

**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 2002 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. Cellular phones are not allowed in the examination room.
4. Electronic calculators are not allowed in examination room.
5. Write your Examination Number on every page of your answer booklet(s).

This paper consists of 4 printed pages.

SECTION A (10 Marks)

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Answer ALL questions in this section.

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

- (i) In commercial vehicle layouts engine is located forward, rear or under floor mainly
- | | | | |
|---|---------------------------------------|---|---------------------------------|
| A | for better utilisation of space | B | to increase in fuel economy |
| C | to have a better weight | D | to reduce the weight of chassis |
| E | to minimise the tendency of overturn. | | |
- (ii) Which one of the following is mounted between the engine and gearbox?
- | | | | |
|---|-----------------|---|-------------------|
| A | Propeller shaft | B | Differential gear |
| C | Reductor fan | D | Clutch |
| E | Radiator. | | |
- (iii) If brake wheels get locked before the vehicle stops, the vehicle is said to be
- | | | | | | | | |
|---|-----------|---|---------|---|---------|---|---------|
| A | slipping | B | rubbing | C | sliding | D | rolling |
| E | skidding. | | | | | | |
- (iv) The flow of petrol from fuel tank to the carburettor involves
- | | | | | | |
|---|---------------------|---|---------------|---|-------------|
| A | an accelerator pump | B | a vacuum pump | C | a fuel pump |
| D | a suction pump | E | a float. | | |
- (v) One reason of fitting a gear box is to overcome the following drawback of I.C. engine:
- | | | | |
|---|----------------------------|---|--------------------------|
| A | Low torque at low speed | B | High torque at low speed |
| C | Low torque at high speed | D | High power at low speed |
| E | High torque at high speed. | | |
- (vi) An axle is located on a leaf spring by a
- | | | | | | | | |
|---|-------------|---|-------------|---|-------------|---|-------------|
| A | U-bolt | B | spring clip | C | centre bolt | D | shackle pin |
| E | spring eye. | | | | | | |
- (vii) Rotary motion of the steering wheel is converted to a reciprocating motion by
- | | | | | | | | |
|---|-----------|---|-----------|---|-----------|---|--------------|
| A | track arm | B | track rod | C | stub axle | D | steering box |
| E | king pin. | | | | | | |

- (viii) On a beam axle the stub axle pivots about a
 A. king pin B. ball joint C. track rod
 D. track arm E. steering column.
- (ix) Water circulation in a thermo-syphon cooling system is caused by
 A. conduction currents B. a belt driven water impeller
 C. a gear driven water pump D. the change in density of the water
 E. water pump circulation.
- (x) In a force feed lubrication system the device used to guard against excessive oil pressure is known as
 A. release chamber B. balancer
 C. relief valve D. stop valve
 E. pressure actuator.

SECTION B (30 Marks)

Answer **ALL** questions in this section.

2. What is scavenging?
3. Name the water-cooling system in which water pump is not needed for water circulation.
4. Describe the factors which bring a moving vehicle to rest (halt).
5. List down three causes of high oil pressure in the lubrication system.
6. What is the difference between constant-mesh and synchromesh transmission?
7. What is a reversible steering?
8. What is the function of a choke or venturi in a carburettor?
9. How is the repair of a tubeless tire with a small puncture done?
10. Between which two members is the coil spring retained on most front suspension systems? State two methods of retaining the coil spring.
11. Give three causes of car wanders.

SECTION C (60 Marks)

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

12. What is the purpose of a gasket? Name places where gaskets are used in the engine.

13. An engine cylinder has a swept volume of 225 cm^3 and a clearance volume of 25 cm^3 .
- (a) Calculate the compression ratio
 - (b) During a compression test five shots of oil from an oil can decrease the clearance volume by 5 cm^3 . Calculate the compression ratio when the oil is in the cylinder.
14. Some water-cooled engines do not employ a water pump to assist circulation in the system.
- (a) What is the name given to this type of a system?
 - (b) Under what principles does this system operate?
15. State three functions of a steering box.
16. State four causes of noisy gearbox defect.