

## Class-3

# Meteorology

### Topic: The atmosphere, its composition and physical properties

1. Describe the composition of the earth's atmosphere
2. Draw and labels a typical vertical temperature and Pressure profile through the various layers of the atmosphere
3. Briefly describe various layers of the atmosphere.
4. Describe the nature of solar radiation, (scattering, reflection and absorption)
5. Explain the effect on insulation of a variation in latitude, sun's declination and the length of the day.
6. Define 'evaporation', 'condensation', 'latent heat of vaporization', 'saturated air', 'dew point', 'absolute humidity', 'relative humidity' and 'vapor pressure'

### Topic: Atmospheric pressure

1. Define atmospheric pressure and its characteristics
2. Define isobars and Briefly describe various isobaric patterns that may be found in weather charts

### Topic: Anticyclones and other pressure systems

1. Define anticyclone and describe the weather associated with an anticyclone
2. Define ridge and COL and weather sequence with the passage of a ridge and COL

### Topic: Cloud and precipitation

1. Describe the formation process of cloud
2. List and describe the ten basic types of cloud
3. Defines 'precipitation', 'rain', 'drizzle', 'hail', 'snow' and 'sleet'

### Topic: Wind

1. Define wind. Describe the forces involved to drive wind.
2. Briefly describe Geostrophic wind, Gradient wind and Friction layer wind and forces involved with them.
3. Explain Buys-Ballot's law and its limitation
4. List the factors, other than the wind speed, which affect the appearance of the sea surface

5. Explain the difference between apparent and true wind. Determine the true wind velocity by using a vector diagram, given the apparent wind and the ship's course and speed (Wind triangle calculation)

#### **Topic: Visibility**

1. Define 'fog', 'mist' and 'haze'
2. Explain the formation of radiation fog, mentioning areas, seasons and reasons for its dispersal
3. Explain the formation of advection fog, mentioning areas, seasons and reasons for dispersal
4. Explain the conditions leading to the formation of sea smoke, and typical areas where sea smoke may be encountered

#### **Topic: Shipborne Meteorological Instruments**

1. Describe the basic Principles of an aneroid barometer
2. Describe the correction to be applied in a reading of aneroid barometer
3. Describe the function of a hygrometer and precaution to observe during taking the readings
4. Describe the working principle of Wind vane and anemometer

#### **Topic: The wind and pressure system over the ocean**

1. With the aid of diagram briefly describe various circulation cells
2. Briefly describe the characteristics and location of the doldrums, inter tropical convergence zone, trade winds, sub-tropical oceanic highs, westerly and polar easterlies
3. Define monsoon and cause of its formation
4. Briefly describe NE and SW monsoon of Indian continents
5. Briefly describe the monsoon of China Sea, north coast of Australia, west coast of Africa and the north east coast of Brazil and weather associated with each monsoon
6. Briefly describe Land breeze, Sea breeze, Anabatic and Katabatic wind.
7. Briefly describe following local winds:  
Bora, Harmattan, Mistral, Shamal

#### **Topic: Structure of Depressions**

1. Define Air mass and describe ideal condition for the formation of air mass
2. Describe various types of air mass according to the absolute classification
3. Define front. Briefly describe various types of fronts.
4. Briefly describe the weather associated with Warm and Cold front.
5. Define Frontal depression and with the aid of diagram, briefly describe the life cycle of a frontal depression
6. Briefly describe the weather experienced by a stationary observer on the passage of a frontal depression.

**Topic: Weather services for shipping**

1. Describe the organization, functions and objectives of the World Meteorological Organization
2. Enumerate the sources of meteorological information available to seafarer at sea
3. What is NMC. Outline the organization within the land and sea observing networks.
4. Briefly describe the role and function of a port Meteorological officer
5. Briefly describe the work process and classes of Voluntary observing ships
6. Describe the information flow of observing network and how the meteorological data is promulgated at Meteorological center.
7. Enumerate the content of a standard weather message.
8. Describe the types of information received by facsimile receiver

**Topic: Application of Meteorological Information**

1. Write short notes on following:
  - a. Prognosis Charts
  - b. Synoptic Charts
  - c. Nephanalysis Charts
  - d. Upper air chart
  - e. Extended forecast chart

**Total question: 48**