INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

May/ June 2017 End Semester Examinations

B.Tech. (Marine Engineering) Sixth Semester

(AY 2009-2014 batches)

Adv. Marine Heat Engines (Co-cycle) (UG11E1602/ UG11E2602)

Date : 23.06.2017 Maximum Marks: 100

Time: 3 Hrs Pass Marks : 50

PART – A **Marks:10X3=30**

(All questions are compulsory)

1. Explain following :

(a) Turndown ratio of burner.

(b) Primary Air & Secondary Air of combustion

(c) Incidence Loss in centrifugal compressor

(d) Conditions for complete combustion of oil in furnace

(e) Panting of Boiler burner

(f) What is the purpose of Air Pre-heaters and where they are fitted ?

(g) Why Steam Propulsion was preferred for LNG ships and why not now ?

(h) 3 T's of combustion

(i) Higher Heat Value (HHV) & Lower Heat Value (LHV)

(j) Choking condition in a centrifugal compressor.

PART – B

Marks:5X14=70

(Answer any 5 of the following)

2) a) Discuss different types of fouling that can be experienced w.r.t. heat exchangers.

b) Explain how Fouling Factor is taken in to account.

(10 + 4 = 14 Marks)

3) a) What is Stalling phenomenon of rotary compressor.

b) Discuss Matching of Turbocharger with the Engine.

(4 + 10 = 14 Marks)

4) a) What is Cascade Refrigeration System ?

b) Explain working of such a system with line diagram and Pressure – Enthalpy diagram and Temperature- Entropy diagram of two stage cascade refrigeration system using two different refrigerants.

(4+10=14 Marks)

5) Discuss with neat diagrams how energy optimization can be achieved for a ship's entire combined power plants with Slow Speed Two Stroke Main Diesel Engine and a Steam Turbine where steam is fed from a single pressure waste heat boiler. (14 Marks)

6) a) What is Stoichiometric combustion ?

b) Show the Calculation for requirement of theoretical amount of air for burning 100 Kg of Furnace oil and theoretical CO_2 content in flue gas. (Given – air contain 23 % of O_2 and Specification of furnace oil - % by wt. Carbon
85.9, Hydrogen – 12, Oxygen – 0.7, Nitrogen -0.5, Sulphur – 0.5 , H_2O – 0.35, Ash – 0.05.)

(4 + 10 = 14 Marks)

7) a) With neat diagrams explain working of a Free Piston Gas generator with Gas Turbine.

b) How much is the efficiency this engine & disadvantages ?

(12 + 2 = 14 Marks)

8) With respect to combustion in boiler furnace explain :

a) theoretical air curve showing relationship between combustion air setting on the boiler and various fuels. (7 Marks)

b) Theoretical air curve for the Natural Gas as fuel showing fuel rich and fuel lean combustion. (7 Marks)