



**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 : 08.08.2019

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Time allowed **THREE** hours Total marks : 180  
**ANSWER ALL QUESTIONS** Pass marks : 50%

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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.

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- 1) Answer the following questions with regard to TRS:
- a) Explain the formation of a Tropical Revolving Storm (TRS) including the conditions required for formation. (10 marks)
  - b) Briefly describe what “Easterly Wave” is. (05 marks)
  - c) In the vicinity of a TRS in Northern Hemisphere a vessel doing 15 kts observes following weather conditions:  
Barometric pressure – Falling / 5mb below the standard pressure for the month.  
Wind- Force 6 and increasing / Changing directions from NNE , NE and then E’ly in the last two hours.
    - i. Find the location of the vessel in relation to the TRS. (15 marks)
    - ii. State the actions required to take to avoid the most destructive parts of the TRS. (05 marks)

After several hours of observation the wind direction became steady and barometric pressure continued to fall.

    - iii. Analyse the reasons for this change of weather and state whether you would consider any change in the avoiding action to avoid the vessel getting closer to the centre of the TRS. (10 marks)

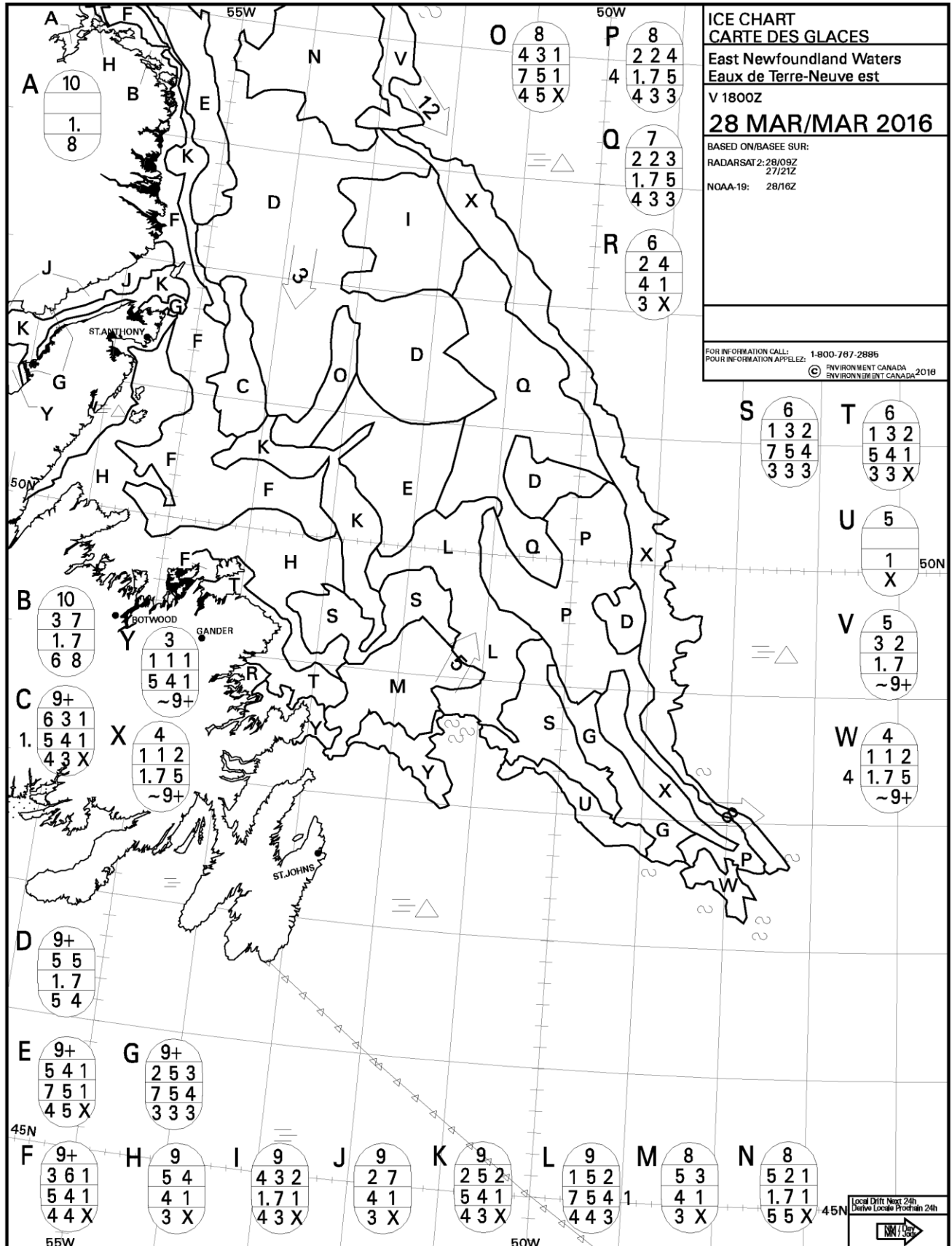
- 2) A busy shipping lane is located in Atlantic Ocean below the New Foundland Island. Vessels en-route from east coast of North America to Europe very often use this route. But during certain times of the year this area is known to have floating ice bergs.
- Briefly describe why this area is well known for ice bergs. (Your answer must contain the origination of ice bergs, the path and currents involved.) (10 marks)
  - State the geographical limits of ice bergs in this area. (05 marks)
  - Banks of New Foundland often have restricted visibility. Briefly explain the causes for the formation of fog in this area. (05 marks)
  - 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  $49^{\circ}00'N$ ,  $052^{\circ}00'W$ . (15 marks)
- 3) Answer the following questions with regard to ocean currents:
- Explain the reasons for formation of Equatorial and Equatorial Counter currents. (05 marks)
  - Why in the areas of Aghulas current near South Africa are known to produce hazardous Rogue Waves? (05 marks)
  - Mark all prominent currents for Pacific Ocean in the given map. Also state whether they are cold or warm currents. (15 marks)
- 4) 500mb chart is often used by meteorologists for prediction of surface weather patterns.
- Using a sketch briefly describe:
    - “Ridge” and a “Trough” (06 marks)
    - “long wave” and a “short wave”. (06 marks)
  - State the importance of 5640m height contour. (03 marks)
  - Explain the effect of ridges and troughs in the 500mb chart on the “Low” and the “High” on the surface. (10 marks)

- 5) Answer the following questions with regard to ship's weather routine:
- a) Lists the benefits of shore based weather routine for ships. (06 marks)
  - b) briefly explain following tracks:
    - i. Least time
    - ii. Least time and least damage
    - iii. Least damage(04 marks each)
  - c) With a suitable sketch explain how a least time track is constructed. (07 marks)
- 6) Answer the following questions with regard to weather on during the passage:
- a) Briefly describe the difference between an Analysis weather chart and a Prognosis weather chart. (05 marks)
  - b) State the sources available to the Master to obtain en route weather. (05 marks)
  - c) A vessel at a position (50°00'N, 000°00' W) will proceed along the 40<sup>th</sup>North parallel on a course of 270°(T) to a position of 50°00'N , 010°00' W. Then on a Southerly course to 40°00'N , 030°00' W. List down the current weather at following points/areas using the attached surface analysis chart (Annex – III):
    - i. Departure point
    - ii. Between 00°00'W to 010°00' W along the 40<sup>th</sup>North parallel.
    - iii. 40°00'N , 030°00' W(15 marks)

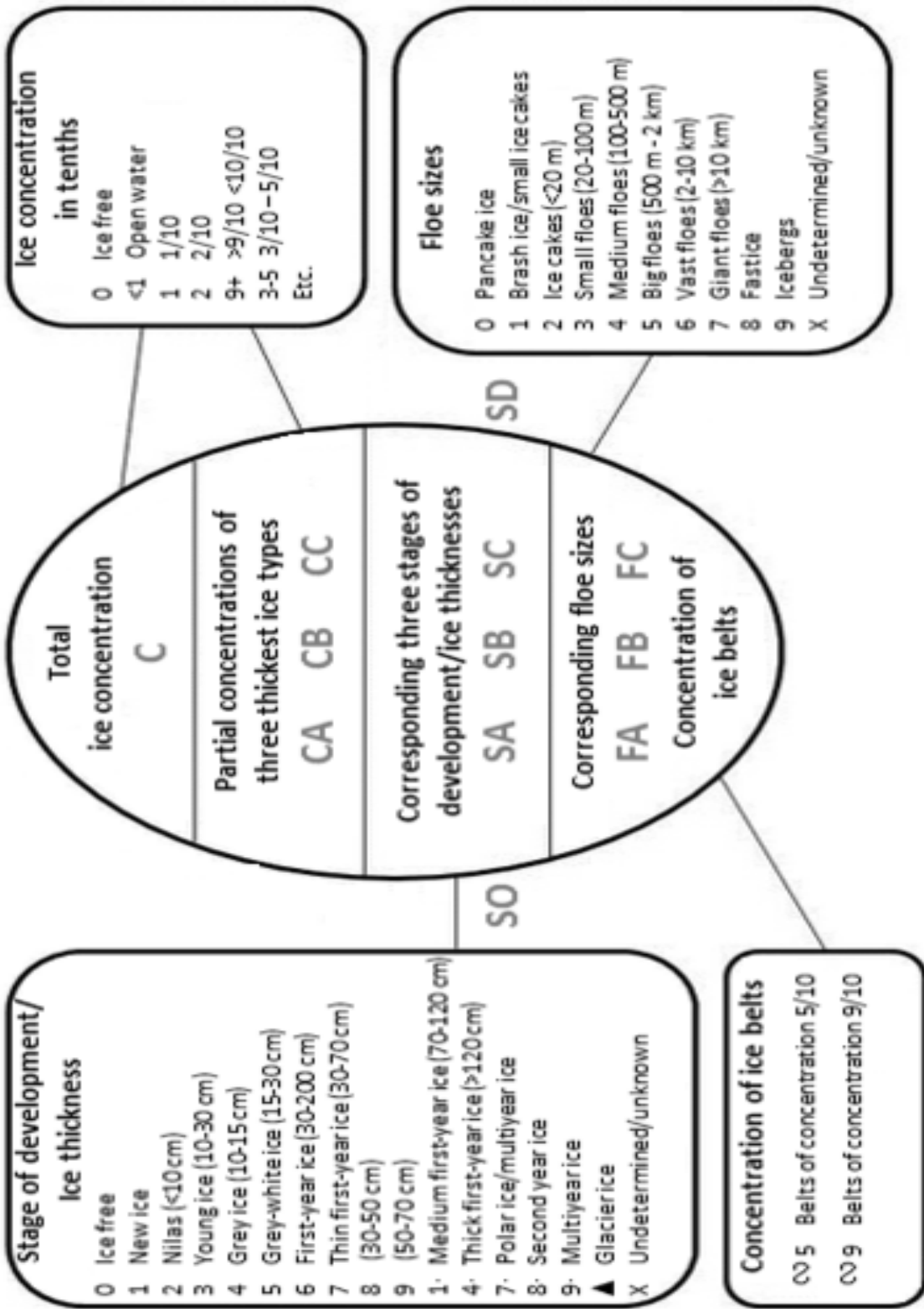
Your answer shall contain information on following as much as practicable:

- Wind direction and speed
- Temperature variation
- Clouds and cloud cover
- Precipitation

**ANNEX - I**



EGG Code

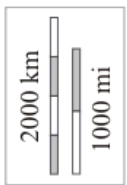
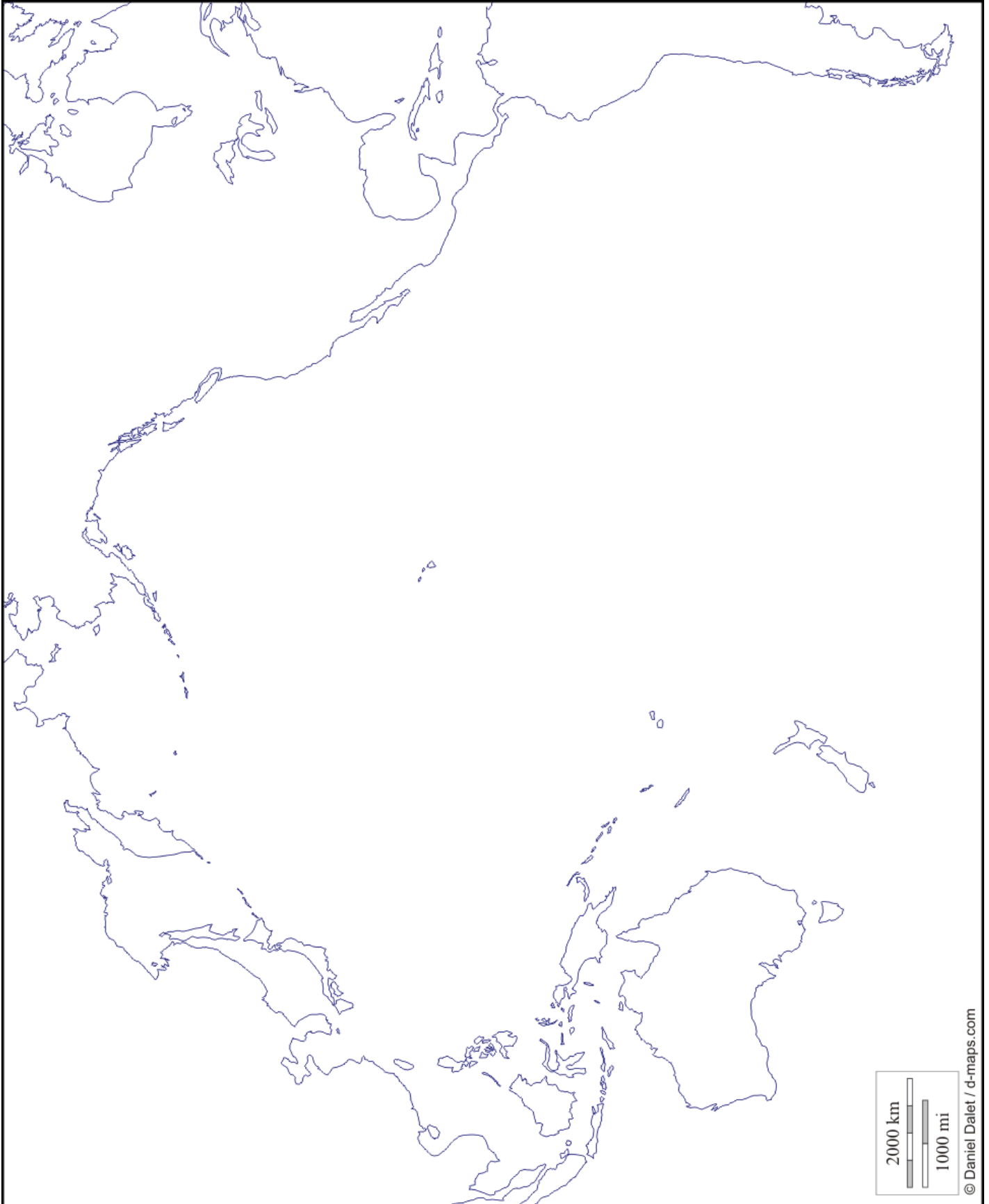


The ice egg may be supplemented by 2 figures:

**SO** Sporadic (<1/10 concentration) occurrences of ice, thicker than indicated inside the egg, may be indicated here.

**SO** When all partial ice concentrations inside the egg total considerably less than the total ice concentration **C**, the stage of development of the predominant of the remaining thinner ice types may be indicated here.

**ANNEX - II**



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ANNEX - III

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