THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION

790 AUTOMOBILE TECHNOLOGY

Time: 3 Hour. **Monday, 14th May 2002 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) Explain five workshop safety rules a technician must follow before performing repair or service on a vehicle.

   (b) State three types of fire extinguishers used in an automotive workshop and explain the type of fire each is used for.

   (c) Describe how to respond in case of a fuel spill in a workshop environment.

2. (a) Explain the working principle of a four-stroke spark ignition engine.

   (b) Outline four functions of a carburetor in petrol engines.

   (c) State three advantages and two disadvantages of electronic fuel injection systems over traditional carburetors.

3. (a) Differentiate between the following:

   (i) Overhead Valve (OHV) and Overhead Camshaft (OHC) engines

   (ii) Naturally Aspirated and Supercharged engines

   (iii) Wet and dry liners

   (b) State three advantages of using aluminium in engine block construction.

   (c) Explain two reasons why cylinder head gaskets fail.

4. (a) Define the term “compression ratio” and explain its importance in engine performance.

   (b) A diesel engine has a bore of 85 mm, a stroke of 110 mm, and four cylinders. Calculate the engine displacement in cc.

   (c) State four factors that affect the thermal efficiency of an internal combustion engine.

5. (a) Describe the working of a disc brake system using a labeled sketch.

   (b) Give three reasons why modern vehicles prefer disc brakes over drum brakes.

   (c) Explain how Anti-lock Braking Systems (ABS) improve safety during braking.

6. (a) Describe the functions of the following suspension components:

   (i) Shock absorber

(ii) Coil spring

(iii) Control arm

(b) Differentiate between independent suspension and rigid axle suspension.

(c) State three symptoms of worn-out suspension parts and their effects on vehicle performance.

7. (a) Describe the procedure for checking and adjusting wheel alignment.

(b) Explain the effects of incorrect camber, caster, and toe on tire wear and steering.

(c) What are the benefits of computerized wheel alignment over manual methods?

8. (a) List four functions of the lubrication system in an engine.

(b) Differentiate between mineral oil and synthetic oil in terms of performance and usage.

(c) Describe how to perform an oil pressure test on an engine.

9. (a) What is a catalytic converter and what role does it play in emission control?

(b) State four pollutants reduced by modern emission control systems.

(c) Explain two differences between EGR and PCV systems.

10. (a) List five common causes of engine overheating and explain how each affects the engine.

(b) Describe the working principle of a thermostat in a cooling system.

(c) Explain how to carry out a radiator pressure test.