



**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 : 21st February 2019

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.

- a. 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)

- b. 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)

2.

- a. 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.

(15 marks)

- b. 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)

3. 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.
- Drift Current
 - Gradient Current
 - Upwelling current
 - Warm current
 - Cold Current
 - Seasonal Current

(05 marks each)

4. In mid-latitude navigating 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 following questions in relating to fronts and frontal depressions.
- Briefly explain properties of air masses and factors effecting properties of an air mass.

(15 marks)

- 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)

5. Tropical cyclones in different regions of the world been addressed by different names. But formation and general movement of Tropical cyclones have no significant variations although different names being given. With respect to Tropical cyclones answer following questions.

- Briefly describe conditions of formation of tropical cyclones.

(07 marks)

- Briefly explain indication of approaching of tropical cyclone including method of ascertaining vessel's position with regard to the position of TRS.

(08 marks)

- Explain in detail with suitable sketches general avoiding actions in Northern hemisphere if the vessel is in Navigable semicircle and Dangerous semicircle respectively.

(15 marks)

6. Weather routing being used in merchant ships to obtain least time track and optimum route. With regards to weather routing answer following questions.

a. What are the main factors to be considered in order to obtain optimum weather routing for a particular vessel during transit of a particular area.

(15 marks)

b. What are the main weather charts vessels should consider when weather routing and explain how to obtain suitable route according to the given weather maps (refer below two maps) for a General deck cargo vessel with actual displacement 34000MT, GM 0.95m, Mean draft: 7.56m, propeller immersion 78% and loaded with general cargo on deck and under deck, vessel's departure port is Vancouver BC and the port of arrival is Yokohama.

(15 marks)



