

GANPAT UNIVERSITY

B. Tech. Semester: V (Marine Engineering)

CBCS (NEW) Regular Theory Examination November – December 2015

2MR503 Naval Architecture I

Time: 3 Hours

Total Marks: 70

- Instruction:**
- (1) Attempt all Questions.
 - (2) Assume suitable data if necessary.
 - (3) Figure to right indicates full Marks.
 - (4) Question: 3 in Section 1 and Question 6 in section 2 are compulsory
 - (5) Start new Questions on New Page.
 - (6) Use Hydrostatic particular for Ship "A" where needed.

Section – I

Que.-1) A ship 120 m long and 9100 tonne displacement floats at a even keel draught of 6.50 m in fresh water of 1.000 t/m^3 . MCTC 130 tonne m. TPC in sea water 16.5 , LCB 2.30 m forward of the midships LCF 0.6 m aft of midships. Calculate the new draughts if the vessel moves into sea water of 1.024 t/m^3 without change in displacement? 12

OR

Que.-1) Explain free surface effect? What is affected due to F.S.E and in what way? Steps to be taken to Avoid F.S.E? Explain how angle of loll will be tackled by example with drawing? 12

Que.-2) Give the precautions for dry-docking the vessel from the point of view of stability of ship Explain "P" force and when the effect of the P force on the ship is maximum and minimum, give the formula for P force Calculation ? 11

OR

Que.-2) Displacement 5600 t, GM 0.5 m Initial Draughts F: 3.20 m A: 4.40 m MCTC 140 LCF 64 m Foap The KM for the initial true mean draught is 8.20 m and for the true mean draught at the time of Critical instant is 8.28 m. Calculate the effective GM at the critical instant. 11

Que.-3) ship "A" Floating on an even keel draught of 8.00 m in salt water, LBP – 140.0 m the following

Cargo is now worked:

Loaded 1600 tons at position Lcg 110.0 m Foap

Loaded 2000 tons at position Lcg 40.0 m Foap

Discharged 1550 tons at position Lcg 80.0 m Foap

Calculate final draughts in salt water at completion of cargo

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Section – II

Que.-4) Define following

- | | |
|--------------------------|-------------------------|
| a) Laws of floatation | d) Reserve buoyancy |
| b) Fresh water allowance | e) Coefficient of Forms |
| c) Inclining experiment | f) Angle of Loll |

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OR

Que.-4) Define following

- | | |
|----------------------------|---|
| a) Rightening lever | d) Dock water allowance |
| b) Floodable length curves | e) Effect of Adding and removing Masses |
| c) Wetted surface area | f) Free surface effect |

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Que.-5) Light Displacement: 5000t, KG 8.20m Summer Displacement: 18500t. The vessel is

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loaded as follows:

9100 t cargo KG 8.40 m

1870 t cargo KG 7.80 m

1100 t cargo KG 9.22 m

195 t fuel KG 5.90 m, free surface moment caused 1800 tm, Investigate the effect of filling the double bottom tanks, Kg 0.5m with ballast which brings the vessel to load displacement.

OR

Que.-5) Displacement 20000 tons, LBP 170m, KM 9.30 m, KG 7.82 m, MCTC 290, TPC 50

Draughts F: 9.25 m A: 10.25 m LCF 85 m Foap

Calculate a) the GM at the instant the vessel takes blocks fore and aft?

b) the draughts fore and aft at the same instant.

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Que.-6) A 6m model of a ship has a wetted surface area of 7m^2 , and when towed in fresh water at 3 knots, has a total resistance of 35 N. Calculate the effective power of the ship, 120 m long,

at its corresponding speed. $n = 1.825$; f from formula: $\text{SCF} = 1.15$.

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WORKSHEET Q.
(This Worksheet must be returned with your answer book)
HYDROSTATIC PARTICULARS 'A'

DRAUGHT m	DISPLACEMENT t		TPC t		MCTC tm		KM _T m	KB m	LCB foap m	LCF foap m
	SW RD 1.025	FW RD 1.000	SW RD 1.025	FW RD 1.000	SW RD 1.025	FW RD 1.000				
	7.00	14576	14220	23.13	22.57	184.6				
6.90	14345	13996	23.06	22.50	183.0	178.5	8.35	3.58	70.08	67.46
6.80	14115	13771	22.99	22.43	181.4	177.0	8.36	3.53	70.12	67.57
6.70	13886	13548	22.92	22.36	179.9	175.5	8.37	3.48	70.16	67.68
6.60	13657	13324	22.85	22.29	178.3	174.0	8.38	3.43	70.20	67.79
6.50	13429	13102	22.78	22.23	176.8	172.5	8.39	3.38	70.24	67.90
6.40	13201	12879	22.72	22.17	175.3	171.0	8.41	3.33	70.28	68.00
6.30	12975	12658	22.66	22.11	173.9	169.6	8.43	3.28	70.32	68.10
6.20	12748	12437	22.60	22.05	172.5	168.3	8.46	3.22	70.35	68.20
6.10	12523	12217	22.54	21.99	171.1	167.0	8.49	3.17	70.38	68.30
6.00	12297	11997	22.48	21.93	169.8	165.7	8.52	3.11	70.42	68.39
5.90	12073	11778	22.43	21.87	168.5	164.4	8.55	3.06	70.46	68.43
5.80	11848	11559	22.37	21.82	167.3	163.2	8.59	3.01	70.50	68.57
5.70	11625	11342	22.32	21.77	166.1	162.1	8.63	2.95	70.53	68.65
5.60	11402	11124	22.26	21.72	165.0	161.0	8.67	2.90	70.57	68.73
5.50	11180	10908	22.21	21.66	163.9	160.0	8.71	2.85	70.60	68.80
5.40	10958	10691	22.15	21.61	162.9	158.9	8.76	2.80	70.64	68.88
5.30	10737	10476	22.10	21.56	161.8	157.9	8.81	2.74	70.68	68.95
5.20	10516	10260	22.05	21.51	160.8	156.9	8.86	2.69	70.72	69.02
5.10	10296	10045	22.00	21.46	159.8	155.9	8.92	2.63	70.75	69.09
5.00	10076	9830	21.95	21.41	158.8	154.9	8.98	2.58	70.79	69.16
4.90	9857	9616	21.90	21.36	157.9	154.0	9.06	2.53	70.82	69.23
4.80	9638	9403	21.85	21.32	156.9	153.1	9.13	2.48	70.86	69.29
4.70	9420	9190	21.80	21.27	156.0	152.2	9.22	2.43	70.90	69.35
4.60	9202	8978	21.75	21.22	155.1	151.3	9.30	2.38	70.93	69.42
4.50	8985	8766	21.70	21.17	154.2	150.5	9.40	2.32	70.96	69.48
4.40	8768	8554	21.65	21.12	153.3	149.6	9.49	2.27	71.00	69.55
4.30	8552	8344	21.60	21.07	152.4	148.7	9.60	2.22	71.04	69.62
4.20	8336	8133	21.55	21.02	151.5	147.8	9.71	2.17	71.08	69.68
4.10	8121	7923	21.50	20.97	150.6	146.9	9.83	2.12	71.12	69.74
4.00	7906	7713	21.45	20.93	149.7	146.0	9.96	2.07	71.15	69.81
3.90	7692	7505	21.40	20.88	148.7	145.1	10.11	2.01	71.18	69.88
3.80	7478	7296	21.35	20.83	147.8	144.2	10.25	1.96	71.22	69.94
3.70	7265	7088	21.30	20.78	146.8	143.3	10.41	1.91	71.25	70.00
3.60	7052	6880	21.24	20.72	145.9	142.3	10.57	1.86	71.29	70.07
3.50	6840	6673	21.19	20.67	144.9	141.3	10.76	1.81	71.33	70.14

THESE HYDROSTATIC PARTICULARS HAVE BEEN DEVELOPED WITH THE
VESSEL FLOATING ON EVEN KEEL

Candidates
Name

Examination
Centre