一. Terminology Explanation：(每小題 4 分，共 20 分)

(1) Block Coefficient C_B (方塊係數) and Prismatic Coefficient C_P (菱形係數)

(2) Initial Metacentric Height (初始定傾高度)

(3) Effect of Free Surface of Liquids (自由表面效應)

(4) Roll Period (橫搖週期)

(5) Damage Stability (破損穩度)

二. A ship's waterplane is 150m long. The **half-ordinates** commencing from afterward (station 0) are as follows:

station i	0	0.5	1	2	3	4	5	6	7	8	9	9.5	10
ordinate y_i (m)	0.000	5.400	8.288	9.375	9.656	9.694	9.713	9.666	9.563	8.813	6.656	2.869	0.000

The interval between the **first three** and the **last three** ordinates is **half** of that between the other ordinates. Use Simpson's rule to calculate the area of the waterplane (A_w), the position of the center of flotation (***LCF***) and the transverse moment of inertia (I_T) of the waterplane. (25 分)

三. A vessel is loaded up ready for departure. ***KM*** is 11.9 m. ***KG*** is 9.52 m with a displacement of 20550 tonnes. From the ship's Cross Curves of Stability, the **assumed** *GZ* ordinates for a displacement of 20550 tonnes with an **assumed** ***VCG*** = 0m above the baseline are as follows:

Angle of heel (θ°)	0	15	30	45	60	75	90
GZ ordinate (m)	0	3.17	6.22	8.26	9.14	8.98	8.36

Using this information, construct the ship's **statical stability curve** for this condition of loading and determine the following:

(a) The maximum righting lever *GZ*.

(b) The angle of heel at which this maximum *GZ* occurs.

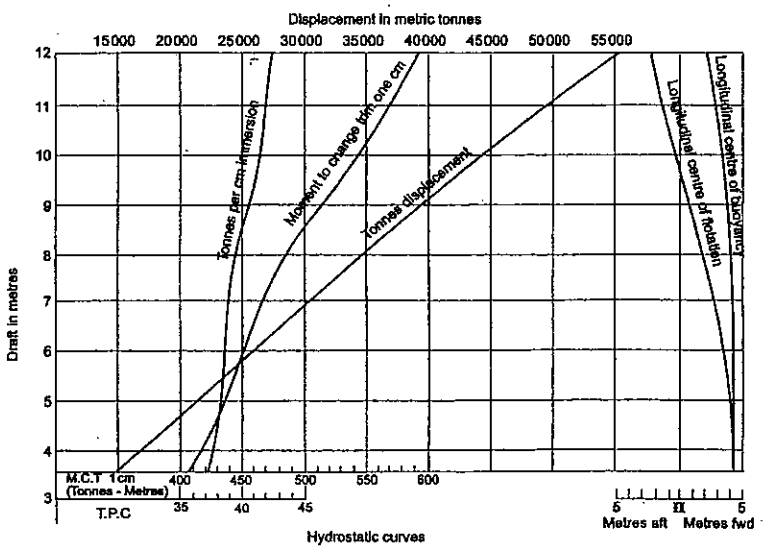
(c) The initial metacentric height.

(d) The range of stability.

(e) Dynamical Stability up to 90 degrees heel. (25分)

四. A ship of 10000 tonnes displacement is floating in dock water of density 1.024 t/m^3, and is carrying oil of relative density 0.84 in a doublebottom tank. The tank is 25 m long, 15 m wide, and is divided at the centre line. Find the virtual loss of GM due to this tank being **slack**. (10 分)

五. A Tanker is 200 m long and has hydrostatic curves shown below. If the displacement under a loading condition is 40000 tonnes. Find the new drafts if the 250 tonnes of bunkers (already loaded on board) is now shifted 50 m forward. (20 分)



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