INDIAN MARITIME UNIVERSITY

Time Bound Assignment September/October 2020

DNS Arrear Examinations

NAVIGATION – I: TERRESTRIAL & CELESTIAL
UD11T4104

Date: 24/09/2020 Maximum Marks: 70
Time: 3 Hrs Pass Marks: 35

Note: Use of Non-programmable type Scientific Calculator is allowed. Draw Sketches wherever required. Dev card is given at the end of question paper. In the absence of chart, do the plotting in the answer sheet using scale and pencil as directed in the question.

Section A: TERRESTRIAL & CELESTIAL NAVIGATION

Note: Q. No. 1 & 2 are compulsory. Answer any 2 out of remaining 3

1. Define following (1 x 5 marks)
   (a) Great circle (b) Nautical mile (c) Meridional parts
   (d) Prime Meridian (e) Dead Reckoning Position

2. (a) Describe Mercator Projection and with a diagram show rhumb lines course and great circles course a on Mercator Chart.
   (b) Find the course and distance between A Lat 70° 12'N Long 010° 12' W and B Lat 52° 52'N Long 009° 42' E, by Mercator sailing.
   (Given MP of Lat 70°= 5979.12; MP of Lat 52°52'= MP=3731.81)
   (3+7 Marks)

3. (a) Convert compass course 293° C to true course, if Var 3°W, Dev, as per card attached.
   (b) Convert True course 290° T to compass course, if Var 7°W Dev, as per card attached.
   (c) What are the corrections that have to be applied to the observed altitude measured of Sun during celestial observation to get the true altitude of the Sun. Put the corrections in sequence with the sign (+ or -) and the conditions when to be added or subtracted. (2+2+6 Marks)

4. On 14th Oct at noon, a ship in Posn 14°44' N 124° 49'E, set courses as follows:-

	Time	Gyro Course	Gyro Error	Leeway	Wind	Log
	1200	092°	2° L	3°	S	0
A/Co	2300	118°	1° L	2°	NE	158
A/Co	0600	134°	1° L	2°	NE	262
A/Co	1200	084°	Nil	2°	S	338

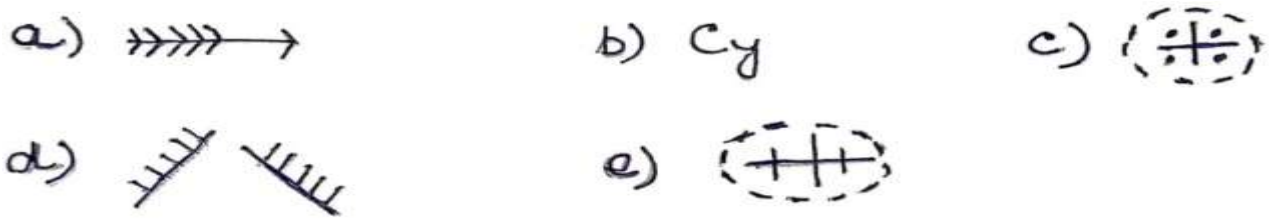
During the above period the ship experienced a current setting 330° T at 1.5 Knot. Find estimated position next noon. (10 Marks)

5. (a) With a labelled diagram explain the apparent orbit of the Sun around the Earth.
   (b) Find the course and distance between A Lat 36° 02.5′ N Long 075° 32.8′ E and B Lat 39° 57′N Long 079° 42′ E, by plane sailing. (2 x 5 Marks)

Section B: CHART WORK

Note: Q. No. 6 is compulsory and carries 5 marks. Attempt any 3 out of the remaining four, they carry 10 marks each.

6. Identify the following Symbols and Abbreviations (1 x 5 = 5 Marks)



7. Write Short Notes (2 x 5 = 10 Marks)
   a. Small scale chart b. Transit bearing c. Deviation on compass
   d. Observed Position e. Chart catalogue

8. In the diagram below explain how will you do the following plotting? (Draw bearing as close as possible to the given bearing. Take1 nm = 1 cm as scale for distance. Draw the light houses on your answer sheet as shown in the diagram 5cms apart and answer the question)

   a) At 0600 hrs Lt. Ho. **X** bore 000° T and distance 2.5 nm. Plot the position of the ship and mark as A. Explain the procedure.
   b) From this position A, draw and explain how will you plot a course to pass Lt Ho. **Y** 3.5 nm on the port beam? (5+5=10 Marks)

9. In the diagram below explain how will you do the following plotting? (Draw bearing as close as possible to the given bearing. Take1 nm = 1 cm as scale for distance. Draw the light houses on your answer sheet as shown in the diagram 4cms apart and answer the question)

a) At 0700 hrs, from a ship Lt. Ho. **M** and Lt. Ho. **N** were in transit when the brg was 092° C. How will you find the compass error and the deviation on the compass if the Var was 4.5° W.
b) If the distance from Lt. Ho. **M** at the same time was 2.5nm, find the position of the ship. (5+5= 10Marks)

10. From a ship on a course at a given speed observes two bearings not at the same time but after a duration of time, how will the position of the ship be obtained using the two bearings at two different times? Explain with an example and a diagram. (10 Marks)

xxxxx------xxxxx

Dev card for Q. No 3 a) & b)

Ship's head by compass	Deviation
290° C	3° E
300° C	5° E
310° C	7° E