

## Class-2

# Meteorology

### Topic: The Planetary System of Wind and Pressure

1. With the aid of diagram, describe the wind circulation cells of a rotating earth with homogenous surface.
2. With the aid of diagram briefly describe the global pressure distribution in Northern and Southern hemisphere for the month of January and July
3. With the aid of diagram, describe the characteristics and location of the Doldrums, ITCZ, Trade Winds, Sub tropical oceanic highs, Westerlies and polar Easterlies
4. Define monsoon. Briefly describe SW and NE monsoon of Indian ocean
5. Briefly describe the January and July monsoons of China sea, North Coast of Australia and West Coast of Africa
6. Briefly describe the monsoon type weather in NE coast of Brazil

### Topic: The Weather Associated with the Principal Air Mass Types

1. Define Air mass and source region. Briefly describe the formation process of an air mass
2. Describe the Relative and Absolute classification of air mass.
3. Describe all the air masses under Absolute classification in terms of location and weather associated with individual air mass type.
4. Briefly describe modification of air mass and its effect on weather system of a place.

### Topic: Synoptic and Prognostic Charts and Forecasts from any source

1. Write short notes on following:
  - a. Prognosis Charts
  - b. Synoptic Charts
  - c. Nephanalysis Charts
  - d. Upper air chart
  - e. Extended forecast chart
  - f. Ice chart
2. Evaluates the information given in shipping weather message.

### Topic: The range of information available through Fax transmissions, Internet and Email

1. Lists the information available to the mariner in fax transmissions
2. List the information available to the mariner via internet and email

**Topic: The main types of floating Ice their origins and movements**

1. Define following ice terminology:
  - a. Ice Shelf
  - b. Ice Island
  - c. Tabular Iceberg
  - d. Bergy Bit
  - e. Growler
  - f. Calving
2. Briefly describe the life cycle of an iceberg
3. Briefly describe the route of iceberg in Arctic
4. Briefly describe the route of iceberg in Antarctic
5. Explains the reasons for the decay of icebergs
6. Define: Ice tongue, Ice shelf, Pack ice and Fast ice
7. Briefly describe the life cycle of sea ice (Formation, Growth, Deformation and Disintegration process)
8. Briefly describe the factors affecting the sea ice dynamics
9. Describe the difference between Arctic and Antarctic sea ice

**Topic: The guiding principles relating to the Safety of Navigation in Ice**

1. Enumerate the signs which may indicate the proximity of ice on clear days and nights
2. Enumerate the signs which may indicate clear water within sea ice
3. States the precautions to be taken when navigating near ice
4. Enumerate the general requirements for a ship navigating in areas of sea ice.

**Topic: Conditions Leading to Ice Accretion on Ship's Superstructures, Dangers and the Remedies Available**

1. Describes the factors which may give rise to ice accretion
2. Describe the methods of avoiding or reducing ice accretion
3. Explains the reports to be made under International Conventions when ice is encountered
4. Briefly describe the objective and function of IIP (International Ice Patrol)

**Topic: The Formation, Structure and Weather Associated with The Principal Frontal Systems**

1. Define Front. Briefly describe all types of fronts
2. With the aid of diagram, briefly describe the characteristics and weather associated with the passage of a cold front.
3. With the aid of diagram, briefly describe the characteristics and weather associated with the passage of a warm front.

### **Topic: The Formation of, and Weather Associated with, Frontal and Non-Frontal Depressions**

1. Describe, with the aid of diagrams, the formation, development and decay of frontal depressions
2. Explain the process of the occlusion of a frontal depression
3. Briefly describe warm and cold occlusion
4. With the aid of diagram, briefly describe the Frontogenesis process of a frontal depression
5. With the aid of diagram, briefly describe the Frontolysis process of a frontal depression
6. With the aid of diagrams, briefly describe the weather will be experienced by a stationary observer with the passage of a frontal depression

### **Topic: The Formation and Weather Characteristics of Non- Frontal Weather Systems**

1. With the aid of diagrams, briefly describe four types of non-frontal depression
2. Define anti cyclone. Briefly describe the types of anti-cyclone and weather associated with individual type.
3. Define Trough of low pressure and weather associated with trough of low pressure.
4. Define Ridge of high pressure. Briefly describe the weather associated with Ridge of high pressure
5. Define COL and weather associated with passage of a COL.

### **Topic: Tropical Revolving Storms (TRS)**

1. Enumerate regions and seasons of greatest frequency of TRS
2. Briefly describe the conditions associated with the formation of tropical revolving storms
3. Draw a plan diagram of a TRS showing isobars, wind circulation, path, track, vortex or eye, trough line, dangerous semicircle, dangerous quadrant and navigable semicircle (for northern and southern hemispheres)
4. Briefly describe the signs of an approaching TRS
5. Briefly describe how to ascertain the vessels position relative to the storm's path.
6. Briefly describe the correct action to avoid collision both in Northern and southern hemisphere
7. Briefly describe the Master's obligatory report that is to be sent as per SOLAS when
  - a. Encountering a TRS or in the vicinity of a TRS
  - b. A wind of or above storm force 10 is encountered which has not previously been reported
8. Briefly describe the advantages and disadvantages for a vessel received a TRS warning in following circumstances:
  - a. Vessel in berth
  - b. Vessel at anchorage
  - c. Vessel at high sea

**Topic: Surface water circulation of the ocean and principal adjoining seas**

1. Briefly describe the causes of development of ocean current
2. With the aid of diagram, outline the circulation of major ocean gyres of the world
3. Discuss the generation of following ocean currents:
  - a. Wind drift currents
  - b. Gradient current
  - c. Geostrophic current
4. Briefly describe the formation of upwelling and downwelling current
5. Define Warm and Cold current and briefly describe two of each type.
6. Briefly describe following ocean currents;
  - a. Gulf stream
  - b. Kuroshio current
  - c. Agulhas current
  - d. Labrador current
  - e. Benguela current

**Topic: Voyage Planning Principles with Respect to Weather Conditions and Wave Height**

1. Define Sea wave and swell. Briefly describe the characteristic of wave.
2. Determine the factors affecting wave height and direction.
3. Briefly describe Tsunami and Freak wave
4. What is weather routing. Briefly describe purpose and benefit of weather routing
5. Briefly describe main weather factors to consider during planning weather routing
6. Describe the methods of constructing a least time track
7. Describe the method of constructing vessel's performance curve
8. With the aid of diagrams briefly describe the interpretation and use of the following charts:
  - a. Vector mean chart
  - b. Predominant current chart
  - c. Current rose chart
  - d. Monthly routine chart

**Topic: The Formation of Sea Waves and Swell Waves**

1. Briefly describe the role of wind, wind force, duration and fetch for the development of ocean wave
2. Write short notes on following:
  - a. Wave trochoids
  - b. Wave group
3. Briefly describe the consequence when ocean wave reaches a shallow water.

**Total: 70 questions**