

B.Sc. (NAUTICAL SCIENCE)**Term-End Examination****June, 2010****BNA-021 : NAVIGATION III**

Time : 3 hours

Maximum Marks : 70

Note : All questions are compulsory. Use of Non-programmable Scientific calculator is allowed. Use B.A. Chart 2675 (English channel) tidal graph and Luminous range diagram to be provided by exam centre.

1. (a) Explain *any two* of the following : 5
- (i) Superior conjunction
 - (ii) Opposition
 - (iii) Eccentricity of Earth's orbit
- (b) A ship was in position $06^{\circ}10'N$, $084^{\circ}59'E$ on 23rd August 1992 and was keeping Indian Standard Time (IST). Find the time sunset and sunrise would have taken place on this day on this ship. 5
2. On 22nd Sept. 1992, PM on a ship in DR $48^{\circ}20'N$. 10
 $085^{\circ}40'E$, the sextant altitude of the Sun's UL was $20^{\circ}14.8'$ when chronometer showed $10^h03^m20^s$ (error 6m 18s slow). If I E was 2.2' on the arc and HE was 25m, find the direction of P-L and show by a rough sketch how it will be drawn on chart. (Use Intercept Method).

3. (a) On 14th Sept. 1992 on a ship in DR longitude $116^{\circ}27'W$, the sextant meridian altitude of the sun's UL north of the observer was $70^{\circ}29.8'$. If IE was 3.2' off the arc and HE was 12 m. Find the direction of PL and position through which to draw. 7
- (b) State and explain any two methods you can use to find gyro compass error during daytime. 5
4. (a) At 0600 hrs on a vessel steering $245^{\circ}C$, Royal Sovereign Light vessel bore $028^{\circ}C$ and Beachy Head light bore $328^{\circ}C$. Find ship's position. [VAR : $6^{\circ}W$ Dev : $2^{\circ}W$]. 3
- (b) From 0600 hrs position find Gyro course to steer to pass casquets Lt. Ho. 9 NM off counteracting a current setting $274^{\circ}T$ at 2.5kts. Wind North leeway 4° . [GE $2^{\circ}H$, ship's spd 15 kts). Also find course and speed made good. 5
- (c) Find the time and distance off when Alderney Lt. Ho. will be a beam. 2
5. (a) On board a ship at 0800 hrs following compass bearings were observed : 5
- Needles Point Lt. Ho $319^{\circ}C$
 St. Catherine Lt. Ho. $359^{\circ}C$
 Nab Tower Lt. Ho. $050^{\circ}C$
 Find ship's position and compass error.

- (b) From 0800 hrs position find compass course 5
to steer to raise Bill of Portland light house 30°
on stbd bow. [Ht of Bill of Portland Lt. Ho. :
35 m, HE : 24 m, VAR : 3°W, Dev : 2°E].

6. A ship having draft of 15 metres had to pass under 8
a bridge (charted height : 45 m) in Mumbai on
16/4/1992 after 0800 hrs till noon.

Find the time range she could do so keeping
clearance of 0.5 m between mast and bridge.
[Height from keel to mast : 62 m] Extract from
A.T.T.

ZT : -0530		16/4/1992	
Time	Ht. (m)	MHWS : 4.7 m	
0053	4.5		
0729	0.0		
1316	4.7		
1945	0.3		

7. (a) Explain the use of clearing marks. 4
(b) Explain the use of cumulative Notices to 2
mariners.
(c) Explain the term E C D I S. 4