

# IMAYAM ARTS AND SCIENCE COLLEGE

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III-B.Sc.,-PHYSICS

COMMUNICATION PHYSICS

16SMBEPH3

## QUESTION BANK

### 2- MARKS

#### UNIT I -RADIO TRANSMISSION AND RECEPTION

##### **1. Define Modulation.**

The process of changing some characteristics of a carrier wave in accordance with the intensity of the signal is Known as Modulation.

##### **2. What is meant by amplitude modulation?**

When the amplitude of high frequency wave is changed in accordance with the intensity of the signal it is called amplitude modulation.

##### **3. Define modulation factor.**

The ratio of change of carrier wave to the amplitude of normal carrier wave is called the modulation factor.

##### **4. Define Frequency modulation.**

When the frequency of the carrier wave is changed in accordance with the intensity of the signal it is called frequency modulation.

##### **5. Give the advantages of frequency modulation.**

1. The operating range is quite large.
2. It gives high –fidelity reception.
3. The efficiency of transmission is very high.

##### **6. Define Demodulation.**

The process of recovering the audio signal from the modulated wave is known as demodulation or detection.

##### **7. What does Transmitter mean?**

A transmitter is an electronic device used in telecommunications to produce radio waves in order to transmit or send data with the aid of an antenna. The transmitter is able to generate a radio frequency alternating current that is then applied to the antenna, which, in turn, radiates this as radio waves.

##### **8. What is Receiver?**

A receiver is a hardware module or device used to receive signals of different kinds, depending on the context of the application. It may receive analog electromagnetic signals or waves, or digital signals through wired media.

## **UNIT II Fiber Optic Communication**

### **1. What is optical fibre and optical communication?**

The guiding medium is called optical fibre. The communication through optical fibre is known as optical communication or light wave communication.

### **2. What is core and Cladding?**

It consist of an inner cylinder made of glass or plastic called core. The core has high refractive index. This core is surrounded by a cylindrical shell of glass or plastic called cladding.

### **3. What is total internal reflection?**

Total internal reflection is a phenomenon that happens when a propagating wave strikes a medium boundary at an angle larger than a particular critical angle with respect to the normal to the surface . If the refractive index is lower on the other side of the boundary and the incident angle is greater than the critical angle, the wave cannot pass through and is entirely reflected. The critical angle is the angle of incidence above which the total internal reflectance occurs.

### **4. Define critical angle.**

The critical angle is the angle of incidence above which total internal reflection occurs.

### **5. Condition for total internal reflection.**

1. The material of the fibre should have higher refractive index than that of the material surrounding the fibre.
2. The light should incident at an angle greater than critical angle

### **6. Define Acceptance angle.**

The maximum angle  $\theta_0$  at which a ray of light can enter through one end of the fibre and still be totally internally reflected is called acceptance angle of the fibre.

### **7. What is numerical aperture?**

The Sine of the acceptance angle of the fibre is known as numerical aperture.

### **8. What is Fractional index Change?**

It is the ratio between refractive index difference between core and cladding and refractive index of core.

**9. What do you mean by Single mode fibre?**

If only one mode is transmitted through an optical fibre the optical fibre is known as single mode fibre.

**10. What is multimode fibre?**

If more than one mode is transmitted through the optical fibre than the optical fibre is known as multimode fibre.

**11. Define step index fibre.**

The variation in refractive index of core and cladding vary step by step This type is Known as step index fibre.

**12. Define attenuation**

It is defined as the logarithmic value of ratio of the optical power output from a fibre to the power input.

**13. What is the unit of attenuation?**

Decibel (dB)

**14. Define Dispersion.**

When an optical signal pulse is sent into the fibre the pulse spreads or broaden as its propagates through the fibre. This phenomenon is called dispersion.

**15. What is material dispersion?**

The narrow pulses of light broaden when they travel through the fibre. This broadening of pulse is Called material dispersion.

**16. What is fibre optic sensor?**

A sensor is a transducer which converts one form of energy into another.

**17. Define Temperature sensor.**

It is a sensor used to sense and measure the temperature of an object.

**18. Define Displacement sensor.**

It is a sensor which is used to sense and measure the displacement of an object.

**19. What is fibre optic endoscope?**

It is a tubular optical instrument which is used to know the internal parts of a human body.

**20. Distinguish between single mode and multimode fibre.**

S.No	Single mode Fibre	Multimode fibre
1.	In single mode fibre only one mode can Propagate through the fibre.	In multimode allows a large number of paths or modes for the light rays travelling through it.
2.	It has smaller core diameter and the difference between the refractive index of the core and cladding is very small.	It has larger core diameter and the refractive index difference between the core and cladding is larger than the single mode fibre.
3.	No signal dispersion.	There is signal degradation
4.	Fabrication is difficult and costly.	Fabrication is less difficult and cheap.

### UNIT III Radar Communication

#### 1 .What is pulsed radar?

The Radar, which operates with pulse signal is called the Pulse Radar.

#### 2. What are the classifications of pulsed radar?

Basic Pulse Radar

Moving Target Indication Radar

#### 3. What are basic pulsed radar?

The Radar, which operates with pulse signal for detecting stationary targets, is called the Basic Pulse Radar or simply, Pulse Radar

#### 4. What do you meant by MTI Radar?

Moving Target Indication Radar is the Radar, which operates with pulse signal for detecting non-stationary targets, is called Moving Target Indication Radar or simply, MTI Radar.

#### 5. What is Continuous Wave Radar?

The Radar, which operates with continuous signal or wave is called Continuous Wave Radar.

#### 6. Define CW radar.

The Radar, which operates with continuous signal (wave) for detecting non-stationary targets, is called Unmodulated Continuous Wave Radar or simply, CW Radar. It is also called CW Doppler Radar.

#### 7. Define FM CW radar.

If CW Doppler Radar uses the Frequency Modulation, then that Radar is called the Frequency Modulated Continuous Wave (FMCW) Radar or FMCW Doppler Radar. It is also called Continuous Wave Frequency Modulated Radar or CWFm Radar.

#### 8. What do you meant by clutter?

The echo signals due to stationary objects (places) such as land and sea are called clutters.

### **9. What is called Tracking?**

The Radar, which is used to track the path of one or more targets is known as Tracking Radar.

### **10. What is meant by radar display?**

An electronic instrument, which is used for displaying the data visually, is known as display. So, the electronic instrument which displays the information about Radar's target visually is known as Radar display.

### **11. Define A-Scope.**

It is a two dimensional Radar display. The horizontal and vertical coordinates represent the range and echo amplitude of the target respectively. In A-Scope, the deflection modulation takes place. It is more suitable for manually tracking Radar.

### **12. What is the purpose of using radar?**

Radar is used for detecting the objects and finding their location.

### **13. What is Range?**

Range The distance between Radar and target is called Range of the target or simply range.

### **14. Maximum range of Radar:**

$$R_{Max} = \left( \frac{p_T G_T \lambda^2 S}{(4\pi)^3 P_{Rmin}} \right)$$

### **15. What is radar communication system?**

**Radar** is a detection **system** that uses radio waves to determine the range, angle, or velocity of objects. It can be used to detect aircraft, ships, spacecraft, guided missiles, motor vehicles, weather formations, and terrain.

### **16. What is Doppler Effect in radar?**

A Doppler radar is specialized radar that uses the Doppler Effect to produce velocity data about objects at a distance. It does this by bouncing a microwave signal off a desired target and analyzing how the object's motion has altered the frequency of the returned signal.

## **UNIT-IV Satellite Communication**

### **1. What is satellite communication?**

If the communication takes place between any two earth stations through a satellite, then it is called as satellite communication.

### **2. What is satellite?**

A satellite is a body that moves around another body in a particular path. A communication satellite is nothing but a microwave repeater station in space. It is helpful in telecommunications, radio and television along with internet applications.

### 3. What do you mean by uplink and downlink frequencies?

The frequency with which, the signal is sent into the space is called as Uplink frequency. Similarly, the frequency with which, the signal is sent by the transponder is called as Downlink frequency.

### 4. Applications of Satellite Communication.

- Radio broadcasting and voice communications TV broadcasting such as Direct To Home (DTH)
- Internet applications such as providing Internet connection for data transfer, GPS applications, Internet surfing, etc.
- Military applications and navigations
- Remote sensing applications
- Weather condition monitoring & Forecasting etc..

### 5. What is called Apogee?

The farthest point of an ellipse from the centre is called as apogee

### 6. What is called Perigee?

The shortest point of an ellipse from the centre is called as perigee.

### 7. What are satellite orbits?

An **orbit** is a regular, repeating path that one object in space takes around another one. An object in an **orbit** is called a **satellite**.

### 8. What is a geostationary orbit used for?

A spacecraft in this **orbit** appears to an observer on Earth to be stationary in the sky. This particular **orbit** is **used** for meteorological and communications satellites. The **geostationary orbit** is a special case of the **geosynchronous orbit**, which is any **orbit** with a period equal to Earth's rotation period.

### 9. What is difference between geostationary and geosynchronous orbit?

**Geostationary Orbits.** While **geosynchronous** satellites can have any inclination, the key **difference** to **geostationary orbit** is the fact that they lie on the same plane as the equator. While the **geostationary orbit** lies on the same plane as the equator, the **geosynchronous** satellites has a different inclination.

### 10. What are the multiple access techniques?

Frequency division multiple access (FDMA)

Time division multiple access (TDMA)

### 11. What is meant by FDMA?

**FDMA** (frequency division multiple access) is the division of the frequency band allocated for wireless cellular telephone communication into 30 channels, each of which can carry a voice conversation or, with digital service, carry digital data. With **FDMA**, each channel can be assigned to only one user at a time.

#### **12. What is antenna?**

The antenna consists of a radiating element that splits the rods and makes current flow through the centre by using a feeder at the transmitter out that takes from the receiver.

#### **13. What is meant by the footprint of a satellite?**

The **footprint** of a communications **satellite** is the ground area that its transponders offer coverage, and determines the **satellite** dish diameter required to receive each transponder's signal. There is usually a different map for each, as each may be aimed to cover different areas.

### **UNIT-V Mobile Communication**

#### **1. What is meant by GSM?**

GSM (Global System for Mobile communication) is a digital mobile network that is widely used by mobile phone. GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot.

#### **2. Why is cellular concept used in mobile telephony?**

The **cellular concept** was invented in solving the spectral congestion and user capacity. To accommodate a large number of users over a large geographic area, the **cellular** telephone system **uses** a large number of low-power **wireless** transmitters to create cells.

#### **3. What does *Facsimile (Fax)* mean?**

A facsimile, more commonly referred to as a fax, is the transmission of a document or image from one place to another electronically. The document to be sent is scanned and sent over a telephone or Internet connection. A combined scanner and transmitter is usually known as a fax machine. Modern-day Internet connections have greatly reduced the use of fax machines.

#### **4. What is VSAT and how it works?**

The earth station is designed to transmit and receive data signals via a satellite signal.

#### **5. What is a modem and what is it used for?**

A modem is a device or program that enables a computer to transmit data over, for example, telephone or **cable** lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of **analog** waves. A modem converts between these two forms.

**6. What is the use of IPTV?**

**IPTV** (Internet Protocol television) is a service that provides television programming and other video content using the TCP/IP protocol suite as opposed to traditional cable or satellite signals.

**7. What is WiFi and how it works?**

WiFi is a technology that uses radio waves to send and receive signals from nearby devices to provide Internet access to the devices connected to it.

**8. What does 3G mean?**

**3G** is shorthand for "3rd generation," and refers to a networking standard in cell phone technology that is capable of providing high-speed data service to mobile devices.

**5-MARKS**

**UNIT-I Radio transmission and reception**

1. What is modulation? what is the need for modulation.
2. Explain about Amplitude modulation.
3. Explain the limitations of amplitude modulation.
4. Explain AM & FM radio receivers.
5. Explain FM radio receivers.

**UNIT-II Fiber Optic Communication**

1. Explain total internal reflection in optical fiber.
2. Describe principal and propagation of light in optical fiber.
3. Write a note on numerical aperture.
4. Write a note on refractive index profile.
5. Explain fiber optic sensors.
6. Explain Temperature sensor.
7. Explain fiber optic endoscope

**UNIT-III Radar Communication**

1. Describe Radar range.
2. Explain Pulsed radar system.
3. Write a note on Tracking radar.
4. Explain Moving target indicator.

**UNIT-IV Satellite Communication**

1. Explain communication system.
2. Write a note on constructional features of satellites.
3. Write a note on multiple access.
4. Communication package.



5. Satellite Foot print.

#### **UNIT-V Mobile Communication**

1. Explain GSM.
2. Describe mobile services- concept of cell.
3. Explain facsimile (FAX) and its application.
4. Write a note on VSAT.
5. Write a note on Wi-Fi
6. Write about 3G.

#### **10-MARKS**

#### **UNIT-I Radio transmission and reception**

1. Explain block diagram of AM and FM Transmitter.
2. With a neat diagram super heterodyne radio receiver.

#### **UNIT-II Fiber Optic Communication**

1. Explain types of optical fibers based on material. Explain the number of modes.
2. With a neat diagram explain fiber optical communication system.

#### **UNIT-III Radar Communication**

1. Explain Plan position indicator.
2. MTI Principle
3. CW Doppler Radar
4. Frequency modulator CW Radar.

#### **UNIT-IV Satellite Communication**

1. History of satellite
2. Describe classification of satellites.
3. Satellite communication in India.

#### **UNIT -V Mobile Communication**

1. System architecture of mobile communication
2. Explain IPTV.

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