

0103/213  
TRADE THEORY  
June/July 2020  
Time: 2  $\frac{1}{2}$  hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL  
ARTISAN CERTIFICATE IN MOTOR VEHICLE MECHANICS

TRADE THEORY

2  $\frac{1}{2}$  hours

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Drawing instruments.*

*This paper consists of TWO sections; A and B.*

*Answer ALL questions in section A and any FOUR questions from section B.*

*Maximum marks for each part of a question are indicated.*

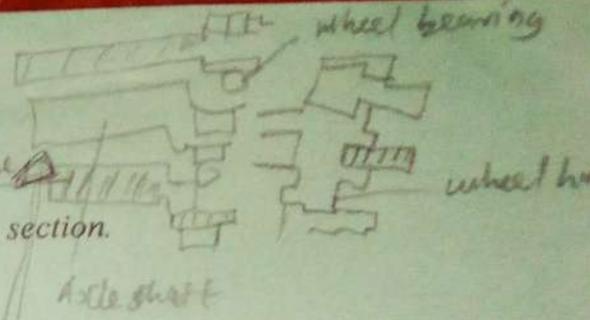
*Candidates should answer the questions in English.*

[www.judictv.co.ke](http://www.judictv.co.ke)  
This paper consists of 3 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

**SECTION B**

Answer any **FOUR** questions from this section.



11. (a) State **two** functions of the suspension system. (2 marks)
- (b) Sketch a front double wish bone independent suspension and explain its advantages and operation. (13 marks)
12. (a) State the purpose of a final drive. (2 marks)
- (b) Using a diagram, explain the construction of a fully floating axle. (13 marks)
13. (a) Draw and label the main features of a piston. (5 marks)
- (b) Explain the operation of a four stroke C.I engine. (10 marks)
14. (a) Name **two** main functions of a coil ignition system. (2 marks)
- (b) With the aid of a sketch, explain the operations of a coil ignition system. (13 marks)
15. (a) State **one** function of a starter motor. (1 mark)
- (b) With the aid of a sketch, explain the operation of a starter motor. (14 marks)

Induction  
 - Piston moves downward.  
 - Inlet valve is open.

Compression  
 - Inlet valve remains open.  
 - No power is generated.  
 - Air is compressed.  
 - There is air compression.

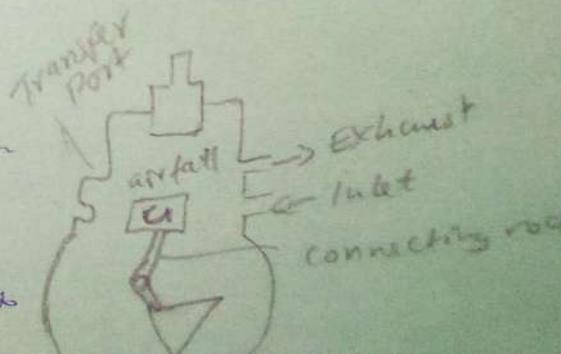
Power  
 - Both inlet and exhaust valves open.  
 - High multiplication of air.  
 - Power is generated.  
 - Fuel is injected.  
 - Just before B.P.C the fuel is injected.  
 - Both inlet and exhaust valves open.

**THIS IS THE LAST PRINTED PAGE.**

Exhaust

- Piston moves upward.  
 - Exhaust valve is open.  
 - The ~~inlet~~ port is opened.

The fresh air ~~enter~~ pushing the burnt gases to pass through the transfer port into the exhaust valve and emitted to the atmosphere.



When the drive starts the vehicle the motion runs from the starter to

## SECTION A

Answer ALL questions in this section.

1. List **four** attires to be worn when working in the workshop. (4 marks)  
*Overalls, boots, caps, gloves*
2. (a) List **two** special tools used when fitting a piston back in the cylinder bore. (2 marks)  
*Wrist pin driver, piston ring compressor*
- (b) List **two** tools used in measuring crankshaft journal. (2 marks)  
*Feeler gauge, micrometer*
3. (a) Outline **three** methods of keeping workshop records. (3 marks)  
*Registers, statistics, cards*
- (b) List **one** method for costing labour. (1 mark)  
*fatigue*
4. (a) Outline **two** types of tyre construction. (2 marks)  
*Radial-tyre, cross-ply tyre*
- (b) Name **two** types of fuel pumps. (2 marks)  
*electrical fuel pump, mechanical fuel pump*
5. (a) List **two** types of drum shoe arrangement. (2 marks)  
*Horizontal, vertical*
- (b) Name **two** types of thermostats used in a water cooled engine. (2 marks)  
*Bellows thermostat, wax element thermostat*
6. List **four** types of steering gear boxes. (4 marks)  
*Worm and pin, worm and sector, rack and pinion, recirculating ball*
7. (a) State the function of a propeller shaft. (2 marks)  
*to transfer the torque from the engine to rear wheel*
- (b) List **two** types of leaf spring shackles. (2 marks)  
*U-bolts, transverse spring*
8. State **four** types of fire extinguishers. (4 marks)  
*Water, CO<sub>2</sub>, foam, dry powder*
9. (a) Name **two** possible positions that an engine can be mounted. (2 marks)  
*front, rear, middle*
- (b) Name **two** types of head lamps used in a vehicle. (2 marks)  
*transverse spring, semi-elliptical spring*
10. (a) Outline **three** types of rims used in a motor vehicle. (3 marks)  
*steel rim, chrome rim, mag helium rim*
- (b) List **two** types of puncture repair. (1 mark)  
*tubular, tubed*

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