**DIRECTORATE OF MERCHANT SHIPPING**

**GOVERNMENT OF SRI LANKA**

**CERTIFICATE OF COMPETENCY EXAMINATION**

GRADE : CHIEF MATE ON SHIPS OF 500 GT OR MORE (UNLIMITED)

SUBJECT : Meteorology

DATE : 28th February 2024

Time allowed **THREE** hours Total marks : 180

**ANSWER ALL QUESTIONS** Pass marks : 50%

Formulae and all intermediate steps taken in reaching your answer should be clearly shown. You may draw sketches wherever required. Electronic devices capable of storing and retrieving are **NOT** allowed.

1. World is divided in to three climatic zones and each zone is having its inherent type of weather. In relation to torrid zone cyclonic patterns answer following questions.
2. General tendency of the tropical cyclones is to recurve at some stage of the movement of the cyclone. Briefly explain why TRS generally re-curve.

(07 Marks)

1. Weather information of cyclones are important tools for mariner to take early and substantial actions in avoiding tropical cyclone. Briefly explain environmental conditions supports formation of tropical cyclones.

(08 Marks)

1. Affective avoiding actions of tropical cyclones may depend on various factors. Briefly explain general avoiding actions for N/H and S/H for following conditions.
2. If vessel lies in dangerous quadrant,
3. If vessel lies in the path of the TRS
4. If vessel lies in the Navigable semi circle.
5. Marks)
6. Mariner’s knowledge relating to ocean currents will help in many aspects when transiting different areas in different seasons. In relation to ocean currents briefly explain following questions with examples.
	1. Drift Current
	2. Gradient Current
	3. Upwelling current
	4. Warm current
	5. Cold Current
	6. Seasonal Current

(05 Marks each)

1. A busy shipping lane is located in Atlantic Ocean below the New Foundland Island. Vessels en-route from east coast of North America to Europe very often use this route. But during certain times of the year this area is known to have floating ice bergs.
2. Briefly describe why this area is well known for ice bergs. (Your answer must contain the origination of ice bergs, the path and currents involved.)

(10 marks)

1. State the geographical limits of ice bergs in this area.

(05 marks)

1. Banks of New Foundland often have restricted visibility. Briefly explain the causes for the formation of fog in this area.

(05 marks)

1. A master receives an Ice Report (Annex - I) when sailing to New Foundland. As per the Ice Report, state the ice condition prevailing in the position 49°00’N, 052°00’W.

(10 marks)

1. Surface wind is one of the main considerations in voyage planning, with reference to wind answer following.
2. Generally, wind will blow across the isobars and deflected by coriolis force. But in some situations, wind blow parallel to isobars. Explain with suitable sketches the types of wind which blow parallel to isobars.

(15 marks)

1. The general circulation of earth’s atmosphere is modified due to large land masses and surface wind pattern may alter due to various factors. With regards to surface wind explain what is meant by periodical wind and local wind including examples for both categories.
	* 1. marks)
2.
3. Over the earth surface it is noticeable different areas of the world are having different climatic conditions. Explain with suitable sketches why surface temperature varies over the earth surface.

(15 marks)

1. Much of weather related conditions could be explained by evaluating atmospheric stability conditions at the local geographical area. In relation to atmospheric stability briefly explain Stable, Unstable and Conditional atmospheric stability with suitable sketches.

(15 marks)

1. In mid-latitude navigation, mariners should have substantial knowledge of weather associated in mid- latitudes. Frontal and frontal depressions greatly vary by its characteristics compared to tropical cyclones. Answer the following questions in relating to fronts and frontal depressions:
2. Briefly explain properties of air masses and factors effecting properties of an air mass.
	* 1. marks)
3. Briefly explain Cold front, Warm front and weather associated with each condition with suitable sketches including symbols used in weather map for each condition.

(15 marks)

**Annex - I**



