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 **19 November 2001 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. Write your Examination Number on every page of your answer booklet(s).

This paper consists of 4 printed pages.

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) A square type engine has

A geometrical shape as square
B two horizontal cylinders and two vertical cylinders
C operating speed of 64, 81, 100, 144, 196 rpm or the like
D a cylinder bore equal to stroke length
E four cylinders with phase shift of 90° between any two consecutive cylinders.

(ii) Engine dynamo is usually driven by

A chain drive B gear drive C flat belt drive

D P.I.V. drive E V-belt drive.

(iii) When the most economical mixture is supplied in an S.I. engine the colour of exhaust flame is expected to be

A bluish, transparent
B dark blue to reddish-yellow
C yellow-red to red
D dark red
E black.

(iv) Too rich mixture for an S.I. engine means that the air fuel ratio is about

A 1:17 B 1:15 C 1:14 D 1:13 E 1:10.

(v) In a four stroke S.I engine the exhaust valve usually opens

A at BDC B at TDC C 35° to 60° after BDC

D 35° to 60° before BDC E 10° to 20° before TDC.

(vi) The gas which does not burn and pass out without transformation in a petrol engine is

A oxygen B carbon dioxide C carbon monoxide

D nitrogen E water vapour.

(vii) The function of a governor in an automobile is to

A limit the power B limit the speed

C effect maximum fuel economy D maintain constant engine speed

E maintain constant engine speed when the vehicle speeds.

(viii) The escape of burnt gases from the combustion chamber past the pistons into the crank case is called

A gas loss B blow by C by pass

D passed gas E crank case explosion.

(ix) Oil pan is attached

A to the bottom of the cylinder block
B in a separate unit away from the crankcase
C at the top of the cylinder block
D at the outside wall of the crank case
E adjacent to oil filters.

(x) Which instrument is used to measure specific gravity?

A Thermometer B Hygrometer C Hydrometer
D Anemometer E Manometer

SECTION B (30 marks)

Answer ALL questions in this section.

2. Which part of a ball bearing is harder than the other?
3. Mention three damages which are likely to occur if the oil level in the oil pan of the engine is maintained above the gauge mark.
4. What is the term used to cover the components fitted to form the drive line between the engine and road wheel?
5. Explain why petrol flows from the float chamber to the venturi.
6. Define the term viscosity. How do the oil viscosities of SAE 20 and SAE 40 compare?
7. State the purpose of the interlocking plungers fitted between the gear box selector rods.
8. What is the action of the differential when a vehicle turns a corner?
9. How is an axle located on the leaf spring?
10. What type of a tyre has a slow deflation when punctured, offers considerable resistance to side deflection and the vehicle is cornered ?
11. What does the abbreviation P.A. S. mean as applied to steering?

SECTION C (60 marks)

Answer THREE (3) questions from this section.

12. (a) The input torque of a gearbox is 125 Nm. The transmission ratio in the second gear is 2.053:1. If the efficiency of the gearbox is 95 %, find the output torque of the gearbox.

(b) Briefly explain why in modern cars the rear wheels are fitted with one "leading" and one "trailing" drum shoes arrangement.

13. Explain the changes which take place during the discharge process of a battery. Support your answer with a chemical equation.

14. (a) Name four advantages of the independent front suspension system (ifs) over the beam axle.

(b) State two purposes of stabilizers as fitted to independent front suspension system.

15. What is the purpose of

(a) camber angle
(b) caster angle
(c) king-pin inclination in automobile steering system?

16. What is the use a thermostat?