Advance Training Course in Meteorological Instrumentation & Information System (Batch No – XIV)

Final Exam: Paper –II	**Max. Marks -100**
Date: 27.02.2025	**Time: - 10:30-13:30**

RADAR TECHNOLOGY AND RADAR METEOROLOGY

1. (A) Fill in the blanks: (Answer any 5)   **(1 × 5 = 5 Marks)**

i. When the size of the target is small compared to the wavelength of the radar, the back scattering energy is inversely proportional to the fourth power of the wavelength. This is known as _____

ii. 25 dBm = _____W**.**

iii. IMD S band Radar has IF _____ MHz.

iv. If the radar shows a nearby storm in a particular direction but there is nothing outside, it is probably a_____

v. The Radar transmits Horizontal and Vertical Polarised electromagnetic waves is called_____

vi. A Radar antenna is generally a parabolic dish antenna that is very sensitive with _____ gain

vii. The most common wavelength used for RF transmission in X-band Radars is._____Centimetre

1. (B) Indicate True or False with justification: (Answer any 5)   **(2 × 5 = 10 Marks)**

i. Phased array radars can steer the radar beam electronically without moving the antenna.

ii. Weather radar calibration is only necessary during the installation phase.

iii. Dual-polarization radar can measure the differential phase shift to estimate rainfall rate.

iv. The Doppler effect is used in radar systems to measure the temperature of the target.

v. Reflectivity measurements can be affected by atmospheric attenuation, especially in heavy rainfall.

vi. S-band radars are more susceptible to signal attenuation due to rain compared to X-band radars.

vii. Ground-based radar cannot detect weather phenomena at high altitudes.

1. (C) Short Answer type Questions: (Answer any 5)   **(2 × 5 = 10 Marks)**

i. What is the significance of the Nyquist velocity in Doppler radar?

ii. How does spectral width help in assessing turbulence within a storm?

iii. What is ground clutter, and how is it reduced in Doppler radar systems?

iv. What is the primary advantage of using dual-polarization in Doppler Weather Radar?

v. What is Doppler Dilemma?

vi. Explain the IMD Radar scan strategy?

vii. State the limitation of radar measurement?

OPERATION AND MAINTENANCE OF WEATHER RADARS

2. (A) Fill in the blanks: (Answer any 5) (1 × 5 = 5 Marks)

i. The process of aligning an antenna to true north involves using_____ a to ensure accurate orientation.

ii. Regular _____ is essential to ensure the accuracy and reliability of measurement instruments.

iii. Always follow the _____ guidelines when working with electrical measurement tools to avoid accidents

iv. A multimeter can measure various electrical parameters such as voltage, current, and resistance using the_____ principle.

v. A spectrum analyzer measures the magnitude of an input signal versus_____ within a specified frequency range

vi. The SI unit of Radar reflectivity factor (Z) is _____.

vii. Very High Frequency (VHF) Radars has frequencies _____than S- Band Weather Radar.

2. (B) Indicate True or False with justification: (Answer any 5) (2 × 5 = 10 Marks)

i. Using a compass is the most accurate method to align an antenna to true north.

ii. Calibration of measurement instruments should be done every five years to maintain accuracy.

iii. An oscilloscope can display frequency spectra of signals.

iv. Wider bandwidth allows an antenna to receive signals from more distant sources.

v. Corrective maintenance of a DWR system includes fixing unexpected failures and restoring the system to its operational state.

vi. Radar systems that operate in the X-band frequency range are more susceptible to atmospheric attenuation and signal absorption compared to radar systems in the S-band.

vii. The Nyquist limit in radar velocity measurements can be exceeded by using higher-frequency radar waves.

2. (C) Short Answer type Questions: (Answer any 5) (2 × 5 = 10 Marks)

i. Why is it important to align an antenna to true north?

ii. What is the primary purpose of regular calibration of measurement instruments?

iii. How often should measurement instruments be calibrated to maintain accuracy?

iv. Why is it important to follow safety instructions when using measurement instruments?

v. How can you use a spectrum analyzer to identify signal interference?

Vi. What is the need of Radar beam widening at long ranges

Vii. What is negative effect of bright band?

WEB DESIGNING & ARTIFICIAL INTELLIGENCE

3. (A) Fill in the blanks: (Answer any 5) (1 × 5 = 5 Marks)

i. _____tag is used to describe HTML document?

ii. A …….is a keyword enclosed by angle brackets.

iii. The_____library is used for data visualization.

iv. In Python, the _____ is used for exception handling.

v. In Python, a list is defined using _____bracket

vi. The _____command is used to install and manage Python packages.

vii. The _____keyword is used to define a function in Python.

3. **(B) Indicate True or False with justification: (Answer any 5)** **(2 × 5 = 10 Marks)**

    i.   Java script is compiled language?

    ii.   In a database, data is stored in spreadsheets which have rows and columns.?

    iii.   Python script is a compiled programming.

    iv.   The input() function is used to take user input in Python.

    v.   Python is a statically typed language.

    vi.   The lambda keyword in Python is used to create anonymous functions.

    vii.   The break statement is used to terminate a loop prematurely.

3. **(C) Explain in brief: (Answer any 5)** **(2 × 5 = 10 Marks)**

    i.   What is "echo" in PHP

    ii.   How a variable is declared in PHP? Give syntax.

    iii.   Write Brief about Raster Model

    iv.   Write Brief About Vector Model

    v.   Write any 6 applications of GIS

    vi.   Write a Python Program function to Check if a Number is Prime

    vii.   Write a Python Program for Simple Linear Regression using Scikit-Learn

LINUX

4. **(A) Fill in the blanks: (Answer any 10)** **(1 × 5 = 5 Marks)**

    i.   The _____command is used to change file permissions.

    ii.   In Linux, the _____command is used to safely shut down the system.

    iii. The root directory in Linux is represented by _____

    iv. The file that stores user account information in Linux is _____.

    v.   The command used to display the current working directory is_____.

    vi. To create a new user in Linux, the command used is _____.

    vii. The process ID of a running process can be viewed using the_____command.

4. **(B) Indicate True or False with justification: (Answer any 5)** **(2 × 5 = 10 Marks)**

    i.   The ls command is used to delete files.

    ii.   The chmod command is used to change file permissions.

    iii. The sudo command allows regular users to execute commands as the root user.

    iv. The df command is used to check disk space usage in Linux.

    v.   The mkdir command is used to remove files and directories.

    vi. The Local standard user has Administrative privileges in Linux.

    vii. The /home directory contains user-specific files.

LINUX SERVER MANAGEMENT

5. **(A) Indicate True or False with justification: (Answer any 5)** **(2 × 5 = 10 Marks)**

    i.   The systemctl command is used to manage system services in Linux.

    ii.   The scp command is used for secure file transfers between servers.

    iii. The default SSH port is 25.

    iv. RAID 10 is a combination of RAID 1 and RAID 0, providing both redundancy and performance.

    v.   The tar command is primarily used for managing user permissions in Linux.

    vi. The scp command is used to securely copy files between Linux systems.

    vii. Linux does not support virtualization.

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