

**Indian Maritime University**  
(A Central University, Govt of India)  
**End Semester Examinations- June-July 2019**  
**B.Tech ( Marine Engineering)**  
**Semester – VI**  
**Advanced Marine Heat Engine (CO-CYCLES)**  
**(UG11E2602)**

**Duration: 3 Hrs**  
**Date:5-7-2019**

**Max Marks: 100**  
**Pass Marks: 50**

**Part A**                      **(3 X 10 = 30 Marks)**

**Compulsory Questions**

- 1.a) Write the advantages of gas turbine power plant .
- b) Why premixing of gaseous fuel is required for combustion ?
- c) What is flame stabilization and why is it required ?
- d) Explain the procedure of spraying of fuel.
- e) Explain the working principle of a roots blower.
- f) Draw a block diagram of a closed cycle gas power plant .
- g) Give a sketch of a combined gas-steam turbine plant .
- h) What is the purpose of air preheaters and where are they used ?
- i) Define penetration of fuel and combustion chamber.
- j) Why does stalling of compressor occur ?

**Part B**                      **(5X14=70 Marks)**

Answer any **five** of the followings.

2. a) Explain the working principle of a combined cycle plant of diesel engine and steam turbine
- b) What is IGCC? Draw a block diagram of a basic IGCC plant arrangement. (7+7)
3. a) Explain the working principle of a centrifugal Compressor.
- b) Derive (along with velocity diagram) an expression for the work done by impeller in a Centrifugal Compressor. (6 + 8)
4. a) Narrate the principle of a Axial Flow Compressor.
- b) Explain the phenomenon of choking and surging in a compressor the help of a diagram of delivery pressure vs mass flow (7 + 7)

5. a) What is Coal Gasification and show its location in a combined cycle plant .  
b) Establish the approximate thermal efficiencies of different components of a combined cycle plant. (7 +7)
6. a) Discuss about the spray combustion system along with the sketches of different types of flames..  
b) Draw various types of Injector systems for fuel atomization (7 + 7)
7. a) How can you classify different Heat Exchangers ?  
b) Establish a relationship between heat transfer coefficient and Fouling Factor.  
c) Obtain a relationship between LMTD and overall heat transfer Coefficient for a counter flow heat exchanger. (4+3+7)
8. Write short notes on **any two** of the followings :
- a) Vane type Blower
  - b) Axial vs Centrifugal Compressor
  - c) advantages and disadvantages of combined cycle power plant
  - d) Shell and tube heat exchanger. (7 X 2)

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