

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

093

MOTOR VEHICLE MECHANICS

(For Both School and Private candidates)

Time: 3 Hours

Year: 2021

Instructions

1. This paper consists of section **A**, **B** and **C** with total of **fourteen (14)** questions.
2. Answer **all** questions in section **A** and **B** and **three (3)** questions in section **C**.
3. Section **A** carries **ten (10)** marks and section **B** and **C** carries **forty five (45)** marks each.
4. Cellular phones, and any unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet (s).



SECTION A (10 marks)

Answer **all** questions in the section

1. Choose the correct answers among the given alternatives:

- i) What are the advantages of using helical gears compared to spur gears in a transmission system?
 - A. Strength is high and less cost
 - B. Strength is high and less end thrust
 - C. Noise level is low and its strength is high
 - D. Noise level is low and its economy in fuel
 - E. Noise level is high and its strength is high.
- ii) If a wheel diameter is divided by section width of a wheel and the result is multiplied by 100%, what will be the outcome?
 - A. Aspect ratio of the diameter expressed in percentage
 - B. Aspect ratio of the tyre expressed in percentage
 - C. Aspect ratio of the bead expressed in percentage
 - D. Aspect ratio of the width expressed in percentage
 - E. Aspect ratio of the height expressed in percentage.
- iii) What is the octane rating of petrol available commercially with regard to motor car?
 - A. 65-75
 - B. 95-100
 - C. 100-110
 - D. 110-125
 - E. 85-95.
- iv) What effects will be experienced when there is wheel imbalance in motor vehicle?
 - A. Steering wheel vibrations and uneven tyre wear

- B. Poor acceleration and hard steering
 - C. Frequent hard steering and hard ride
 - D. Poor acceleration and reduced fuel efficient
 - E. Frequent wheel vibrations and uneven tyre wear
- v) Which engine operation causes the spark plug to indicate deposit of black coating of soot?
- A. Most economical mixture
 - B. Stoichiometric mixture
 - C. Too lean mixture
 - D. Too rich mixture
 - E. Stoichiometric fuel.
- vi) What does the crescent shaped cavity on the piston head top surface represent?
- A. Piston oil hole
 - B. Snap ring
 - C. Valve recess
 - D. Valve clearance
 - E. Piston fuel hole
- vii) A mechanist intends to order a multi-grade engine oil for the car. Which type of engine oil is he supposed to order?
- A. SAE 30
 - B. SAE 20 W50
 - C. API SF
 - D. API 50
 - E. API 50 multi
- viii) Which parameters determine the size of engine cylinder?
- A. Diameter and bore

- B. Displacement
 - C. Diameter and stroke
 - D. Bore and length of piston efficiency
 - E. Bore and stroke
- ix) How can you avoid arcing and wearing of contact breaker point of ignition system which affects the performance of the engine?
- A. By frequent change of contact breaker points
 - B. By frequent adjusting contact breaker points
 - C. By using solid state electronic devices
 - D. By changing the condenser and resistor
 - E. By the use of parallel variable resistor.
- x) Which part of engine indicates the temperature of the car?
- A. Oil lubricated jacket
 - B. Engine cylinder
 - C. Engine piston hole
 - D. Water cooling jacket
 - E. Piston rings groove.

SECTION B (45 marks)

Answer **all** question in this section

2. Explain five effects of hazardous materials to be observed when working in motor vehicle workshop.
3. (a) Mention five stationary parts of an engine
(b) State the importance of each part in (a).
4. Briefly explain five important engine components which facilitate the flow of the lubricating oil in an engine.
5. Explain two functions of the valves available in a radiator cap.
6. (a) Describe in brief three main parts of the tyre.

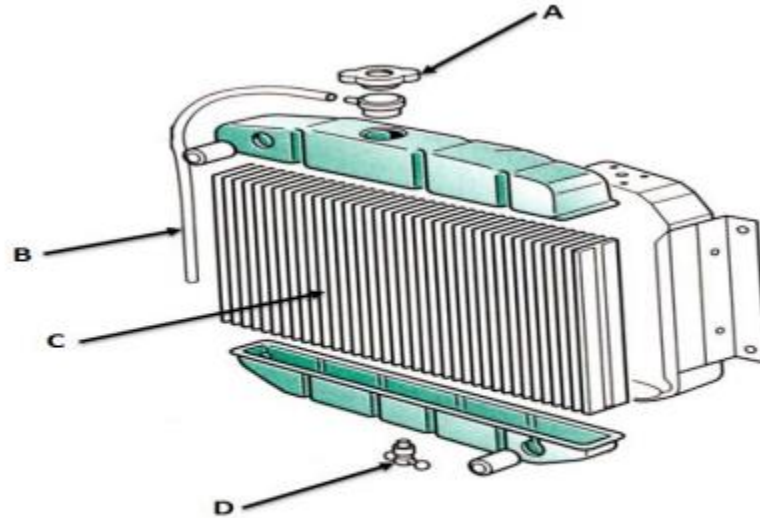
- (b) Explain in brief two characteristics of a steering system that must be realized in motor vehicle.
7. Briefly explain the procedures of removing a broken stud or nut by using extractor.
 8. Enumerate five major components of hydraulic operated brakes and their application.
 9. Explain five ways of solving the problem of the client's car engine which emits a lot of gases.
 10. Identify five safety precautions to be considered when removing airbags from the vehicle.

SECTION C (45 marks)

Answer three (3) questions from this section

11. (a) Make comparisons of different ways of holding air in tubeless and tubed tyres.
(b) Identify four periodic inspections of tyres maintenance that should be done on a newly bought car, and state two functions of the wheel in the motor vehicle.
(c) Give explanations of wheel and tyre which are: tyre rotation, rim, tyre bead and ply rating.
12. (a) (i) Identify the device in a motor car which steps up voltage in the ignition system.
(ii) Explain the construction of the device mentioned in (a) (i) with the aid of sketch.
(b) Identify four requirements to be considered while selecting the spark plug.
(c) Explain ways of setting the contact breaker gap in ignition system and what will happen when the contact breaker gap is either too wide or too narrow.
13. (a) Explain how engaging the gear smoothly, changing gears and acting as positive brake can be achieved by friction clutch.
(b) Describe symptoms and two possible causes of the clutch slip, clutch spin and clutch judder.

14. (a) (i) Explain thermo-siphon cooling system and two disadvantages of it.
(ii) Differentiate vertical flow from cross flow radiators.
(b) Label the components of radiator shown below and explain their roles in cooling system.



A Diagram of Radiator