

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 –XI)

Date: 27.02.2023

Final Examination

Max. Marks -100

Paper-I

Time: - 10:30 AM - 13:30 PM

I. Digital and Wireless Communication systems (20 Marks)

Q1 (A) Fill in the blanks (Answer any 10)

(1×10 = 10 Marks)

- i. 1G & 2G Mobile technologies were optimized 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 BTS in Mobile Communication system is _____.
- v. _____ technique is used by AWS for satellite communication.
- 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. Quantization is used in which Modulation technique: -
 - a. Pulse Code Modulation
 - b. Phase shift Keying
 - c. Amplitude Shift Keying
 - d. All of Above
- xi. LTE uses technique to achieve high data rates.
- xii. QAM is combination of which are out of phase by 90 degrees with each other.

Q1 (B) Answer in short. (Any 5)

(2×5 = 10 Marks)

- i. Full form of GPRS is General Packet Radio Switching. (True / False)
- ii. 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
- iii. What are the types of Pulse Modulation Techniques?
- iv. What is sampling?
- v. What is Modulation?
- vi. Give two Advantages of Digital signals over Analog Signals.
- vii. Examples of 3 types of Modulation techniques are _____.

II. Antenna and Wave propagation (20 Marks)

Q2 (A) Very Short Answer (Any 10)

(1×10 = 10 Marks)

- i. An ideal antenna in which the power is radiated equally in all directions is called as _____ antenna.
- ii. _____ is also called 3-Db beam width.
- iii. Refractive index of Air is _____.
- iv. Which antennas are mostly used in TV Dish?
- v. Which layers of ionosphere regions are present in the night time?
- vi. At what height the Ionosphere lies above the earth surface?
- vii. Ground wave propagation is also known as _____.
- viii. Write formula to estimate range for line of sight communication.
- ix. Which of the following frequency is greater than the critical frequency?
 - a) MUF
 - b) LUF
 - c) Optimum frequency
 - d) VLF
- x. What should be the phase difference for total constructive interference?
- xi. When a wave is incident normally then the acceptable highest frequency at which signal can be returned is the _____.
- xii. What is the wavelength for S Band Radar?

Q2 (B) Short Answer type Questions (Any 5)

(2 ×5=10 Marks)

- i. Define Directivity of Antenna.
- ii. Size of antenna in S-Band radar is smaller than X –Band Radar. (True or false with reason)
- iii. Write any four type of antennas commonly used.
- iv. Which ionization layer exists during day time& usually vanishes at night due to highest recombination rate?
- v. What is the value of maximum usable frequency when the incident angle is 0° and the critical frequency is 10 MHz?
- vi. What is skip distance?
- vii. Which of the following statements is false with reason?
 - a. MUF is always greater than or equal to critical frequency depending on the incident angle.
 - b. Optimum frequency is the frequency at which optimum reflection of wave takes place.
 - c. Beyond the MUF, the entire wave gets reflected back.
 - d. Below LUF, the entire power of wave gets absorbed.

III. Networking and Security Systems (20 Marks)

Q3 (A) Very Short Answer (Any 10)

(1×10 = 10 Marks)

- i. Firewall operates at _____ Layer.
- ii. In 10 GB distribution switch GB stands for _____.
- iii. MAC address is _____ bit physical address of machine.
- iv. Fiber optics cable works on _____ Principle.

- v. OSI stands for _____.
- vi. Layer 5 in OSI model is _____.
- vii. In a network a machine is identified by unique address called _____.
- viii. DNS denotes _____.
- ix. VLAN stands for _____.
- x. Ipv4 address is _____ bits long.
- xi. Speed of LAN is _____ than WAN.(more/less)
- xii. IP address is a sequence of four digit numbers separated by _____.

Q3 (B) Short Answer type Questions (Any 5)

(2 ×5=10 Marks)

- i. How do you classify fiber optic cable?
- ii. What is a gateway or Router?
- iii. A LAN is connected to large geographical area.(True/False)
- iv. Router and switch both operates on data link layer and network layer only.
- v. Two LANs are connected by a Gateway.
- vi. What is Multiple Access?
- vii. What is point-point link?

IV. GTS and WMO/GTS data procedure (20 Marks)

Q 4 (A) Very Short Answer (Any 10)

(1×10 = 10 Marks)

- i. _____ is a file format for the storage and transport of gridded meteorological data.
- ii. Maximum bandwidth of RTH New Delhi HQ of VPN is _____ Mbps.
- iii. _____ VPN, in which the service provider participates in the customer routing.
- iv. 4 IP address is _____ bit address.
- v. MAC address is _____ bit address.
- vi. ASCII stands for _____.
- vii. Full form of MPLS is _____.
- viii. Full form of BUFR is _____.
- ix. Full form of NET CDF format is _____.
- x. Full form of GTS is _____.
- xi. Net CDF is machine _____ format. (Dependent/independent)
- xii. IMD has presently _____ VPN stations in India to transfer data.

Q 4(B) Short Answer type Questions (Any 5)

(2 ×5=10 Marks)

- i. Brief the data format used in GTS.
- ii. Give the advantages of GTS communication.
- iii. Main differences between Leased line and VPN.
- iv. Explain some salient features of NKN.
- v. Explain some salient features of VPN.

- vi. What is the difference between BUFR and ASCII format used in GTS?
- vii. Explain the WMO file naming convention.
- viii. Customers use VPN primarily to reduce operational costs. True/False? Give reasons.

V. Concept of Networking and IMD networks (20 Marks)

Q 5 (A) Very Short (Any 10)

(1 × 10 = 10 Marks)

- i. Which of the following is the broadcast address for a Class B network ID using the default subnet mask?
 - a) 172.16.10.255
 - b) 255.255.255.255
 - c) 172.16.255.255
 - d) 172.255.255.255

- ii. You have an IP address of 172.16.13.5 with a 255.255.255.128 subnet mask. What is your class of address, subnet address, and broadcast address?
 - a) Class A, Subnet 172.16.13.0, Broadcast address 172.16.13.127
 - b) Class B, Subnet 172.16.13.0, Broadcast address 172.16.13.127
 - c) Class B, Subnet 172.16.13.0, Broadcast address 172.16.13.255
 - d) Class B, Subnet 172.16.0.0, Broadcast address 172.16.255.255

- iii. The combination of _____ and _____ is often termed the local address of the local portion of the IP address.
 - a) Network number and host number
 - b) Network number and subnet number
 - c) Subnet number and host number
 - d) Host number

- iv. Which of the following are Gigabit Ethernets?
 - a) 1000 BASE-SX
 - b) 1000 BASE-LX
 - c) 1000 BASE-CX
 - d) All of the mentioned

- v. A topology that involves Tokens.
 - a) Star
 - b) Ring
 - c) Bus
 - d) Daisy Chaining

- vi. Two devices are in network if _____
 - a) a process in one device is able to exchange information with a process in another device
 - b) a process is running on both devices
 - c) PIDs of the processes running of different devices are same
 - d) a process is active and another is inactive

- vii. Protocols are set of rules to govern _____
 - a) Communication
 - b) Standard
 - c) Metropolitan communication
 - d) Bandwidth

- viii. _____ topology requires a multipoint connection.
- ix. TCP/IP layer is equivalent to combined Session, Presentation and _____.
- x. Connecting two or more networks to form a single network is called _____.
- xi. 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 _____.
- xii. The data link layer takes the packet it gets from the network layer and encapsulates them into _____.

Q 5 (B) Short Answer type Questions (Any 5)

(2 ×5=10 Marks)

- i. State whether true or false with brief reason.
 - i) A connection oriented protocol can only use unicast addresses.
 - ii) The any cast service is included in IPV6.
 - a) True, True
 - b) True, False
 - c) False, True
 - d) False, False
- ii. What are the uses of sub-netting?
- iii. What are the components of the network?
- iv. What is the maximum number of IP addresses that can be assigned to hosts on a local subnet that uses the 255.255.255.224 subnet mask?
- v. What is difference between software and Firmware?
- vi. State difference between TCP/IP and OSI Model?
- vii. What is Network Topology and explain its types?
