SET A

UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION
JANUARY 2016 SESSION

SUBJECT CODE   :   LMB 10203

SUBJECT TITLE   :   NAVAL ARCHITECTURE FOR MARINE ENGINEERS

LEVEL   :   BACHELOR

TIME / DURATION   :   2 ½ HOURS

DATE   :   MAY 2016

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.

2. This question paper is printed on both sides of the paper.

3. Please write your answers on the answer booklet provided.

4. Answer should be written in blue or black ink except for sketching, graphic and illustration.

5. This question paper consists of TWO (2) sections; Section A and B. Answer all questions in Section A. For Section B, answer TWO (2) questions only.

6. Answer all questions in English Language.

THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer ALL questions.

Please use the answer booklet provided.

Question 1

(a) Describe the following terms with the aid of appropriate sketches :

(10 marks)

    i) Design spiral

    ii) Longitudinal Centre of Buoyancy (LCB)

    iii) Block Coefficient, Cb

    iv) Explain Archimedes principles

    v) Angle of Loll

(b) A general cargo ship 115 m long, 16 m beam and 7.1 m draught has a displacement of 11,000 tonnes, in sea water. The area of the load water plane is 1259 m² and its midship section coefficient is 0.92. Find :

    1) Block coefficient, Cb

    2) Area of immersed midship section, A_m

    3) Prismatic coefficient, Cp.

    4) Water plane area coefficient

    5) TPC

    6) Find the new draught if 50 tonnes of cargos are loaded.

(10 marks)

Question 2

(a) A large VLCC, at a fully loaded waterplane has the following dimensions of 1/2-ordinates equally spaced 45m apart. 0, 9.0, 18.1, 23.6, 25.9, 26.2, 22.5, 15.7 and 7.2 metres respectively.

    Calculate the WPA and TPC in salt water.

(10 marks)

2

(b) A ship floating in sea water at a design draught of 4.7m is 74m long and 11.5m wide.

Sectional areas up to the design draught are given as follows:

Station	0	1	2	3	4	6	8	10	12	14	16
Area(m²)	20.2	22.6	25.1	33.5	45.2	48.9	50.2	42.5	31.3	16.1	4.6

Calculate:

    I.   Volume of Displacement

    II.   Displacement

    III.   LCB from amidships

(10 marks)

SECTION B (Total: 60 marks)

INSTRUCTION: Answer only THREE (3) questions.

Please use the answer booklet provided.

Question 3

(a) Explain what do you understand by ship stability?

(5 marks)

(b) A timber carrying ship of 6,000 tonnes displacement has KG = 6 m and KM = 7.33 m.

While in port the following cargo is loaded:

        1000 tonnes, Kg 2.5 m

        500 tonnes, Kg 3.5 m

        750 tonnes, Kg 9.0 m

        The following cargo is then discharged:

        450 tonnes of cargo Kg 0.6 m

        And 800 tonnes of cargo Kg 3.0 m

    Find the final GM.

(10 marks)

LMB 10203 NAVAL ARCHITECTURE FOR MARINE ENGINEERS

(c) From the calculations and the results found in (b) above, state whether the ship is stiff or tender and state your reason. How can we improve the situation?

(5 marks)

Question 4

(a) With the aid of sketches explain the following terms:

i) Trim

ii) True Mean Draft

iii) Center of Floatation

(6 marks)

(b) A passenger ferry 120m long has an MCT 1 cm 100 tonnes-metres, TPC 25 tonnes per centimeter is having a draft of 6.00m Fwd and 6.60m Aft. A weight of 250 tonnes is loaded 12m forward of the centre of flotation which is 2m about aft of amidships. Calculate the new drafts forward and aft.

(14 marks)

Question 5

a) Explain the term free surface effects and how it effects ship stability

(5 marks)

(b) A chemical tanker displacing 8000 tonnes in salt water has a double bottom tank 20 metres long and 16 metres wide, partly full of sea water. If the ship's KM is 7metres and the KG is 6metres, calculate the effective GM if (a) the D.B. is undivided, (b) there is a centre line division,

(15 marks)

5

Question 6

(a) The movement of a ship in sea water is subjected by various forces of friction. Explain the following terms:

 i) Frictional resistance

 ii) Wave-making resistance

 iii) Appendage resistance

(6 marks)

(b) Sketch a typical marine propeller and identify the following parts:

 i) Face

 ii) Back

 iii) Leading edge

 iv) Diameter

 v) Rake

(10 marks)

(c) With the help of an appropriate sketch, explain what is meant by propeller pitch?

(4 marks)

END OF QUESTIONS