

**भारत मौसम विज्ञान विभाग**  
**सूचना संचार एवं उपकरण प्रशिक्षण केंद्र नई दिल्ली**  
**(विश्व मौसम संगठन का क्षेत्रीय प्रशिक्षण केंद्र नई दिल्ली)**  
**Advance Training Course in Meteorological Instrumentation**  
**&**  
**Information System B-IX**

**Date: 25.02.2022**

**Final Exam (Paper-I)**

**Max. Marks -100**

**Time: - 10:30-13:30**

**Digital Communication Systems and Wireless Communication**

**Q1 (A) Fill in the blanks/Very short answer type (1 mark each) (10 out of 12)**

- i. 1G & 2G Mobile technologies were optimised for\_\_\_\_\_ communications (Voice / Data)
- ii. First Generation Mobile communication technology uses\_\_\_\_\_ Communication. (Analog/Digital)
- iii. Full form of LTE in relation to 4G Technology is \_\_\_\_\_.
- iv. Full form of GSM is Global System for Mobile Telecommunication. (True/ False).
- v. Full form of GPRS is General Packet Radio Switching. (True/ False).
- vi. Full form of FSK is \_\_\_\_\_.
- vii. PCM in Modulation technique stands for \_\_\_\_\_.
- viii. Full form of QAM is \_\_\_\_\_.
- ix. In FSK Modulation technique, \_\_\_\_\_ of carrier signal is varied according to Amplitude of the baseband Signal.
- x. What is SNR?
- xi. What is Baseband signal?
- xii. Quantisation is used in which Modulation technique-
  - a) Pulse Code Modulation
  - b) Phase shift Keying
  - c) Amplitude Shift Keying
  - d) All of Above

**Q1 (B) Short answer Type Questions (2 Marks each) (5 out of 7)**

- i. Some prominent characteristics of 2G communication are – (Tick whichever applicable)
  - a) Data speeds up to 64 kbps
  - b) Text and multimedia messaging possible
  - c) Better quality than 1G
  - d) All of the Above

- ii. Name the technique which is used by AWS for satellite communication?
- iii. Name the LTE uses technique to achieve high data rates?
- iv. What is Modulation?
- v. Give two Advantages of Digital signals over Analog Signals. - [1 mark for each point]
- vi. Examples of 3 types of Modulation techniques are?
- vii. QAM is combination of which two types of Modulation techniques, which are out of phase by 90 degrees with each other?

## **Radio Physics**

### **Q2 (A) Very Short answer type/ Fill in the blanks (10 out of 12) (1 mark each)**

- i. ----- is also called 3-Db beam width.
- ii. -----antenna can achieve circular polarization.
- iii. The radiation lobe containing the direction of maximum radiation is called as \_\_\_\_\_.
- iv. The ratio of maximum power density in the desired direction to the average power radiated from the antenna is called as \_\_\_\_\_.
- v. An ideal antenna in which the power is radiated equally in all directions is called as \_\_\_\_\_ antenna.
- vi. The directivity of Yagi-Uda antenna is increased by adding \_\_\_\_\_
- vii. Directors are used to increase \_\_\_\_\_ of the Yagi-Uda antenna.
- viii. If beam width of the antenna increases, then directivity \_\_\_\_\_.
- ix. When a wave is incident normally then the acceptable highest frequency at which signal can be returned is the \_\_\_\_\_.
- x. Refractive index of Air is -----.
- xi. What is the ratio of focal length to diameter (f/D) for practical applications in a parabolic reflector?
- xii. Which antennas are mostly used in TV Dish?

### **Q2 (B) Short answer Type Questions / True or False with brief reason. (2 Marks each) (5 out of 7)**

- i. Communication through LOS can be increased by decreasing the height of antenna. (True or False with Reason)
- ii. What is the value of maximum usable frequency when the incident angle is  $60^\circ$  and the critical frequency is 4.5MHz?
- iii. What should be the phase difference for total constructive and total destructive interference?
- iv. Define Directivity of Antenna.
- v. Size of antenna in S-Band radar is smaller than X –Band Radar.(True or false with reason)
- vi. What is Multipath fading?
- vii. Write any four type of antennas commonly used.

## **Networking and Security System**

### **Q3 (A) Very Short answer type/ Fill in the blanks or True/False (10 out of 12) (1 Mark each)**

- i. WAN stands for \_\_\_\_\_
- ii. OSI stands for \_\_\_\_\_
- iii. Layer 5 in OSI model is \_\_\_\_\_
- iv. In a network a machine is identified by unique address called \_\_\_\_\_
- v. DNS denotes \_\_\_\_\_
- vi. VLAN stands for \_\_\_\_\_
- vii. Ipv4 address is \_\_\_\_\_ bits long.
- viii. Firewall operates at \_\_\_\_\_ Layer.
- ix. In 10gb distribution switch gb stands for \_\_\_\_\_
- x. Fibre optics cable works on \_\_\_\_\_ Principle
- xi. MAC address is 32-bit physical address of machine. (True/False)
- xii. A hub connects two WANS. (True/False)

### **Q3 (B) True/False with reason (5 out of 7) (2 Mark each)**

- i. IP address is a sequence of four digit numbers separated by coma.
- ii. A LAN is connected to large geographical area.
- iii. Speed of LAN is less than WAN.
- iv. Router and switch both operates on data link layer and network layer only.
- v. Two LANs are connected by a Gateway.
- vi. A server cannot run on a workstation computer
- vii. IPV4 address is 24 bits' long.

## **Networking**

### **Q4 (A) Very Short answer type/ Fill in the blanks /True or False (10 out of 12) (1Mark each)**

- i. A Computer that connects to the Internet is called the \_\_\_\_\_
- ii. \_\_\_\_\_ uses light for transmission of data and is capable of transferring large amounts of data.
- iii. The Internet is an example of \_\_\_\_\_
- iv. A Network device that checks the address of a message received and sends it to the appropriate computer is called a \_\_\_\_\_
- v. Cable television is an example of \_\_\_\_\_
- vi. A network device that provides a hardware interface between a computer and a network so that computer can communicate over the network is called a \_\_\_\_\_
- vii. A powerful computer that provides service to many users, such as creating an email account, is called a \_\_\_\_\_
- viii. How many layers are in the T C P/ I P model?
- ix. Hexadecimal has a base value of?
- x. Which of the following storage media used laser technology to store data (Tick one from mentioned below)

- a) Floppy disk
- b) Magnetic tape
- c) CD-ROM
- d) Hard disk

- xi. Full form of SMTP is \_\_\_\_\_
- xii. Full form of ARP is \_\_\_\_\_

**Q4 (B) Short answer type questions (5 out of 7) (2 Marks each)**

- i. What is a computer network?
- ii. What are the components of the network?
- iii. State the different types of mail protocols
- iv. Explain the role of a modem in a network.
- v. What do you mean by the DHCP Protocol?
- vi. What is the use of a router and how is it different from a gateway?
- vii. What is the UDP protocol?

**GTS and WMO GTS Data Procedure**

**Q5 (A) Very Short answer type/ Fill in the blanks or True/False (10 out of 11) (1 Mark each)**

- i. Full form of MPLS is \_\_\_\_\_
- ii. Full form of GTS is \_\_\_\_\_
- iii. Full form of BUFR is \_\_\_\_\_
- iv. Full form of NET CDF format is \_\_\_\_\_
- v. Full form of WMO is \_\_\_\_\_
- vi. Full form of NKN is \_\_\_\_\_
- vii. IMD Headquarters presently has two links for internet. Bandwidth of them are \_\_\_\_\_ MBPS
- viii. Mention Data formats used in GTS?
- ix. Mention one difference between Leased line and VPN?
- x. 10.Mention one advantage of GTS communication?
- xi. Full form of WIS \_\_\_\_\_

**Q5 (B) Short answer type questions and True/False with brief reason (5 out of 7) (2 Marks each)**

- i. Full form is ASCII format is American Standard Code for Information Interlink. (True/False)
- ii. Customers use VPN primarily to reduce operational costs. (True/False)
- iii. Explain Some Salient features of NKN?
- iv. Explain Some Salient features of VPN?
- v. Explain the WMO file naming convention?
- vi. Explain about difference between VPN and MPLS VPN?
- vii. Difference between BUFR and ASCII format used in GTS?

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