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

093

MOTOR VEHICLE MECHANICS
(For Both School and Private Candidates)

Time: 3 Hours ***Friday 23rd October 2009 a.m.***

Instructions

1. This paper consists of sections A, B and C.
2. Answer **all** questions in sections A and B and **three (3)** questions from section C.
3. Electronic calculators are **not** allowed in the examination room.
4. Cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

This paper consists of 5 printed pages.

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SECTION A (10 Marks)

Answer **all** questions in this section.

1. For each of the items (i) - (x) choose the correct answer from among the given alternatives and write its letter beside the item number.

(i) In case of four cylinder in-line engine, the number of firing stroke(s) in one revolution of crank is
- A One (1)
- B Two (2)
- C Three (3)
- D Four (4)
- E Five (5).

(ii) Which part is not common for petrol and diesel engines?
- A Air cleaner
- B Exhaust silencer
- C Battery
- D Dynamo
- E Spark plug.

(iii) The operation of removing trapped air from hydraulic braking system is known as
- A trapping
- B tapping
- C pressurization
- D bleeding
- E clearing.

(iv) The gears in a constant mash gearbox which have teeth inclined to the shaft axis are called
- A spur
- B worm
- C bevel
- D helical
- E epicyclic.

(v) The reason why a laminated spring is made up of a series of leaves is to
- A reduce interleaf friction
- B soften the spring action and increase the maximum deflection
- C allow the leaves to slide during the bump movement
- D overcome the weakness at the centre of a single leaf spring
- E overcome friction and power.

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(vi) As applied to steering the abbreviation P.A.S stands for
- A pump assisted system
- B pump aided steering
- C power assisted steering
- D power activated system
- E pump activated steering.

(vii) The track rod is connected to the track arm by a
- A ball joint
- B king pin
- C stub axle
- D universal joint
- E U-bolt.

(viii) The main purpose of the fan of a liquid cooling system for an engine is to
- A disperse engine fumes
- B cool the external surface of the engine
- C pump hot air over the cold cooling water
- D give air flow when the engine speed is low
- E push air over the cooling water.

(ix) Excess oil consumption in an engine may be due to
- A leakage of oil through oil pan gasket
- B poor quality or improper viscosity of engine oil
- C excessive oil pressure
- D badly worn piston rings
- E worn valves.

(x) Air resistance to a car at 20 kmph is R. The air resistance at 40 kmph would be
- A R
- B 2R
- C 4R
- D R^2
- E $4R^2$.

SECTION B (30 Marks)

Answer **all** questions in this section.

2. What does 'piston displacement' mean?

3. Explain briefly how a thermostat controls the engine temperature.

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4. What is the main difference between the actions of the friction pads on the drum brake and the disk brake?

5. List down the three (3) causes of low engine oil pressure in the lubrication system with the sump oil level correct.

6. State three (3) disadvantages of Compression ignition (C.I) engine compared to petrol engine.

7. State six (6) possible causes of external leakage of cooling system of motor vehicle

8. Describe briefly power steering.

9. Write suitable ratio of fuel to air in order to obtain:

   (a) Maximum economy.

   (b) Maximum power.

   (c) Starting at cold.

10. (a) Mention two (2) functions of a tyre.

    (b) State three (3) causes of excessive tyre wear.

11. What is meant by sprung weight and unsprung weight?

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SECTION C (60 Marks)

Answer **three (3)** questions from this section.

12. Figure 1 shows one type of oil filtration systems of a motor vehicle.

(a) What is the name of this type (Figure 1) of oil filtration system?

(b) Describe fully the sequence of operation of this type (Figure 1) of oil filtration system.

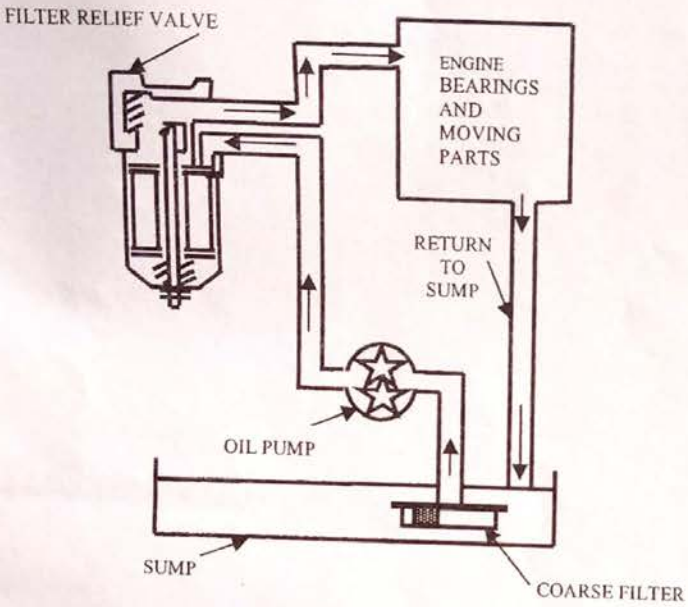

Figure 1

13. (a) Explain the two (2) purposes of a radiator in a car.

(b) Describe briefly two (2) types of radiators.

14. Explain four (4) types of steering gear boxes in common use.

15. Elaborate four (4) probable causes of a noisy gear box in neutral.

16. An engine has a bore diameter of 80 mm, stroke of 140 mm, and a hemispherical combustion chamber as shown in Figure 2.

Calculate:

(b) Swept volume of the cylinder.

(c) Clearance volume.

(d) Compression ratio.

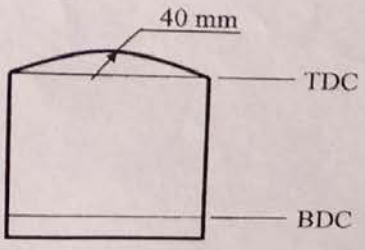

Figure 2

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