

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

June 2017 End Semester Examinations
B. Sc (Nautical Science – First Semester

Terrestrial Navigation – UG21T 3106)
(AY 2016 - 17 batch onwards)

Date: 10.06.2017

Maximum Marks : 70

Time: 3 Hrs

Pass Marks : 35

Use of Norie's Tables & Non-programmable type Scientific Calculator are allowed in the Exam Hall.

Exam Centres are to supply 'World map' (A4 size) to candidates.

Note: Q No 1 is compulsory and carries 10 marks. Attempt any six out of remaining eight, they carry 10 marks each.

1. (a) Define with diagram: Deviation, Great circle. (4 Marks)

(b) Indicate the following on the world map :- (6 Marks)

English Channel, Port Rotterdam, Cook strait, Gulf of Aden, Gulf of California, Strait of Gibraltar.

2. (a) Define Natural scale. Find the natural scale of a Mercator chart in Latitude 50° N if the Longitude scale is $12 \text{ cm} = 1^{\circ}$ of Longitude. (5 Marks)

(b) A ship in position $12^{\circ} 25' \text{ N } 072^{\circ} 40' \text{ E}$ steered 260° and covered a distance of 300'. Find her final position? (5 Marks)

3. On 12 June 2016 at 1200 h , a ship in position $07^{\circ} 42' \text{ N } 125^{\circ} 43' \text{ W}$ Steered the following courses at constant speed 12 Kn:-

	Date	Time	Co(Gyro)	Leeway	Wind
	12	1200	125°	2°	S
a/c	12	2200	212°	3°	E
a/c	13	0600	342°	4°	W
	13	1200			

Gyro error was 1° low. Find the position at noon on 13 June 16. The current was 050° (T) at 2 kn throughout.(a/c means altered course) (10 Marks)

4. A ship at position $17^{\circ} \text{ N } 042^{\circ} \text{ E}$ had to arrive at $52^{\circ} \text{ N } 172^{\circ} \text{ E}$ on a great circle track. However the limiting latitude was 60° N . Draw a suitable composite track & find the distance run. (10 Marks)

5. (a) A ship in position $24^{\circ} 43' S$ $178^{\circ} 15' W$, steered along the parallel of latitude westward & covered 400'. What was her final position?
(5 Marks)
- (b) Construct a chart based on Mercator projection, between $65^{\circ} S$ $020^{\circ} W$ to $68^{\circ} S$ $023^{\circ} W$. Use 1° of longitude = 30 mm. (5 Marks)
6. A ship at position $47^{\circ} 18' S$ $133^{\circ} 12' W$ on a great circle track arrived at $31^{\circ} 31' N$ $148^{\circ} 13' E$. Find the initial course, distance run & final course.
(10 Marks)
7. (a) A ship sailed from position $01^{\circ} 45' N$ $177^{\circ} 40' E$ on a rhumb line track & arrived at position $03^{\circ} 15' S$ $177^{\circ} 20' W$. Find the course steered & distance covered?
(5 Marks)
- (b) A ship at position $13^{\circ} 35' N$ $105^{\circ} 40' E$ steered 222° on a rhumb line track and covered a distance of 2500'. Find the final position.
(5 Marks)
8. (a) Define : Compass error, Isogonic lines (3 Marks)
- (b) Find the true course if the compass course is $126^{\circ}(C)$ & variation is $3^{\circ} W$. Also find the true bearing if the compass bearing of a lighthouse is $333^{\circ}(C)$ when ship is on a compass course $126^{\circ}(C)$ (Deviation as per table below:) (4 Marks)
- (c) Find the compass course if the true course is $124^{\circ} (T)$ & variation is $2^{\circ} W$. (3 Marks)
- Use the following deviation table for both the parts (b) & (c):
- | | | | | |
|-----------------|---------------|---------------|---------------|---------------|
| Ship's head (C) | 110° | 120° | 130° | 140° |
| Deviation | $6^{\circ} E$ | $3^{\circ} E$ | $1^{\circ} W$ | $5^{\circ} W$ |
9. (a) What is the relationship between latitude scale & longitude scale ?
Find the latitude scale of a Mercator chart in Lat $40^{\circ} S$ if the Longitude scale is 18 cm = 1° of Longitude (4 Marks)
- (b) A ship at position $31^{\circ} 35' S$ $122^{\circ} 20' W$ on a rhumb line track arrived at $13^{\circ} 22' N$ $125^{\circ} 40' E$. Find the course steered and distance run.
(6 Marks)
