

**Indian Maritime University**  
**(A Central University, Govt of India)**  
**End Semester Examinations December 2023**  
**Programme Name: B.Sc., (NS)**  
**Semester: IV**  
**Subject Code: UG21T5404**

**Subject Name: MARINE ENGINEERING, AUTOMATION & CONTROL  
SYSTEMS – II**

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Date: 23.11.2023

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

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General Instructions

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

**Section A**

**Answer all questions (10x1mark=10marks)**  
**MCQs/Fill in the Blanks / Choose the correct answer as applicable.**

1. In 4-Stroke engine there is a Power stroke in every \_\_\_\_\_ revolution of crankshaft.
2. An \_\_\_\_\_ is a gas detector which is used to measure the amount of combustibile gases present in a sample
3. \_\_\_\_\_ is the most common fire extinguishing medium in case of Main Engine scavenge fire.
4. As per SOLAS, Main steering gear should be capable of move from 35° on one side to 30° on other side in \_\_\_\_\_ sec.
5. An \_\_\_\_\_ controller, also called a non-feedback controller, is a control loop part of a control system in which the control action is independent of the "process output".
6. \_\_\_\_\_ transmit the propeller thrust to ship's hull.
  - a) Plumber block
  - b) Flywheel
  - c) Thrust block
  - d) Rudder
7. Pitch of propeller is defined as
  - a) Forward movement of propeller when rotated by 360 degree

- b) Forward movement of propeller in un-yielding medium when rotated by 360 degree
  - c) Forward movement of propeller when rotated by 3600 when the vessel is floating in water
  - d) Forward movement of propeller when rotated by 360 degree and in sea water
8. Which of the following is not a true statement?
- a) Butterfly valves are for modulating flow and can be throttled.
  - b) Globe Valves can be straight flow or angle flow type.
  - c) Swing check valve will provide lesser resistance than same bore diameter globe type check valve.
  - d) In a globe valves, mechanical seals are used for providing sealing between the valve bonnet and the spindle.
9. Unit of Specific fuel oil consumption is
- a) gm/Kw.hr
  - b) Kg/hr
  - c) Kg/Kw.hr
  - d) gm / hr
10. Clean fuel in shipping is
- a) Heavy Fuel oil
  - b) Biofuel
  - c) Diesel oil
  - d) Ultra-Low sulphur fuel oil

### **Section B**

**Answer all five questions (5x2marks = 10marks)**

- 11. Define supercharging.
- 12. Explain compression and spark ignition Engine
- 13. Define real and apparent slips.
- 14. What is rudder drop and how it is measured?
- 15. Explain gas freeing of a cargo tank.

### **Section C**

**Answer any Five out of Seven Questions (5x10marks = 50marks)**

- 16.
- a. Explain with diagram, Inert gas production, generation from boiler exhaust gas. (5 Marks)
  - b. What are the FSS code requirement for the Inert Gas System. (5 Marks)
- 17.
- a. Explain with diagram of the working of sewage treatment plant.

(7 Marks)

- b. Describe the regulation pertaining to ship concerned to water pollution form discharge of sewage (3 marks)

18. Draw jacket water cooling system of main engine(6marks). Explain its working. (4marks)

19. Explain with diagram the system of use of secondary refrigerant for cargo hold cooling. (10 marks)

- 20.
- a. Explain with sketch, a proportional controller. (5 marks)
  - b. Explain with sketch, a proportional and integral controller. (5marks)

- 21.
- a. Explain with diagram a variable delivery pump as used in electro hydraulic steering gear. (5 marks)
  - b. State different rules and regulations of steering gear (5marks)

- 22.
- a. Explain with diagram the pumping system of a Gas carrier (5marks)
  - b. Explain with diagram the pumping system of an Oil tankers. (5marks)

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