



UNIVERSITY OF RUHUNA

Faculty of Engineering

End - Semester 4 Examination in Engineering: September 2023

Module Number: ME 4211

Module Name: Automobile Engineering (C-18)

[Three Hours]

[Answer **ANY FIVE (5) QUESTIONS**, each question carries **TEN** marks]

- Q1. (a) State the four strokes in a four-stroke internal combustion engine. [2 Marks]
- (b) Explain the objective(s) of each stroke described in Q1.(a). [2 Marks]
- (c) Explain the difference between dry and wet sleeves with the aid of a neatly drawn labeled diagram of a combustion chamber. [2 Marks]
- (d) Different ignition advance mechanisms have been used in automobiles since the invention of the automobile. Briefly explain the requirement for an Advance Ignition System in an automotive vehicle by using a graph. [2 Marks]
- (e) Variable Valve Timing (VVT) is common in modern vehicles. Use a valve timing diagram to explain the VVT concept. [2 Marks]

Q2. Figure Q2. shows a diagram of an engine starter motor with an electrical circuit.

- (a) Name all the parts of the engine starter motor. [3 Marks]
- (b) Explain the working mechanism of the engine starter motor. [7 Marks]

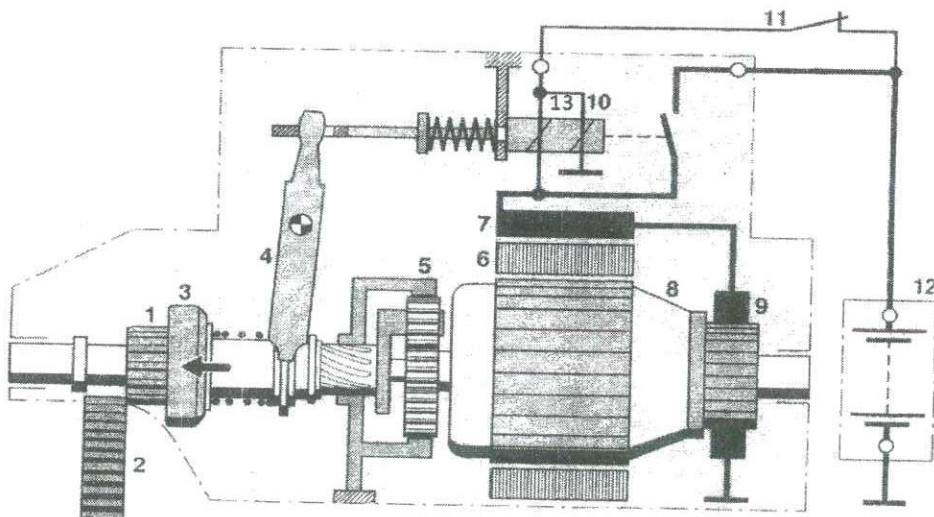


Figure Q2.

- Q3. (a)** State the objective(s) of the engine heating system. [2.5 Marks]
- (b)** Draw a circuit diagram of a basic preheating system that is used in modern vehicles, name the parts, and briefly explain the function of each part. [2.5 Marks]
- (c)** Some of the engines with turbochargers are fitted with intercoolers. State the advantages of intercooling. [2.5 Marks]
- (d)** State the limitations of intercooling. [2.5 Marks]
- Q4. (a)** State the requirement of an automobile brake system. [2 Marks]
- (b)** No sooner the automobiles began to mass produce Dual Brake Systems were introduced as a safety measure. Explain the working principle of the Dual Brake System with the aid of a simple diagram. [4 Marks]
- (c)** Splitting the brake between the front and rear wheels can be done in three common methods. Draw the three (03) circuits of splitting brakes. [4 Marks]
- Q5. (a)** Briefly describe the requirements and importance of correct clutch adjustment. [2 Marks]
- (b)** Describe the possible outcomes of incorrect clutch clearance. [2 Marks]
- (c)** Describe the factors affecting the torque capacity of a clutch assembly. [2 Marks]
- (d)** Mention the name/type of the bearing located in the center of the flywheel and state its function. [2 Marks]
- (e)** Briefly explain the functional requirement(s) of the grooves on the plate linings. [2 Marks]
- Q6. (a)** Write down the functions of an automobile differential and the propeller shaft. [4 Marks]
- (b)** Draw neat sketches of three (03) possible wheel bearing arrangements of rear-wheel drive vehicles and explain the working of the above arrangements. [6 Marks]