higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

NOVEMBER EXAMINATION

MAINTENANCE MANAGEMENT: FARMING N5

24 NOVEMBER 2016

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 Rudolf Diesel,✓ 1878✓ (2)

1.2 The diesel engine is an internal combustion engine✓ that uses the heat✓ of compressed air to initiate ignition✓ to burn the fuel which is injected✓ into the combustion chamber. To obtain a high compression pressure a large amount of air✓ is drawn into the cylinders during the intake stroke. During the compression stroke✓ the air is heated to between 500º C and 800º C. Diesel fuel is injected✓ with the compressed air at the end of the compression stroke. This high air temperature causes the fuel to spontaneously ignite✓ and burn. (Any appropriate 8 × 1) (8)

1.3
- Crankshaft turns camshaft
- Cam presses onto cam follower/tappet
- Cam follower presses against pushrod
- Pushrod presses against valve rocker
- Rocker rotates on rocker shaft
- Valve rocker presses against valve stems and opens valves against the pressure of the valve spring
- When cam moves away from cam follower the valve spring closes the valve against the valve seat (Any appropriate 7 × 1) (7)

1.4
- Stores fuel in small quantities
- Mixes the fuel with air
- Atomises petrol into a mist
- Measures the fuel
- Controls engine speed
- Supplies vacuum to the vacuum devices (Any appropriate 3 × 1) (3)

[20]

QUESTION 2

2.1
- Provides a permanent neutral
- Enables engine torque to be increased
- Provides a forward and reverse
- Allows road speed to be increased
- Allows engine torque to increase to move a vehicle from a stop.

(Any appropriate 3 × 1) (3)

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2.2
- Helical
- Spur gear (2)

2.3 2.3.1 Connects the drive shaft to turn the final drive and wheels.

2. 3.2 Allows the driver to change gears.

2.3.3 Provides different gear ratios in conjunction with output shaft gears.

2.3.4
- Prevents gears from clashing (grinding) during engagement.
- Locks the output gear to the output shaft.
- Synchronises the speed of gears before engagement.

(Any 1 × 2)
(4 × 2) (8)

2.4 Liquids cannot be compressed and when pressure is applied to a liquid within a closed space, pressure is exerted equally in all directions. (2)
[15]

QUESTION 3

3.1
- Provides a firm base on which to fit the tire.
- Must withstand the forces caused by accelerating, braking and hard cornering.
- Must be as light as possible to help keep un-sprung weight to a minimum.
- Must allow for quick mounting and dismounting of the tire onto the rim.
- Must be strong enough to carry the mass of the vehicle.

(Any appropriate 5 × 1) (5)

3.2
- Act as a cushion between the road, vehicle and the passengers.
- Provide adequate traction (friction) with the road surface.
- Displaces water at high speeds
- Reduces road noise
- Reduces rolling resistance (Any appropriate 5 × 1) (5)

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3.3
- Check tire pressure regularly and adhere to manufacturer specifications.
- Inspect tire for cuts and bulging.
- Check wheel alignment regularly to avoid excessive tire wear.
- Rotate wheels every 10 000 kilometres to ensure equal wear on all tires.
- Do not store tires in direct sunlight as this will cause hardening of the rubber.
- Avoid continued exposure to strong chemicals because they will deteriorate rubber.
- Always have a dust cap fitted to the air valve.
- Limit strong acceleration and hard braking. These actions will increase tire wear.
- Don't overfill tractor tires and the correct amount of fluid is required for proper traction purposes.
- Inspect wheel rims for serviceability.
- Balance wheels when shaking of steering occurs.

(Any appropriate5 × 1) (5)
[15]

QUESTION 4

4.1
- Gas welding is a melting process where the parent metals are melted together using the oxy-fuel flame.
- No flux is needed to do the melting process because the parent metal melts.
- The gas used during this welding process is oxygen and acetylene.
- The gas provides the heat.
- The filler rod is being held in the hand and is a consumable.
- This process takes longer than arc welding. (Any appropriate5 × 1) (5)

4.2
- Keep oil and grease away from the gas system.
- Do regular inspections for damaged pipes and leaks.
- Do not weld or gas cut on containers or vessels which had flammable liquids in it or is near flammable substances.
- Always wear a gasmask when you do gas cutting on galvanized plate or painted surfaces due to the toxic gasses.
- Make sure there is a fire extinguisher nearby. (Any appropriate 5 × 1) (5)

4.3
- Store full and empty cylinders separately.
- Store flammable and non-flammable cylinders separately.
- Cylinders must not be rolled, slid or knocked on the floor, or used as rollers.
- Keep cylinders out of direct sunlight and away from heat.
- Keep cylinders in a cool dry place with good ventilation**.**

(Any appropriate5 × 1) (5)
[15]

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QUESTION 5

5.1
- Eskom
- Diesel/Petrol generators
- Solar power (Photovoltaic systems)
- Wind power
- Water power (Hydro-electric power) (5)

5.2 5.2.1 Clean the motor and starter. (1)

5.2.2 Clean slip rings and covers with a soft brush dipped in white spirits. (1)

5.2.3
- Check earth connections of motor and starter.
- Blow through the motor and starter with dry compressed air at 2 kg/cm^2.
- Check tightness of cable connections.
- Check motor for overheating, abnormal noise/sounds, sparking and proper bedding of brushes.
- Tighten belts and pulleys to eliminate excessive losses.

(Any 3 × 1) (3)

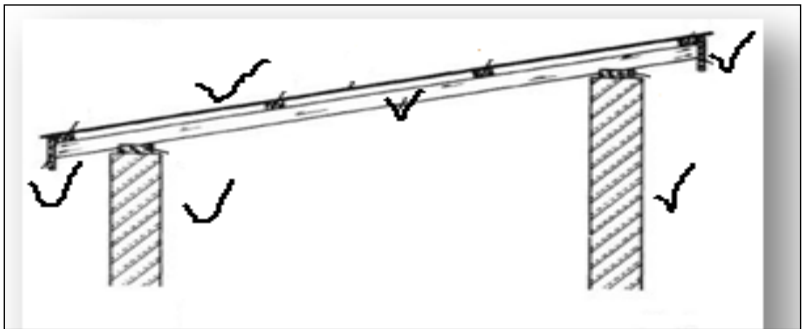
5.2.4
- Check the overload mechanism of the starter.
- Check alignment of motor with driven equipment.
- Check no load current and compare with earlier/original.
- Check/Change lubrication as per given lubrication schedule.
- Check the securing foundation nuts for tightness.
- Inspect the paint coating and do touch-up wherever required.
- Check IR of motor and starter with 500 V megger. It should not be less than 2 µ. (Any appropriate 5 × 1) (5)

[15]

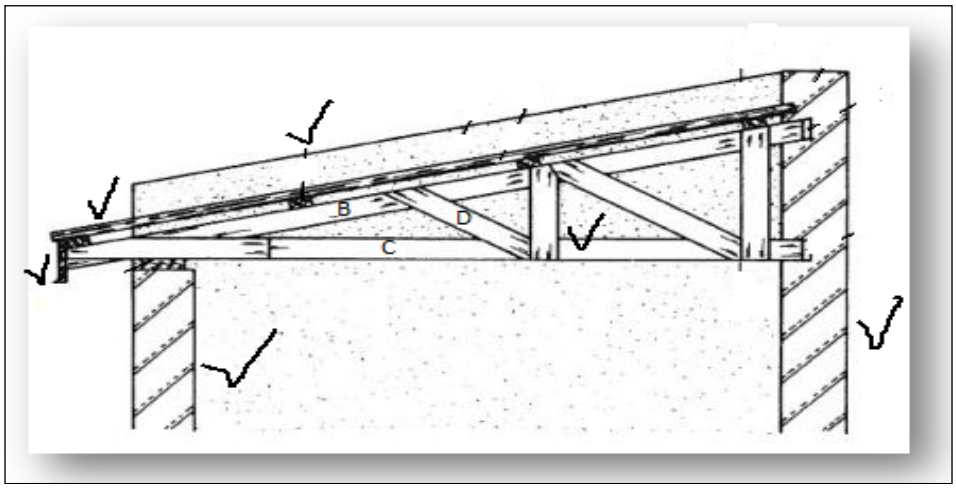
QUESTION 6

6.1
- It gives shelter to people and animals.
- It provides shade.
- It isolates the building from cold and heat.
- It keeps out dust and dirt.
- It protects the interior of the building.
- It sheds rainwater. (Any appropriate 5 × 1) (5)

6.2 6.2.1



6.2.2



(Any 5 × 2) (10)

6.3.1 Daily water requirements:
= 50 × (40 + 60 + 90) + (300 × 5)
= 11 000 litre✓

Minimum capacity of dam measured in m³:
= 11 000 × 90✓
= 990 000 litre per 90 days
= 990 000/1000✓
= 990 m^3✓

NOTE: 1 000 litre = 1 m³
The capacity of the dam will have to be greater than 990 m^3 to allow for seepage and evaporation during the 90-day period.

The safety factor:
To compensate for water losses a safety factor of 1,5 should be used.

Minimum capacity of dam measured in m³:
= 990 × 1,5
= 1 485 m³✓ (5)

[20]

TOTAL: 100

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