

B.Sc. (NAUTICAL SCIENCE)**Term-End Examination****December, 2015****BNA-024 : SHIP OPERATIONS***Time : 2 hours**Maximum Marks : 70*

Note : Questions no. 1 and 2 are **compulsory**. Attempt any **five** questions from the remaining. *M.V. Hindship tables and non-programmable scientific calculator are allowed.*

1. M.V. Hindship is at Mumbai in Condition No. 4. A consignment of cargo weighing 500 tonnes is shifted from No. 3 cargo hold to the upper deck KG : 13.28 m. Find the final GM_s and GM_f . 10

2. A ship of displacement 16000 tonnes, KM : 9.0 m, KG : 8.0 m is listed 7° to starboard. It then works cargo as follows :
 - (a) Loads 1600 tonnes cargo KG 4.5 m, 5.0 m to Port.
 - (b) Loads 1400 tonnes cargo KG 8.0 m, 4.5 m to Starboard.
 - (c) Discharges 1000 tonnes KG 6.5 m, 1.0 m from Starboard.

Find how many tonnes of ballast water must be transferred transversely to upright the vessel, if P & S tank centres are 10 m apart. 10

3. Explain what is meant by hogging and sagging. Describe the loading conditions which may give rise to hogging and sagging. 10
4. Define the following with sketches : 5×2=10
- (a) Rake of Stem
 - (b) Sheer Strake
 - (c) Aft Sheer
 - (d) Entrance
 - (e) Tumblehome
5. Draw the sketch of a typical forecastle deck with mooring and anchoring arrangements, showing leads of moorings. Label at least ten items. 10
6. (a) State the criteria under which oily water from slop tank of an oil tanker may be discharged into the sea.
- (b) Write down the special areas as per Annex V of MARPOL 73/78. 2×5=10
7. Sketch and describe the following : 2×5=10
- (a) Sounding Pipe
 - (b) Air Pipe

8. (a) What flags are required to be hoisted when a vessel is requiring a pilot and when the pilot has come on board ? 2
- (b) State the functions of the following in an Engine Room of a ship : 2×4=8
- (i) Purifiers
 - (ii) Air Compressor
 - (iii) Air Bottles
 - (iv) Oily Bilge Water Separator
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