

Indian Maritime University
(A Central University, Govt of India)

End Semester Examinations – December 2025

Programme Name: B Tech (ME)

Semester: VII

Subject Code: UG11T4706

Subject Name: Fuels and Lubricants

Date: 17th December 2025

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

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

1. With respect to ISO 8217 Petroleum products - Specifications of marine fuels, select the correct statement.

- (A) The standard also specifies the requirements for fuels with a maximum content of 0.5% Sulphur by volume for use in Emission Control Areas
- (B) The standard also specifies the requirements for fuels with a maximum content of 0.5% Sulphur by mass for use in Emission Control Areas
- (C) The standard also specifies the requirements for fuels with a maximum content of 0.1% Sulphur by mass for use in Emission Control Areas
- (D) The standard also specifies the requirements for fuels with a maximum content of 0.1% Sulphur by volume for use in Emission Control Areas

2. Select the correct statement:

- (A) With respect to the cold flow properties, Fuel should be stored at a temperature at least 80° C above the pour point and at least 5° C above the CFPP Temperature of the fuel bunkered
- (B) With respect to the cold flow properties, Fuel should be stored at a temperature at least 70° C above the pour point and at least 20° C above the CFPP Temperature of the fuel bunkered
- (C) With respect to the cold flow properties, Fuel should be stored at a temperature at least 10° C above the pour point and at least 10° C above the CFPP Temperature of the fuel bunkered
- (D) With respect to the cold flow properties, Fuel should be stored at a temperature at least 40° C above the pour point and at least 10° C below the CFPP Temperature of the fuel bunkered

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3. Which of the following statements about cetane number is correct?
- a) It indicates the knocking tendency of SI engine fuel
 - b) It represents the ignition quality of diesel fuel
 - c) It measures the octane rating of petrol
 - d) It shows the viscosity of lubricating oil
4. Which of the following is obtained by heating coal in the absence of air?
- a) Charcoal
 - b) Coke
 - c) Peat
 - d) Lignite
5. State which alternate fuel may be used in C.I engine without much alternation to existing engine
- (A) LNG
 - (B) Bio Fuel
 - (C) Methanol
 - (D) Ammonia
6. In hydrodynamic lubrication, the film of oil that separates the metal surfaces is
- (A) supplied by an external pump
 - (B) self-generated when speed achieved
 - (C) supplied from the crankcase
 - (D) not self-generated
7. Which of the following is the main component of LPG (liquefied petroleum gas)?
- a) Methane
 - b) Propane and Butane
 - c) Ethanol
 - d) Carbon monoxide
8. Which of the following does the saponification number of a fat or oil indicate?
- a) The amount of free fatty acids present
 - b) The amount of alkali required to saponify a given quantity of fat or oil
 - c) The viscosity of the fat or oil
 - d) The ignition quality of the fat
9. What additive is added to the extreme pressure lubricant?
- (A) Molybdenum disulphide
 - (B) Silicon sulphide
 - (C) Chromium dioxide
 - (D) Aluminium dioxide
10. What does the viscosity index (VI) of a lubricant indicate?
- a) The lubricating oil's colour
 - b) The change in viscosity of the oil with temperature
 - c) The oil's flash point
 - d) The amount of additives in the oil
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Section B

Five Questions of 02 Marks each

11. What does 'compatibility' mean for fuel oil?
12. What is Ignition delay in CI Engine combustion?
13. What do you understand by SAE numbers?
14. What is synthetic oil? How it is different from Mineral oil? Where is it used?
15. Differentiate between octane and cetane number of the fuels.

Section C

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

16. What are ISO8217 standards and differences between ISO8217:2017 and ISO8217:2024 standards (10)

17. Name the different types of lubricating principles used in the lubrication of ships machinery. Give examples in each case, stating the names of machinery/ components/ system where same applied (10)

18. With reference to lubricating oil:

Explain why oil employed in the crankcase of a trunk piston engine differs in its properties from that employed in the crankcase of a crosshead engine (10)

19. With reference to Fuel oil, Explain the following terms:

- (a) CCAI value (4)
- (b) Calorific value (3)
- (c) Flash point (3)

20. a) Describe the transesterification process for biodiesel production. [5]

b) Discuss the use of vegetable oil as an alternative fuel in engines, including its advantages and limitations. [5]

21. a) Discuss the use of methanol as a fuel in internal combustion engines, highlighting its combustion characteristics and the types of emissions produced. [5]

b) Explain the working principle of a hydrogen fuel cell and discuss its applications, advantages, and environmental impact. [5]

22. (a) What does the ISO Cleanliness Code represents in lubrication systems (5 marks)

(b) What are the main functions of the additives in the Lubricating oil. (5 marks)
