Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – December 2022

Programme Name: B Tech (ME)

Semester: VI

Subject Code: UG11T3607

Subject Name: Marine Steam Engineering

Date: 05.12.2022	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

General Instructions

(i) All Sections (A, B & C) are to be attempted.
(ii) Options, if any, are specified in respective section.

Section A

MCQs of 01 Mark each – Choose the correct answer as applicable.

1. Which of the following is not correct for steam engines?
   a. They require extensive maintenance
   b. They are suitable for very large power
   c. They are more prone to vibrations
   d. They have short start up time

2. How is the propeller direction reversed on steam ships?
   a. By supplying steam in opposite direction
   b. By reversing the firing order
   c. By having separate astern blading on the turbine shaft
   d. By changing the gears in reverse direction

3. When can the scoop injection be used with propulsion turbines?
   a. In port when turbine is being warmed up
   b. In harbour when ship is manoeuvring
   c. In all conditions
   d. At sea when turbine is operating at full speed

4. Where is dummy piston used?
   a. It is a spare piston on motor ships
   b. In impulse turbines
   c. In reciprocating engine
   d. In reaction turbines

5. Which changes occur in steam parameters when it passes through reaction blades?
   a. Pressure is reduced with increase in velocity and specific volume
   b. Velocity is reduced with increase in pressure and specific volume
   c. Specific volume is reduced with increase in pressure and velocity

d. Pressure is increased with reduction in velocity and specific volume

6. What can be the cause of rotor's excessive axial movement?
   a. Main bearing worn out
   b. Thrust bearing worn out
   c. Reduction gear bearing worn out
   d. Auxiliary drive gear bearing worn out

7. What is purpose of shroud ring in steam turbines?
   a. It reduces the steam leakage between blade tip and diaphragm
   b. It reduces the vibration of individual blades
   c. It reduces the steam leakage between diaphragm and rotor
   d. It reduces the wear of blades from erosion

8. What is the working mechanism of labyrinth packing?
   a. By creating resistance in steam flow
   b. By using a packing material between rotor and casing
   c. It works in a similar way as mechanical seal
   d. It works in a similar way as a gland packing

9. Which of the following is not true about diaphragms?
   a. They separate two moving discs
   b. They are constructed as single piece
   c. They hold nozzles or guide blades
   d. In pressure compounded turbines, they maintain pressure difference between stages

10. What is the usual pressure of gland sealing steam?
    a. 0.5 to 1.5 bar
    b. 2 to 4.5 bar
    c. 5 to 9.5 bar
    d. 10 to 15 bar

Section B

Five Questions of 02 Marks each

11. What is a stage in a steam turbine?

12. What is a diaphragm?

13. What is the operating principle of a reaction turbine?

14. Do you stop cooling-water flow through a steam condenser as soon as the turbine is slopped?

15. How is velocity compounding accomplished in a steam turbine?

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

16a. Draw neatly and label the general arrangement of a marine steam turbine propulsion system showing the following

a) The flow of steam from boiler to steam turbine
b) The return of condensate from condenser to boiler
c) Lubricating oil flow from sump to gravity tank and back to sump through bearings

The question carries marks for neatness and proper labelling of the various parts of the system.

Marks 7

16b. What is the use of an ejector in the steam turbine system

Marks 3

17a. With a neat sketch explain what is a double flow steam turbine and what are its advantages and disadvantages.

Marks 5

17b. With the help of a Rankine Cycle explain the principle of a Reheat Turbine. What are the advantages of a Reheat Turbine?

Marks 5

18. What are five different ways of fabricating a steam turbine rotor? What are the advantages and disadvantages of various types of fabricated rotor explain it with simple sketches?

Marks 10

19. What are quill shafts and flexible couplings? With the help of a simple diagram show the arrangement of a membrane type of flexible coupling with a quill shaft explaining the working of flexible coupling.

Marks 10

20. What is a role of a condenser in a steam plant?
How does the effect of a) Change of sea water temperature b) Circulating water quantity c) Change of main engine power effects the performance of the condenser?

Marks 10

21a. What is gland steam and what is its use in a three cylinder steam turbine system? Explain it with a simple sketch.

Marks 5

21b. In a two cylinder turbine propulsion system how the vessel can be operated in emergency with L.P. turbine out of operation. and what precautions have to be taken while running the vessel with L.P. turbine out of operation. Explain with a simple diagram.

Marks 5

22. What are the various types of internal and external losses in a steam turbine?

Marks 10