ACADEMIC YEAR 2023 - 2024

Program	Year	Semester	Paper
DO	4	1	MID TERM

MODULE NAME:	**Marine Power Plant**		
MODULE CODE:	**DMARPOWER**	**EXAM DATE:**	**07/11/2023**
TEACHER'S NAME:	**Hamid Soltani**	**DURATION:**	**1.5 hrs.**

Questions to be answered on:	**Allowed requirements:**	**Number of pages**
✓ Space provided on the question paper	Pen, Pencil & Calculator	(Incl. cover page)**:** **10**

Points of attention:

- For each question, the maximum earned points are mentioned between brackets at the end of each question.
- Write very clearly! Answers that are not readable are not marked and don't get points!
- Make sure your answers are written to the point.
- All answers should be written **in English.**
- Write all the answers in **blue or black pen only.**
- Use the **pencil** only for **diagrams & graphs.**
- Show all the calculation steps in the given space.
- When finished submit the question paper, together with the answer scripts and the signed cover page to the invigilator.
- Any cheating/copying may result in an instant failing of the examination.

STUDENT NAME:

STUDENT ID:

FINAL MARKS

	50
	10

Number of answer scripts:……..…….. **Invigilator:**……..……..…..

Student's signature: ……..…… **Time of receipt:**……..…..

Answer All Questions (Total questions = 9)

Part1: Scenario [10 Marks]

In the world of 2-stroke diesel engines, a significant modification is currently under consideration. This modification revolves around altering the timing of the exhaust valve's opening during the engine's operation.

Question1:

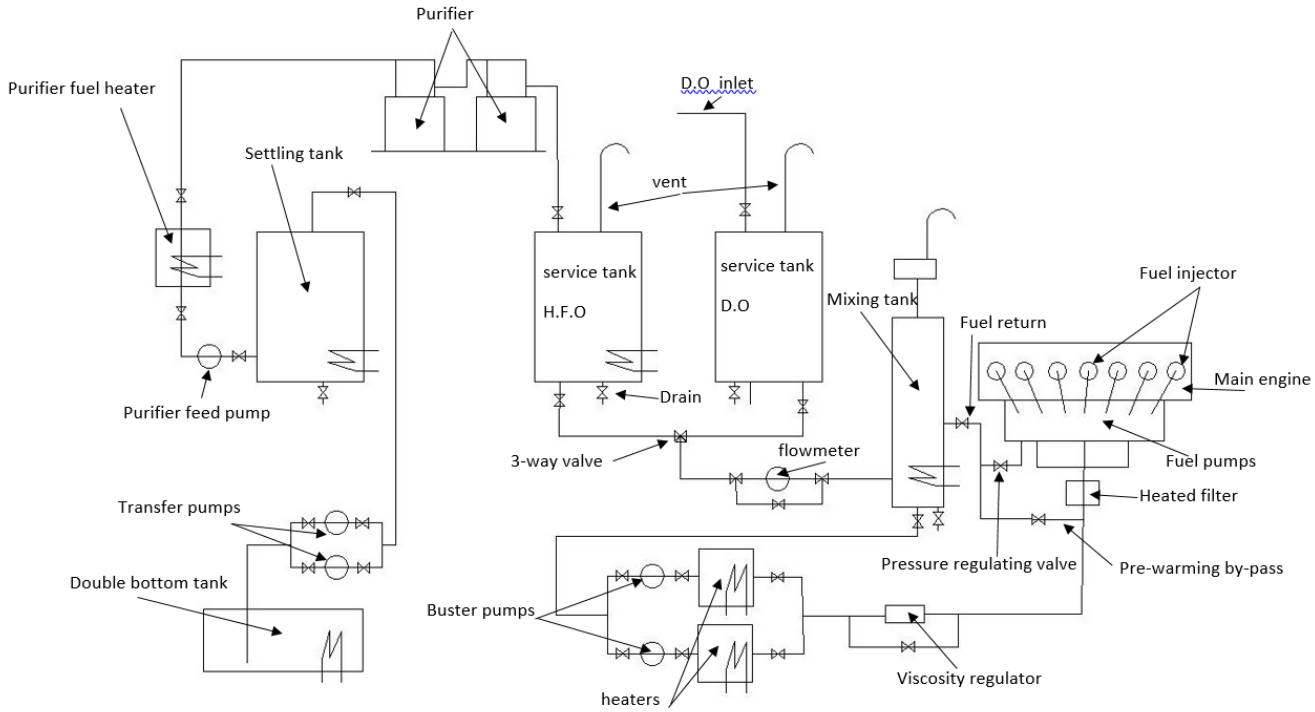
During the second stroke of a 2-stroke diesel engine, discuss and explain the changes in pressure, temperature, and volume within the cylinder. Additionally, describe the timing of valve and ports opening or closing, and clarify the piston's movement from its initial position to its final position during this stroke. (1 marks for each correct point , up to 6 marks) (6 Marks)

Question2:

Imagine a scenario where the exhaust valve of a 2-stroke diesel engine does not fully open during the exhaust stroke. What potential consequences might arise as a result of this partial opening? Please provide only 4 consequences with explanation. Any additional consequences beyond 4 will not be awarded marks, even if they are correct. (1 mark for each consequences with explanation) (4 Marks)

Part2: Scenario [9 Marks]

The diagram below illustrates the fuel transferring, purifying, and supplying system from the fuel oil storage tank to the main engine in the 2-stroke cross-head diesel engine. The preparation and purification of fuel are crucial for achieving high-performance combustion in the diesel engine.



(IMCO, 2018)

Question 3:

Study the diagram and discuss how the system works, highlighting at least 6 important points or steps. (1 mark for each step with explanation, up to 6 marks) (6 Marks)

Question 4:

During a team meeting, the concept of a mixing tank arises, and you need to inform the crew about its functions. List and explain the main functions of the mixing tank in the fuel system. (3 Marks)

Part3: Scenario [14 Marks]

As a deck officer, you need to know the critical systems that ensure the smooth operation and safety of ships at sea. One such system that plays a pivotal role in maritime operations is the High-Temperature (H.T.) cooling water system of a 2-stroke diesel engine. The H.T. cooling water system of the main 2-stroke diesel engine is instrumental in maintaining the vessel's efficiency, reliability, and safety during voyages.

Question 5:
Produce a detailed schematic diagram of the 2-stroke diesel engine's H.T. cooling water system, incorporating the names of crucial equipment. This diagram should be precise and comprehensive, showcasing your proficiency in understanding and illustrating this essential system's layout(as per your class activity) (8 Marks)

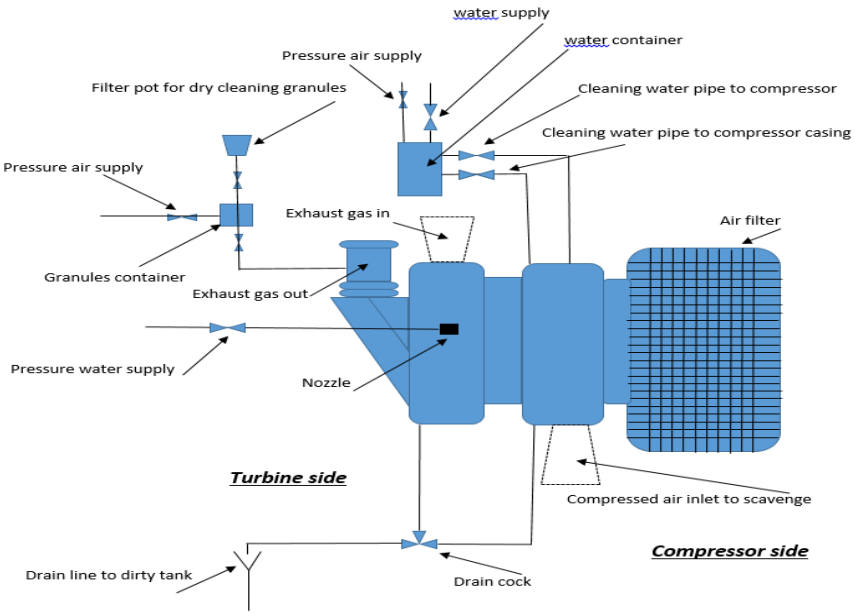
Marking scheme:
- 4 marks for correct labling the componetes or points
- 3 marks for correct drawing (minus 0.5 mark for each missing line or incorrect connection- more that 4 mistake No credit: 0 marks)
- 1 mark for clean drawing

Question 6:

Explain the importance of water treatment in the H.T. Cooling Water System and how it can mitigate these issues. (6 Marks)

Part3: Scenario [7 Marks]

As the senior officer onboard, you have been informed by the chief engineer that he plans to perform water washing on the turbine side of the turbocharger. This procedure takes more than one hour to conduct. The drawing below shows the system used to perform wet and dry cleaning for a 2-stroke diesel engine turbocharger on your ship.



Turbocharger water washing and dry washing piping arrangement

(IMCO, 2018)

Question 7:

Based on what you know about the washing process of the turbocharger, discuss the sequence of events in the procedure for water washing on the turbine side of the turbocharger. (7 marks)

Part4: [4 Marks]

With reference to diesel engine principal of operation, answer the following:

Question 8:

There are important terms that refer to the diesel engine principle of operation. Briefly discusses the following terms in relation to the diesel engine operation and cycle:

a- Explain the term of "Bottom dead center" in diesel engine. (2 Marks)

b- Discuss the dfference between ignition and injection in the diesel engine principle of operation. (2 Marks)

Part5: [6 Marks]

With reference to diesel engine lubricating oil systems and different types of the oil which are used in the diesel engine , answer the following:

Question 9:

Discuss the primary functions of the lubricating oil in a marine diesel engine, mentioning six key functions. (6 marks)

MLO & Bloom's Level of Complexity

Q #	MLO Addressed	Complexity Level	Mark	Remark
Q1	**MLO 3**	Analysing	**6**	
Q2	**MLO 4**	Evaluating	**4**	
Q3	**MLO 2 & 3**	Application/ Analysing	**6**	
Q4	**MLO 1**	Understanding	**3**	
Q5	**MLO 2**	Application	**8**	
Q6	**MLO 1**	Understanding	**6**	
Q7	**MLO 3**	Analysing	**7**	
Q8	**MLO 1**	Understanding	**4**	
Q9	**MLO 1 & 3**	Understanding/ Analysing	**6**	