes.
- D. A p-n junction can act as a semiconductor diode.

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