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 **Tuesday, 10th November 2015 p.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. Calculators and Cellular phones are **not** allowed in the examination room.
4. Write your **Examination Number** on every page of your answer booklet(s).

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SECTION A (10 Marks)

Answer **all** questions in this section.

1. From each of the items (i) – (x), choose the correct answer among the given alternatives and write its letter beside the item number in the answer booklet provided.

(i) Which of the following prefers the 'stroke' of an engine?
A Internal diameter of the cylinder. B Volume of the cylinder.
C Distance from t.d.c to the bearing. D Distance from b.d.c to the bearing.
E Distance from t.d.c to b.d.c.

(ii) Which part of the automobile tyre is subjected to greatest flexing action?
A Tread. B Side wall. C Bead. D Shoulder. E Side tread.

(iii) What happens when the brake pedal free play is less than the specified value?
A Brake fades.
B Vapour locking occurs in the brake lines.
C Vapour locking do not occur in the brake lines.
D Brake drags.
E Antilock braking system malfunctions.

(iv) If the air-fuel mixture in a spark ignition engine is too rich, then air-fuel ratio is about
A 15:1 B 17:1 C 10:1 D 13:1 E 12:1.

(v) The oil pump is driven directly by
A crankshaft B alternator C belt D starter E piston.

(vi) The torque available at the contact between driving wheels and road is known as
A clutch effort B brake effort C wheel effort
D gear effort E tractive effort.

(vii) The diagram which shows the correct crank positions corresponding to the opening and closing of the valves is known as
A valve open/closed diagram B valve timing diagram C valve axis diagram
D valve line diagram E valve delay diagram.

(viii) The compression ratio in petrol engine is kept less than in diesel engine because
A less compression ratio in petrol engines makes engine lighter
B it is just customary to have less compression ratio in petrol engine
C less compression ratio in petrol engines gives better performance
D higher or equivalent compression ratio in petrol engines is impossible due to pre-ignition
E less compression ratio in petrol engines which gives better performance causes pre-ignition.

(ix) The size of the engine cylinder is referred in terms of its
A diameter and bore B displacement and efficiency C bore and stoke

D bore and length E displacement and length.

(x) Incorrect Steering Axis Inclination (S.A.I) causes
A poor recovery of the steering wheel after making a turn
B tendency to assume toe-out orientation
C the vehicle to pull to the side of lesser inclination
D tendency to assume toe-in orientation
E generation of a braking effect at tight corners.

SECTION B (30 Marks)

Answer **all** questions in this section.

2. Why it is necessary to bleed a hydraulic braking system? Give two reasons.

3. What are the three phases of combustion in the C.I. engine?

4. Distinguish brake leading shoe from trailing shoe.

5. Name the two major units which are combined to form steering system.

6. Figure 1 shows some components of a motor car engine. Name the parts indicated by the letters a, b, c, d, e and f.

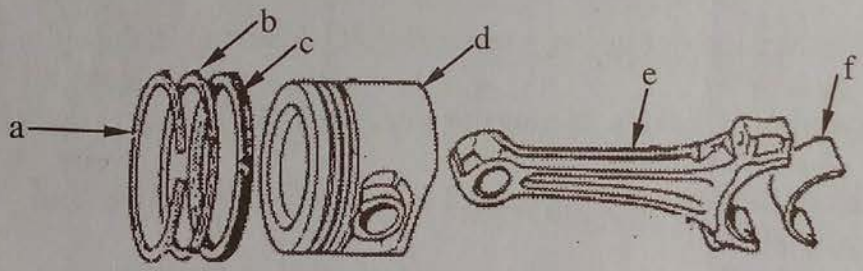


Figure 1

7. (a) State where Tachometer is usually connected and what it does for engine test.
(b) Give the description of Oscilloscope.

8. What are the three causes of sagging springs?

9. (a) Mention two safety stands.
(b) Why are the two safety stands in 9 (a) used?

10. What is the difference between the primary and secondary winding of a coil?

11. Differentiate the four-stroke compression ignition cycle from the four-stroke petrol (spark-ignition) in terms of;
(a) Obtaining the air- fuel mixture in combustion.
(b) The way ignition occurs.

SECTION C (60 Marks)

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

12. Briefly explain eight ways that internal – combustion engines can be classified and give two examples in each. **(20 marks)**

13. (a) Sketch and label the five main parts of the mechanical fuel pump. **(10 marks)**
    (b) Describe the operation of mechanical fuel pump. **(10 marks)**

14. (a) Describe the following fuel layout components of a motor vehicle: **(14 marks)**
    (i) Fuel tank. (ii) Pipeline. (iii) Fuel filter.
    (iv) Fuel lift pump. (v) Carburetor. (vi) Inlet manifold.
    (vii) Air filter/cleaner.

    (b) Differentiate between universal joint and constant velocity (CV) joint. **(06 marks)**

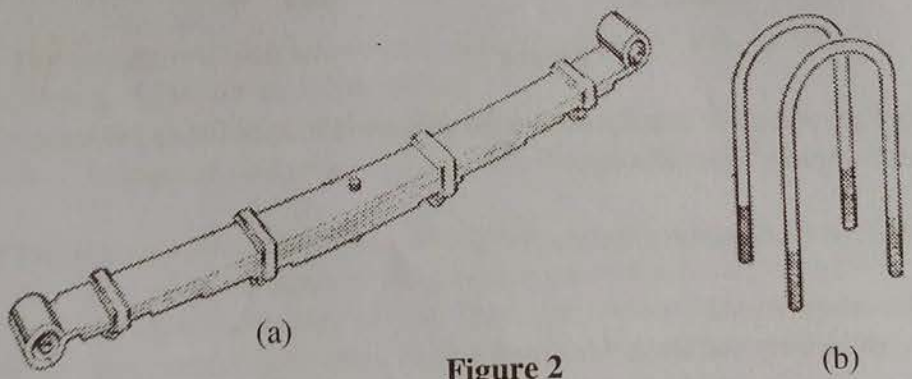
15. (a) What is the most probable cause of bubbles presence in coolant when carrying out a cylinder leakage test? **(02 marks)**
    (b) Differentiate between a fixed choke and constant vacuum carburetors. **(04 marks)**

    (c) (i) Briefly explain the importance of air cleaner in engines.
    (ii) Give the effects associated with running the engine without air cleaner. **(04 marks)**

    (d) Sketch a diagram of carburetor (section view) and label the five major parts. **(10 marks)**

16. (a) Explain three different procedures for removing a broken stud in the cylinder block. **(09 marks)**
    (b) Give three examples of friction locking devices and positive locking devices. **(09 marks)**

    (c) Give the names of the diagrams in Figure 2 as used in suspension system. **(02 marks)**



(a) (b)

Figure 2