

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 –XII)**

Date: 28.08.2023

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 GSM is _____.
- v. Full form of GPRS is _____.
- vi. Full form of FSK is _____ and PCM is _____.
- vii. Full form of QAM is _____.
- viii. In FSK Modulation technique, _____ of carrier signal is varied according to Amplitude of the baseband Signal.
- ix. What is SNR?
- x. Quantization is used in which Modulation technique- (1)
 - a. Pulse Code Modulation
 - b. Phase shift Keying
 - c. Amplitude Shift Keying
 - d. All of Above
- xi. WIMAX full form is _____
- 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. What is Modulation?
- ii. Give two Advantages of Digital signals over Analog Signals. - [1 mark for each point]
- iii. Examples of 3 types of Modulation techniques are _____.
- iv. Full form of BTS and MSC in Mobile Communication system is _____.
- v. 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
- vi. _____ technique is used by AWS for satellite communication.
- vii. LTE uses _____ technique to achieve high data rates

Antenna and Wave propagation (20 Marks)

Q2 (A) Very Short Answer (Any 10)

(1×10 = 10 Marks)

- i. The frequency and phase of the carrier remains_____ in amplitude modulation. (Constant/Variable)
- ii. _____ is also called 3-Db beam width.
- iii. _____Frequency band is used for ground to aircraft communications.
- iv. The directivity of Yagi-Uda antenna is increased by adding _____.
- v. -----antenna can achieve circular polarization.
- vi. If beam width of the antenna increases, then directivity _____.
- vii. Ground wave propagation is also known as_____.
- viii. Write formula to estimate range for line of sight communication.
- ix. The carrier signal is a _____ frequency signal in modulation techniques. (High/Low)
- x. What The circuit which is used to produce the amplitude modulation is_____.
- xi. When a wave is incident normally then the acceptable highest frequency at which signal can be returned is the_____.
- xii. The ratio of maximum power density in the desired direction to the average power radiated from the antenna is called as _____?

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

(2 ×5=10 Marks)

- i. Define Directivity of Antenna.
- ii. For an AM system the total power of modulated signal is 600W and that of carrier is 400W, calculate the modulation index.
- iii. Calculate range of line of sight communication for standard atmosphere when $h_t = 52$ m and h_r is 13 m.
- iv. Define Critical Frequency. What is relation between Critical frequency and Maximum usable frequency?
- v. What is the value of maximum usable frequency when the incident angle is 60° and the critical frequency is 4.5MHz?
- vi. What is skip distance?
- vii Calculate the power developed by an amplitude modulated wave in a load resistance of 100Ω , if the peak voltage of carrier wave is 100V and modulation index is 0.4.

II. Networking and Security Systems (20 Marks)

Q3 (A) Very Short Answer (10)

(1×10 = 10 Marks)

- i. WAN stands for_____.
- ii. OSI stands for_____.
- iii. Layer 6 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. Fiber optics cable works on_____Principle.

Q3 (B) Short Answer type Questions (5) True/False with reason (2 ×5=10 Marks)

- i. IP address is a sequence of four digit numbers separated by coma.
- ii. A LAN is connected to large geographical area.
- iii. MAC address is 32 bit physical address of machine.
- iv. Speed of LAN is less than WAN.
- v. Router and switch both operates on data link layer and network layer only.

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

Q 4 (A) Very Short Answer (10)

(1×10 = 10Marks)

- i. AMSS receive, check and forward automatically, meteorological data and products according to the_____standards.
- ii. _____ is a major part of WMO information system (WIS).
- iii. MPLS stands for _____
- iv. In a network a machine is identified by unique address called _____
- v. GTS denotes _____
- vi. Mirror RTH is situated at_____
- vii. BUFR stands for _____
- viii. RTH stands for _____
- ix. Numerical modeling data used in IMD originally in which format _____
- x. ASCII stands for _____

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

(2 ×5=10 Marks)

- i. CIPS Data Centre Working based on WINDOWS Operating System
- ii. AMSS located at 6 different locations
- iii. TRANSMET System is not GUI of AMSS
- iv. GTS is the communication and data management component in WWW of WMO
- v. Explain file naming convention of WMO Header.

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

Q 5 (A) Very Short (Any 10)

(1 × 10 = 10 Marks)

- i. Establish secure communication channels using _____
- ii. Optimize traffic distribution through _____
- iii. Facilitate automatic IP address assignment using _____.
- iv. Organize networks efficiently by implementing _____.
- v. Patch cords are used to establish _____ connections between devices
- vi. We measure bandwidth in _____
- vii. The default HTTP and HTTPS ports for the Web server are port ____ and _____
- viii. Common troubleshooting commands, such as _____ and _____, help identify and rectify network
- ix. RJ45 stands for _____
- x. LIU stands for _____
- xi. UTP and STP cables stands for _____ and _____ respectively.
- xii. Optical Fiber Cables transmit data using _____ and are known for their low signal attenuation.

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

(2 ×5=10 Marks)

- I. Spyware is a type of Malware.
- II. Endpoint security focuses on protecting High end devices such as servers and applications.
- III. Network security involves protecting computer networks and data from unauthorized access, attacks, and damage.
- IV. Bandwidth refers to the minimum amount of data that can be transmitted over a network in a given time.
- V. Configuring policies on a firewall involves defining rules for controlling traffic and access.
- VI. AAA servers ensure secure and controlled access to network resources.
