

# Indian Maritime University

( A Central University, Govt of India)

May-June 2018 End Semester Examinations

## B. Tech (Marine Engineering)

Semester-VI

### Double Hull Tanker Vessels (UG11E2601/1601)

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Date: 20.06.2018

Max Marks:100 Marks

Time: 3 Hrs

Pass Marks: 50 Marks

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**Note :** Use of non-programmable scientific calculator, scale/ ruler is allowed.

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#### PART – A

Marks : (10 x 3 = 30)

( Answer ALL questions which are compulsory )

- 1) (a) Write in brief what are the advantages of "Double Hull Tanker Vessels" over "Single Hull Tanker Vessels".
- (b) Draw neat sketch of "Hull Envelope (Plan, Profile & Section)" of a Double Hull Tanker Vessel. Show positions of cargo spaces & segregated ballast spaces on the sketch.
- (c) What is "Condition Assessment Scheme (CAS)" and which tankers are subjected to this Scheme.
- (d) Explain what is "Crude Oil Washing system (COW)" for Tanker Vessels and what is its advantage.
- (e) What is a "Slop Tank" and what is retained in these tanks.
- (f) Explain with sketch "Swash bulkhead" of a Tanker Vessel.
- (g) Justify with reasons why "longitudinal framing system" of construction is preferred for large size Tanker Vessels instead of "transverse framing system".
- (h) Explain with sketches the difference between "Sounding" and "Ullage" of tanks.
- (i) What is "Shadow Diagram" for cargo tanks of Tanker Vessels.
- (j) Give a "List of Precautions" need to be taken before entering any cargo tank of a Tanker Vessel.

#### PART – B

Marks : (5 x 14 = 70)

( Answer any 5 questions from this part )

- 2) What are the issues which delayed induction of Double Hull Tanker design. Explain these issues. (14)
- 3) What is Hydrostatic Balance Loading ? (6)  
Describe with sketch the concept of a Mid-deck Tanker design which is considered as an alternative of Double Hull Tanker design. (8)

4) Particulars of a Double Hull Tanker are as follows:

LBP = 185.0 mtr.;      B(mld) = 29.7 mtr.;      D(mld) = 15.4 mtr.;;  
draught = 12.2 mtr.;      Max. Deadweight = 49,600 mt.

Calculate the following in compliance with MARPOL 73/78 Regulations with various amendments :

- a) Minimum amidship draft with segregated ballast
  - b) Maximum trim by stern with segregated ballast
  - c) Approximate fwd. & aft. drafts in segregated ballast condition
  - d) Minimum width of double side (i.e. distance of cargo space from side plate)
  - e) Minimum depth of double bottom (i.e. distance of cargo space from bottom plate) (14)
- 5) What are the effects of waves of seas on a tanker vessel. What actions are taken during structural design stage to avoid/ minimize detrimental effect on the tanker's hull during service period. (14)
- 6) Explain in short the rule requirements, design criteria & capacity of inert gas system of a tanker to avoid explosion risks. Draw a neat sketch of the system. (14)
- 7) Draw schematic diagram of Cargo Piping System (cargo discharge, stripping and loading arrangements) for a Double Hull Tanker Vessel having a central pump room and installed with two cargo pumps. Identify all parts shown on the diagram by writing their names. (14)
- 8) Describe in brief different types of cargo pumps used on Tanker Vessels keeping in view the economic aspects e.g. fast discharging of large quantity of cargo oils, elimination of risk of admixture of different grades of oil etc. (14)

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