

(Or, at the Examiner's discretion, as an alternative to Question 1) :

On 10th August, 1929, at 18 h. 10 m. New Zealand mean time, at ship in approximate position lat.  $47^{\circ}$  S., long.  $171^{\circ}$  E., the observed altitude of the star Achernar was  $17^{\circ} 2'$ . Height of eye, 28 ft. Index error,  $2'4$  to add. After steering west (true) for 12 miles, Nuggets Pt. Lt. was sighted bearing N.  $40^{\circ}$  W. (true).

Required—The position of the ship when the light was sighted.

2. On 10th March, 1929, at 04 h. 15 m., New Zealand mean time, at ship in lat.  $45^{\circ} 0'$  S., long.  $171^{\circ} 50'$  E., the star Altair bore by compass E.N.E.

Required—The true azimuth and error of the compass by time azimuth tables; and, supposing the variation to be  $19^{\circ}$  E., find the deviation of the compass for the direction of the ship's head at the time.

### 3. CHART.

Time allowed: Three hours.

1. Deviation card 12: In a vessel steaming towards Cape Brett Lt. Ho. steering by compass N.  $30^{\circ}$  W. at 9 knots, Henry Island bore by compass S.  $22^{\circ}$  W. and Home point extreme bore S.  $75^{\circ}$  W. by compass.

State the position of the vessel, and the distance from Home Point.

2. From the position as found in question 1, set course to reach a position with Coal Point bearing  $310^{\circ}$  4 miles distant, maintaining a distance of 1 mile off Cape Brett Lt. Ho. and 2 miles off the outer end of the eastern island of the Cavalli Group. On the last course allow for a current which set  $340^{\circ}$  (N.  $34^{\circ}5$  W. mag.) at the rate of 2.5 knots.

Required—The compass courses steered and the distance made good on each course, and the distance that the log should show when in final position supposing it to have been set at the position off Home Point.

3. When steering on the second compass course Ngakotu Raranui Pt. bore by compass S.  $6^{\circ}$  W., and after continuing on the same course for 4 miles the south end of Cavalli Is. bore by compass S.  $58^{\circ}$  W. Assuming that the vessel has made good her course and distance between the bearings, state the position of the vessel and the distance from the south end of Cavalli Is. at the time of taking the second bearing.

4. The following horizontal sextant angles were taken to determine the position of the ship: Between G and D,  $42^{\circ} 20'$ ; between D and F,  $37^{\circ} 40'$ .

Required—The position of the ship by station pointer.

5. Arriving off Manukau Bar at 14 h. 00 m. New Zealand mean time on 16th September, 1929, state the depth of water you would expect to find on the bar if the soundings on the chart showed  $3\frac{1}{2}$  fathoms.

6. Chart 695: Find approximately (without the use of Admiralty or other tide-tables) the time of high water on the afternoon of 14th June, 1929, off Stephens Island, and state also the direction of the tidal stream at 10 h. 00 m. on that day.

### 4. ENGLISH.

Time allowed: One hour and a half.

Describe fully the survey which a vessel undergoes each year.

## SPECIMEN SET OF EXAMINATION-PAPERS FOR SECOND MATE, FOREIGN-GOING.

### KNOWLEDGE OF PRINCIPLES.

Paper 1 (3 hours).

- Given  $\log 3 = 0.477121$  and  $\log 7 = 0.845098$  find, without reference to the logarithm tables, the log of 441.
- Find the volume of steel in a hollow cylinder 14 inches long, the internal and external diameters being 3 inches and  $3\frac{1}{2}$  inches respectively.
- Explain clearly what is meant by the Obliquity of the Ecliptic, and supposing the Right Ascension of the Apparent Sun to be  $09^{\text{h}}. 53^{\text{m}}. 26^{\text{s}}$ , what would be its Declination?
- In the above question explain how you could determine the value of R, given in the Nautical Almanac, from the data therein given.