THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION

790 **AUTOMOBILE TECHNOLOGY**

Time: 3 Hour. **Monday, 13th May 2003 p.m.**

Instructions

1. This paper consists of **ten (10)** questions.
2. Answer any **five (5)** questions
3. Each question carries **twenty (20)** marks.
4. Programmable calculators, cellular phones and other unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

1. (a) State five workshop safety measures a mechanic must observe when working under a lifted vehicle.

   (b) Mention three causes of workshop fires and explain how each can be prevented.

   (c) Outline the procedure for using a fire blanket to extinguish a small engine bay fire.

2. (a) Describe the operating principle of a turbocharged diesel engine.

   (b) State four advantages of turbocharging in modern engines.

   (c) Highlight three possible faults that may result from a failing turbocharger and their effects on engine performance.

3. (a) With the aid of labeled sketches, distinguish between inline and V-type engine configurations.

   (b) Explain the function of the following components:

      (i) Timing belt

      (ii) Flywheel

      (iii) Oil sump

   (c) List three effects of incorrect valve timing on engine operation.

4. (a) Differentiate between wet sump and dry sump lubrication systems.

   (b) Explain how the oil pressure relief valve functions in an engine lubrication system.

   (c) State four signs of insufficient lubrication in an internal combustion engine.

5. (a) Describe the construction and operation of a master cylinder in a hydraulic brake system.

   (b) Explain the importance of brake fluid specifications and compatibility in braking systems.

   (c) State four symptoms of air trapped in the brake system and their implications on safety.

6. (a) Compare coil spring and leaf spring suspension systems in terms of construction and application.

   (b) Explain how a MacPherson strut works and where it is commonly used.

   (c) State three reasons why shock absorbers should be replaced in pairs.

7. (a) Define the term “understeer” and explain its causes in a front-wheel-drive vehicle.

   (b) Describe three methods of correcting wheel imbalance.

   (c) Outline the step-by-step procedure for replacing a worn-out tie rod end.

8. (a) Explain the purpose and working of a crankshaft position sensor.

   (b) Differentiate between open circuit and short circuit faults in vehicle electronics.

   (c) State three causes of starter motor failure and how each can be diagnosed.

9. (a) List four advantages of using CAN bus systems in modern vehicles.

   (b) Explain the function of an Engine Control Unit (ECU) and how it interacts with sensors and actuators.

   (c) What is a multimeter and how is it used to test continuity in a vehicle circuit?

10. (a) A vehicle exhibits frequent overheating. List five possible causes and explain the impact of each on engine health.

    (b) Describe the function of a radiator cap and how it contributes to pressure regulation.

    (c) Outline how to perform a cooling system pressure test.