

KATHMANDU UNIVERSITY  
End Semester Examination  
February, 2025

Marks Scored:

Level : B.E.

Year : IV

Exam Roll No. :

Time: 30 mins.

Registration No.:

Course : MEPP 412

Semester : I

F. M. : 20

Date 04 FEB 2025

SECTION "A"

[20Q. × 1 = 20 marks]

Choose the most appropriate answer and **mark [X]**.

1. How many power strokes occur per crankshaft revolution in a two-stroke engine?  
 One                       Two                       Three                       Four
2. Which of the following is a characteristic of a four-stroke engine?  
 Two power strokes per revolution of the crankshaft  
 One power stroke per revolution of the crankshaft  
 One power stroke every two revolutions of the crankshaft  
 Two power strokes every two revolutions of the crankshaft
3. Which of the following is NOT a common engine emission?  
 Carbon monoxide (CO)                       Hydrocarbons (HC)  
 Nitrogen oxides (NO<sub>x</sub>)                       Carbon dioxide (CO<sub>2</sub>)
4. Which type of fuel pump is commonly used in modern fuel injection systems?  
 Mechanical fuel pump                       Vacuum pump  
 Electric fuel pump                       Gear pump
5. What is the primary purpose of an intercooler in a turbocharged engine?  
 To increase the temperature of the intake air  
 To decrease the pressure of the intake air  
 To lower the temperature of the intake air  
 To increase the size of the engine
6. Which type of cooling system relies on the natural circulation of coolant?  
 Thermosyphon                       Direct cooling  
 Forced circulation                       Evaporative cooling
7. What is the role of baffles in an air-cooled system?  
 To increase the speed of airflow  
 To direct airflow uniformly over the engine surfaces  
 To store excess coolant  
 To protect the fins from damage
8. Anti-knock property of C.I engine fuel can be improved by adding  
 tetra-ethyl lead       amyl nitrate                       trimethyl pentane       hexadecane



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18. What does "camber" refer to in steering geometry?
- The angle of the steering wheel
  - The inward or outward tilt of the wheels
  - The toe-in or toe-out of the wheels
  - The height of the vehicle
19. Which analytical method is commonly used to measure hydrocarbon emissions? \*
- Chemiluminescence
  - Flame Ionization Detector (FID)
  - Non-Dispersive Infra-Red Analyzer (NDIR)
  - Gravimetric method
20. In a hybrid vehicle, what is the role of the planetary gear set in the transmission?
- To increase torque output
  - To manage power split between engine and motor
  - To engage the clutch
  - To improve steering control



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Level : B.E.  
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04 FEB 2025

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Semester : I  
F. M. : 55

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SECTION "B"

*Attempt ALL the questions.*

1. Compare the four-stroke spark-ignition engine and the four-stroke compression ignition engine with appropriate diagrams. [5]
2. Differentiate between liquid-cooled and air-cooled systems with diagrams. [5]
3. Explain briefly with neat sketch components of supercharger and turbocharger use in modern automobile. [5]
4. Explain the components and functioning of a direct fuel injection system in SI engine with a diagram. [5]
5. Explain with diagrams the components and working of a hybrid powertrain system. [5]
6. Discuss the importance of bearings in an engine and the different types of bearings used. [5]
7. Explain the suspension systems and their importance in vehicles with diagrams. [5]
8. Draw and explain the construction and working of a dry-sump lubrication system. [5]
9. Illustrate and explain the functioning of an ABS (Anti-lock Braking System) and (ESP) Electronic Stability Program in automobile braking system with detailed diagrams and discuss its components and importance in vehicle safety. [7]
10. Discuss the operation of a typical clutch system and explain the different types of gearboxes used in automobiles. [8]

