



UNIVERSITY OF RUHUNA

Faculty of Engineering

End -Semester 4 Examination in Engineering: November 2016

Module Number: ME4312

Module Name: Automobile Engineering

[Three Hours]

[Answer all questions, each question carries ten marks]

- Q1. (a)** What are the two basic types of internal combustion engines? State the fundamental differences between the two basic types of internal combustion engines?
[2 marks]
- (b)** Define the compression ratio? What is its range for (a) the SI engines (b) the CI engines? What factors limit the compression ratio in each type of engines?
[3 marks]
- (c)** Describe with a suitable sketch the two stroke cycle of a single cylinder Spark Ignition Engine.
[3 marks]
- (d)** An automobile engine develops 50 kW of brake power at full load. If the mechanical efficiency of the engine is 80%, what is the friction power? What will be the mechanical efficiency of the engine at half load, if the mechanical losses (friction) remain the same?
[2 marks]
- Q2. (a)** What are the five major functions of engine lubricating oils?
[2.5 marks]
- (b)** What does happen if the lubricating oil is **too thick** or **too thin**?
[1 mark]
- (c)** What are the engine parts which are most difficult to lubricate?
[2 marks]
- (d)** What do you understand by a **multigrade oil**? How do multigrade oils differ from monograde oils?
[1.5 marks]
- (e)** Draw a sketch of a dry sump lubricating system and name all the important parts of it. Also briefly explain the operation of the same.
[3 marks]
- Q3. (a)** Why cooling of an internal combustion engine is necessary?
[1.5 marks]
- (b)** Why over cooling of an internal combustion engine is harmful?
[1.5 marks]

- (c) With neat sketches discuss the construction and working of forced liquid cooling system used in an IC engine. Name all the important parts in this system.

[4 marks]

- (d) What is the purpose of the fan in a liquid cooling system? Is it required all the times? What are the different methods used to rotate the radiator fan in internal combustion engines?

[3 marks]

- Q4. (a) Describe the two types of diesel injection systems used in CI engines. Why is the air injection system not used nowadays?

[2 marks]

- (b) Discuss the requirement of an ideal diesel injection system of a CI engine.

[3 marks]

- (c) With a neat drawn sketch, briefly explain the operation of a simple float type carburetor.

[1.5 marks]

- (d) What are the five (05) additional systems which are added to the simple float type carburetor to satisfy the fuel demands of an engine under all running conditions and explain the operation of each additional system.

[3.5 marks]

- Q5. (a) Discuss the basic requirements of a spark ignition system.

[2.5 marks]

- (b) Describe a high tension magneto ignition system used in spark ignition engines. Name all the important parts of the system.

[2 marks]

- (c) Compare the advantages and disadvantages of high tension magneto ignition system with a battery (coil) ignition system.

[3 marks]

- (d) What do you understand by the firing order in internal combustion engines?

[1 mark]

- (e) A four-cylinder four-stroke spark ignition engine has a firing order 1-3-4-2. Draw the firing order matrix for all four cylinders.

[1.5 marks]