

سازمان بنادر و دریانوردی  
اداره امتحانات و اسناد دریانوردان

Exam Code :mmss - ۹۴۶

تاریخ : ۱۳۹۴/۹/۴

زمان : ۳ ساعت

نام آزمون: تعادل و ساختمان کشتی

درجه: فرمانده کمتر از ۳۰۰۰ - سفرهای نزدیک به ساحل

( Pass mark : ۶۰ )

**Q.1) -** A ship 100 m long arrives in port with drafts 3 m forward and 4.3 m aft. TPC 10 tones, MCTC 120 t.m. The center of floatation is 3 m aft of amidships. If 80 tons of cargo is loaded in a position 24 m forward of amidships and 40 tons of cargo is discharged from 12 m aft of amidships. What are the new drafts? (20M)

**Q.2) -** A vessel arrives in port with displacement 2750 tones and  $KG=3.10$  m,

She then loads and discharges the following quantities:

Load: 100 tons of Cargo  $kg = 0.8$  m

50 tons of Cargo  $kg = 2.5$  m

10 tons of F.W  $kg = 0.7$  m

Discharge: 700 tons of cargo  $kg = 2.5$  m

70 tons of cargo  $kg = 1.6$  m

100 tons of cargo  $kg = 2.9$  m

During staying at port, 8 tons of oil ( $kg=1.0$  m) are consumed, if the final KM is 3.7 m.

**Find the GM on departure.** (15M)

**Q.3) -** A Ship of 1800 tones displacement  $KG=3.90$ m,  $KM=4.60$ m floating in salt water, has a double bottom tank 12 x 6 x 1 is divided at the center line and is partially filled with bunker of relative density 0.75. Find the virtual loss of GM due to the free surface of the bunker and the final GM? (15M)

**Q.4) -** With consideration to structure forward of collision bulkhead, Draw fore end construction of a merchant ship showing all sections and name all parts. (20M)

**Q.5) - With the aid of side view of a ship, describe about vertical shear force and longitudinal bending moment in still water. (2.M)**

**Q.6) - Explain the butt welding process used in ship building. (1.M)**