

**(A Central University, Govt.of India)**

**SEMESTER – VI, B.TECH ( MARINE ENGINEERING)**

### DOUBLE HULL TANKER VESSELS (E 1601)

**Time:-3 Hrs**

**Pass Marks:50**

**Note :**

- (i) Use of non-programmable scientific calculator, scale/ ruler is allowed.**
- (ii) Answer ALL question in PART – A, which is compulsory**  
**and**  
**Answer any FIVE questions from PART – B**

**(3 x10 = 30 Marks)**

**(Compulsory Questions)**

1. a) Write in brief the advantages of Double Hull Tanker Vessels over Single Hull Tanker Vessels.
- b) Draw neat outline sketches of hull envelope (Plan, Profile and Cross Section) of a Double Hull Tanker Vessel and identify the cargo spaces, segregated ballast spaces and other utility spaces.
- c) Explain what is “Condition Assessment Scheme (CAS)”.
- d) What are “Lightweight” and “Deadweight” of a ship ?
- e) Give reasons why “longitudinal framing system” of construction is preferred for large size Tanker Vessels instead of “transverse framing system”.
- f) Explain the terms “Hogging” and “Sagging” by showing the positions of wave along the ship’s length
- g) Explain what is “Crude Oil Washing system (COW)” for Tanker Vessels.
- h) Explain with sketches the difference between “Sounding” and “Ullage” of tanks.
- i) How “Purging” and “Gas Freeing” operations are carried out for cargo tanks of Tanker Vessels ?.
- j) Give a list of precautions which need to be taken before entering cargo tanks.

**PART – B**  
**(Answer any five of the following)**

**(5 x14 = 70 Marks)**

2. What are the issues which delayed induction of Double Hull Tanker design.  
Explain these issues in detail. **(14)**

3. Particulars of a Double Hull Tanker are as follows: **(14)**  
LBP = 185.0 mtr.;    B(mld) = 28.5 mtr.;    D(mld) = 15.6 mtr.;  
and    Max. Deadweight = 50,600 mt.;

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

- a) Minimum mid-ship 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 shell plate)
  - e) Minimum depth of double bottom (i.e. distance of cargo space from bottom shell plate)
4. Give a list of various loads which are to be considered for structural strength calculations of a tanker and explain them. **(14)**
5. Draw mid-ship section of a Double Hull Tanker in way of a web frame constructed with longitudinal framing system. Write names of various structural parts to identify them. **(14)**
6. Draw neat sketch of the cargo piping system of a tanker which has 5 cargo tanks, 2 slop tanks and a central pump room. There are 2 cargo pumps and 1 stripping pump to handle two different grades of oil without any major risk of admixture. Identify and write the names of main parts/ components and main pipelines of the system. **(14)**
7. Describe in brief different types of cargo pumps used on Tanker Vessels keeping in view the economic aspects like fast discharging of large quantity of cargo oils and elimination of risk of admixture of different grades of oil. **(14)**
8. Explain in short the rule requirements, design criteria & capacity of inert gas system of a tanker and draw a neat sketch of the system. **(14)**
9. Explain about Ballast Water Management / Treatment on Tanker Vessels. **(14)**

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