Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – June 2024

Programme Name: B Tech (ME)

Semester: VI

Subject Code: UG11T3607

Subject Name: Marine Steam Engineering

Date: 18.06.2024	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

General Instructions

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

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. Impulse turbines tend to run at ------- -------- compared to reaction turbines
2. Maximum quantity a nozzle is capable of discharging superheated steam occurs when the exhaust pressure is approximately -------- of inlet pressure.
3. A De laval impulse turbine consists of a -------- row of blades attached to a wheel
4. Emulsification of turbine lubricating oil may be due to water contamination from steam packed glands or ----------
5. 'Scuffing' in gears is caused by a local breakdown of ---------- between mating gears.
6. Nitriding is a post hobbing process which involves exposing the surface of the gear teeth to ---------- gas at a temperature of about $500^{o}C$.
7. Sequential nozzle control has the advantage of providing maximum ---------- ---- --------- is achieved for all powers
8. Erosion damage in steam turbine blades is reduced by brazing a ---------- strip down the back of the leading edge of the blade.
9. A ---------- ---------- gauge is used to measure rotor axial clearance when the turbine is in stopped condition.
10. Dummy piston and dummy cylinder arrangement will be found in ---------- turbines.

Section B

Five Questions of 02 Marks each

11. Explain why great care should be taken in cleaning air ejector nozzles
12. List out the advantages of incorporating a De Laval stage at the inlet of HP turbine.
13. What is the function of a quill shaft?
14. Explain reasons for use of "End tightened blading"
15. Explain reasons for fitment of a scoop system in a steam propelled ship.

Section C

Seven Questions of 10 Marks each (7+3) of which any 05 questions to be answered.

16. (a) With the help of suitable diagram explain the arrangement of a pressure compounded impulse turbine. The change in pressure and velocity from inlet to exhaust is to be indicated. (A four stage turbine with all stages having the same mean blade diameter may be considered)
    (b) Explain the reason for incorporating a "Curtis" stage at the HP inlet end of a "Parsons" turbine.
17. (a) With the help of suitable diagram explain the function and fixing arrangement of a steam turbine Diaphragm.
    (b) Explain Double flow turbine and its advantages.
18. (a) With the help of a suitable diagram explain main steam turbine gland sealing system.
    (b) Explain why "Partial admission" is employed in some turbine arrangements.
19. (a) Draw a typical gashed disc solid forged rotor and indicate important parts. List out typical material specification for HP turbine rotor suitable for operation at 515^{o}C
    (b) Explain the requirement of dynamic balancing of steam turbine rotors.
20. (a) Explain the gear arrangement – "Single tandem" and "Dual tandem" and bring out the advantages and disadvantages of the two arrangements.

    (b) Explain the requirements of lubricating oil used for a geared turbine plant.
21. (a) With the help of a suitable diagram explain lubricating oil system for a steam turbine reduction gear for a steam propelled ship.
    (b) Write a short note on materials for steam turbine gland segments.
22. (a) Draw a neat sketch of a regenerative condenser and explain the objectives of tube arrangement
    (b) Explain the conflicting features of circulating water velocity through condenser tubes.