B.Tech. Degree V Semester Examination in Marine Engineering December 2012

MRE 507 NAVAL ARCHITECTURE I

Time : 3 Hours

Maximum Marks : 100

(5 x 20 = 100)

I.   (a)   Describe the various features of general cargo ships, container ships, bulk carriers and tankers.

     (b)   Which is the enforcement agency in India to implement provisions of MS Act and Rules? Describe its mechanism.

OR

II.   (a)   Describe the types and purposes of offshore supply/support vessels.

     (b)   What are the roles and functions of ships classification societies?

III.   (a)   A waterplane of a ship has the following offsets at equally spaced stations:

Station	0	1	2	3	4	5	6
½ ordinate [m]	0.1	4.6	7.5	7.6	5.9	3.7	0

The waterplane is 120m long. Calculate the water plane area and TPC.

     (b)   A hold of a ship has 21m length. The cross sectional areas of the hold at equal intervals between transverse bulkheads are as follows: $800m^2$, $960m^2$, $1100m^2$ and $1120m^2$. The end values correspond to bulkhead positions. How many tones of coal at a stowage rate of $4m^3$ per tonne can go into the hold?

OR

IV.   (a)   Explain with neat sketches block coefficient, prismatic coefficient, midship section coefficient and water plane area coefficient. Calculate these coefficients for a rectangular box shaped barge.

     (b)   A ship has water plane areas (WPA) at different drafts as follows:

Draft [m]	0	1	2	3	4
WPA [m²]	650	660	662	661	660

Find the displacement of the vessel at 4m draft in salt water and the vertical position of its centre of buoyancy.

V.   (a)   A ship of 6000t has KG = 6m and KM = 7.33m. The following cargo is added: 1000t at KG = 2.5m, 500t at KG = 3.5m and 750t at KG = 9m. The following cargo is unloaded: 450t at KG = 0.6m and 800t at KG = 3m. Find final GM at the end of operations.

     (b)   Explain frictional resistance and residuary resistance. What constitute the total resistance of ships?

OR

VI.   (a)   Explain admiralty coefficient and fuel coefficient. How they are useful?

     (b)   A box shaped vessel 75m long has 12m breadth and 7m depth. It floats on an even keel of 6m. Calculate KM.

VII. (a) Define with the help of a neat sketch the trim of a vessel.   How   do you calculate MCT $_{1cm}$?

(b) A box shaped vessel is of 50m long, 10m wide, 7m depth and 4m draft. Calculate the floodable length at midship.

OR

VIII. (a) Explain floodable length, factor of subdivision, 1 compartment standard and 2 compartment standard. Briefly compare the subdivision standards of a passenger vessel and cargo ship.

(b) A box shaped vessel 40m x 6m x 3m is floating in salt water on an even keel draft of 2m. A weight of 35 tonnes is discharged from a position 6m from forward. MCT 1cm is 8.5 t-m. Find the new drafts.

IX.   Write short notes on *any five:*

(a) Tchebycheff's rule

(b) MARPOL regulations

(c) Dynamic positioning

(d) Statutory certificates

(e) Lines plan

(f) Free surface effect

(g) Inclining experiment

(h) Froude's law of comparison

***