



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

**N970(E)(N23)H
NOVEMBER EXAMINATION
NATIONAL CERTIFICATE
MAINTENANCE MANAGEMENT: FARMING N4
(4090524)**

**23 November 2016 (X-Paper)
09:00–12:00**

Calculators may be used.

This question paper consists of 8 pages.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE
MAINTENANCE MANAGEMENT: FARMING N4
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
 2. Read ALL the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Write neatly and legibly.
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QUESTION 1: GENERAL

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 The responsibility of the employer includes ...

- A ensuring that workers are always clean and neat at work.
- B ensuring that workers use their safety equipment.
- C reporting unsafe conditions and accidents.
- D ensuring and maintaining a safe workshop.

1.1.2 The responsibility of the employee includes ...

- A ensuring a safe work environment without hazards.
- B ensuring that no toxic gasses are released into the air.
- C conveying information and instructions.
- D wearing safety and protective clothing.

1.1.3 This circuit includes all of the components and wires operating on low voltage:

- A Secondary circuit
- B High-tension circuit
- C Primary circuit
- D Low-pressure injection circuit

1.1.4 A high-voltage electric device for igniting an air-fuel mixture:

- A Ignition switch
- B Ignition coil
- C Condenser
- D Spark plug

1.1.5 The component that ensures rapid warm-up when starting an engine from cold:

- A Radiator
- B Thermostat
- C Pressure cap
- D Water pump

(5 × 1) (5)

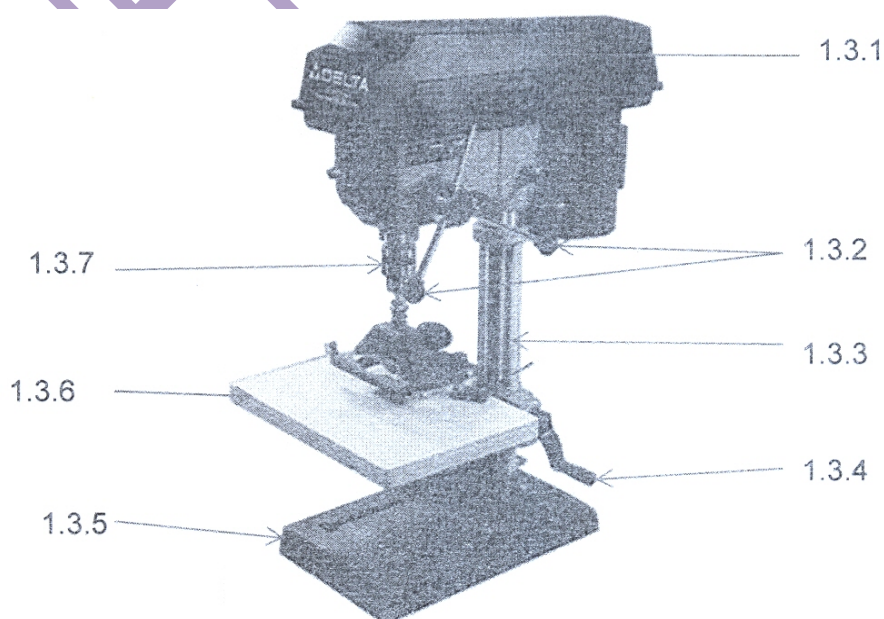
- 1.2 Choose a description from COLUMN B that matches a term in COLUMN A. Write only the letter (A–I) next to the question number (1.2.1–1.2.8) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.2.1	Torque wrench	A	links the crankshaft and the camshaft
1.2.2	Trestles	B	serves as a lever to open the valve
1.2.3	Bearing puller	C	allow the air-fuel mixture to enter the cylinder
1.2.4	Cylinder block	D	used to make rings wide so that they can be fitted onto the engine piston
1.2.5	Rocker	E	houses the pistons
1.2.6	Inlet valve	F	used to insert the piston in the cylinder
1.2.7	Crankshaft	G	used to support the car when the person is working under it
1.2.8	Timing chain/gear	H	mounting point for the connecting rods
		I	sometimes used to perform wheel alignment procedures

(8 × 1)

(8)

- 1.3 A pedestal drill machine is one of the important pieces of equipment a farm owner should have. Below is a diagram of the pedestal drill machine. Label the machine by writing the name of the component next to the number (1.3.1–1.3.7) in the ANSWER BOOK.



(7 × 1)

(7)

[20]

QUESTION 2: VEHICLES AND IMPLEMENTS

- 2.1 Identify the following engine components and state ONE function of each. Write the name and the function next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.

2.1.1



2.1.2



2.1.3



2.1.4



2.1.5



(5 × 1)

(5)

- 2.2 Valves can be regarded as gates that allow air and fuel to get into the engine and fumes to leave the engine operation.

Explain how the valves function. The explanation should start from the rotation of the crankshaft up to when the spring opens or closes the valve.

(4)

- 2.3 Differentiate between the functioning of a four-stroke diesel and a four-stroke petrol engine. Tabulate the answer.

(4)

- 2.4 When an engine is working it generates a lot of heat and when the heat is in excess it needs to be taken out in order to cool off the engine.

List THREE reasons why it is important to cool off the engine.

(3)

- 2.5 Mr Mtshali owns a 400 hectare farm with a lot of equipment including trucks and tractors. He does not understand the importance of cooling systems in his trucks and tractors and even goes without checking the coolant in the radiator for months.

- 2.5.1 Evaluate the effects of Mr Mtshali's behaviour on his farming business and his workers and their families if he continues doing this.

(3)

- 2.5.2 Advise Mr Mtshali on what he should do to avoid the effects mentioned in QUESTION 2.5.1.

(1)
[20]

QUESTION 3: WELDING

- 3.1 Compare the functioning of the following two types of welding machines i.e. the motor generator and the transformer. Advantages and disadvantages may be included. Make FIVE comparisons.



(10)

- 3.2 Welding can be defined as a process of joining metal parts by heating to the point of melting. Sketch the following welding joints:

- 3.2.1 T-joint

- 3.2.2 Corner joint

- 3.2.3 Edge joint

- 3.2.4 Lap joint

- 3.2.5 V-butt joint

(5 × 1) (5)

3.3 Explain the causes of the following welding defects:

3.3.1 Incomplete penetration

3.3.2 Spatter

3.3.3 Porosity

3.3.4 Slag inclusion

3.3.5 Buckling

(5 × 1) (5)
[20]

QUESTION 4: ELECTRICITY

4.1 With the aid of a triangle fully explain Ohm's law. Show the relationships between elements.

(5)

4.2 The following symbols represent units of measurement, for example kilogram (kg) is used to measure weight. Write what the units measure next to the number.

4.2.1 Ohms (Ω)

4.2.2 Volts (V)

4.2.3 Amps (A)

4.2.4 Watts (W)

(4 × 1) (4)

4.3 Resistors connected in parallel are advantageous compared to those in series.

Calculate the total resistance of three resistors in parallel with $R_1 = 5$, $R_2 = 12$ and $R_3 = 20$ ohms. Show ALL steps in the calculations.

(5)

4.4 Electric components are connected by conductors/wires to make circuits in which electricity moves through. The circuits are either series or parallel.

Which circuit between series and parallel is recommended and why? Give FOUR reasons.

(6)
[20]

QUESTION 5: BUILDING TECHNIQUES

- 5.1 Name any FIVE buildings that an animal/crop farmer can have on his/her farm. (5)
- 5.2 Different materials are used when building.
List any FIVE common building materials that can be used when erecting a building. (5)
- 5.3 The correct ratio for mixing concrete guarantees quality.
What is the ratio for a concrete mixture, i.e. cement : sand : stone? (1)
- 5.4 State the steps that one should follow when mixing concrete. (5)
- 5.5 Make sketches of the following building joints:
- 5.5.1 Concave joint
 - 5.5.2 V-joint
 - 5.5.3 Struck joint
 - 5.5.4 Flush joint
- (4 × 1) (4)
[20]
- TOTAL: 100**