



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL TECHNOLOGY

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MEMORANDUM

MARKS: 200

This memorandum consists of 9 pages.

SECTION A**QUESTION 1**

1.1	A	X	C
1.2	X	B	C
1.3	A	X	C
1.4	A	X	C
1.5	A	B	X
1.6	A	B	X
1.7	A	B	X
1.8	X	B	C
1.9	A	X	C
1.10	A	B	X
1.11	A	B	X
1.12	X	B	C
1.13	A	X	C
1.14	A	B	C
1.15	X	B	C
1.16	X	B	C
1.17	A	B	X
1.18	A	B	X
1.19	A	X	C
1.20	X	B	C

TOTAL SECTION A: (20 x 2) 40**TOTAL:**

SECTION B**QUESTION 2: MATERIALS AND STRUCTURES**

- 2.1
- Increases resistance against corrosion ✓
 - Promotes the hardening of steel ✓
 - Improves strength ✓
 - Improves resistance to the formation of scale ✓
 - Improves tensile strength ✓
 - Decreases magnetism
 - Most chromium steels can be welded well
- (Any 5) (5)
- 2.2
- Extend in a straight line ✓
 - Sturdy corner and straining posts ✓
 - Posts upright ✓
 - Straining posts not far from one another ✓
 - Strands firmly attached to line posts by means of isolators ✓
 - Posts and wires should be spaced equally ✓
 - Do not make use of inferior material ✓
- (7)
- 2.3
- Pressure should be high enough to satisfy needs ✓
 - Prevent spillage ✓
 - Joints should be watertight ✓
 - Removal of spillage water ✓
 - Protect all valves
- (Any 4) (4)
- 2.4
- 2.4.1
- Not a solid wood. (not strong enough) ✓
 - Deteriorates/disintegrate in moist conditions ✓
- (2)
- 2.4.2
- Triangular because of their specific shape/design ✓
 - Are very strong. ✓
 - It strengthens the construction so that the struts ✓
 - can carry the weight of the roof. ✓
- (4)
- 2.5
- 2.5.1
- (a) Stretcher bond ✓
- (b) English bond ✓
- (2)
- 2.5.2
- DPC prevents damp rising up into the walls, causes a big problem for painting and plastering at a later stage. ✓
 - Before you start the wall, unroll the 225mm DPC onto the brickwork of the foundation; ✓
 - with an overlap of $\pm 300\text{mm}$. ✓
 - Always place DPC underneath all outside windowsills ✓
 - to prevent penetration of water into the wall. ✓
- (5)

- 2.6
- Mild-steel sheets ✓
 - are cleaned ✓
 - with hydrochloric acid, ✓
 - then fluxed ✓
 - with zinc-chloride ✓
 - and dipped into molten zinc. ✓

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QUESTION 3: ENERGY

- 3.1 3.1.1
- Solar cells or panels are necessary. ✓
 - The solar panels are made of a semi-conductive material – silicon. ✓
 - The semi-conductive material contains inactive electrons. ✓
 - When photons reach the solar cells, ✓
 - The electrons absorb this solar energy, ✓
 - Transforming them into conduction electrons.
 - The solar cells convert the electrons in the photons to free electrons.
 - Which can be conducted through the circuit to its destination
 - The stronger the sun shines, the more electricity is generated.
 - Electricity is then stored in a battery for later use. (Any 5) (5)
- 3.1.2
- That the cell is not working to its full potential (e.g. some electrons may be lost), ✓
 - When the electrons release heat; the panel also becomes warm, interfering with other aspects of the solar cells. ✓
 - The number of solar panels determines the efficiency of the system. ✓
 - Location of the panels ✓
 - Solar cells should always be facing the direction of the sun (north), and have no structures blocking the sun's rays. ✓ (5)
- 3.1.3
- Easy to install ✓
 - Low maintenance costs ✓
 - Relative cheap energy ✓
 - Environmental friendly energy source (3)
- 3.2 3.2.1
- Biofuel is any plant or animal matter which can be combusted and used as a fuel. ✓
 - Biofuels are one of the new ranges of renewable energy sources in the world today. ✓ (2)
- 3.2.2
- Low energy output of the fuels. ✓
 - Production cost of the fuel is very high currently. ✓
 - Certain food crops like maize are needed to produce them, which may lead to an imbalance in food security. ✓
 - There is a huge quantity of water required which may affect the local water resources.
 - More land to produce crops for bio fuel. Habitats of animals and wild plants might be endangered. (Any 3) (3)

- 3.2.3
- Is an alternative fuel made from woody plant fibre, coal or natural gas ✓
 - it is used primarily as a supplement to gasoline. ✓
 - It can be harvested from the methane gas in landfills in addition to fermented waste products such as sewage and manure.
 - Pure methanol can be used as a racing motor fuel
 - It is also the primary alcohol used to mix with biodiesel.

(Any 2) (2)
[20]

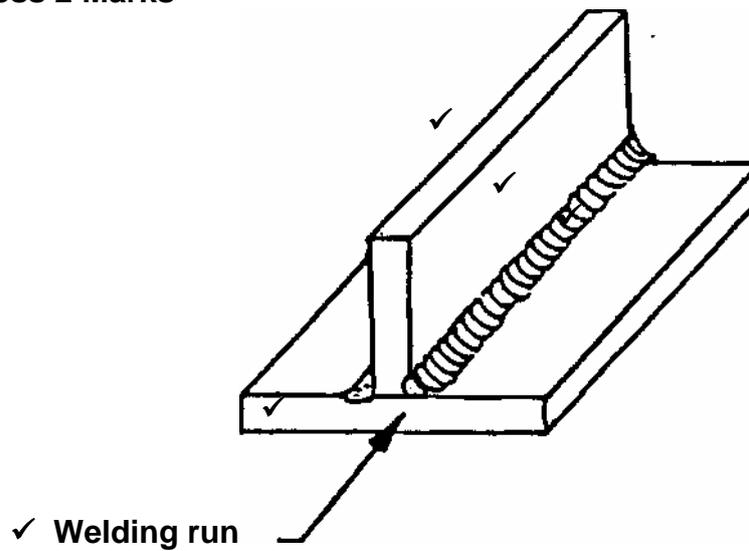
QUESTION 4: SKILLS AND CONSTRUCTION PROCESSES

- 4.1
- Use a pure nickel-welding rod. ✓
 - Amperage must be as low as possible. ✓
 - Arc must be a little longer than when welding mild steel. ✓
 - Make sure that all rust, grease, dirt and/or any other substances, which can weaken the joint has been removed, before starting with the process of joining. ✓
 - Remember to remove the surface layer of the metal where the joint is to be made. ✓
 - Cover the suspect area to be welded with white chalk. Vaseline in the cracks will colour the chalk grey or show a wet line. ✓
 - Mark the line by means of a prick-punch and hammer to prevent the line from disappearing when grinding out the V-groove. ✓
 - It is very important that the cast-iron to be welded is kept as cool as possible during the welding process. ✓
 - Pre-heating of a cast-iron to be welded can help to prevent it from forming new cracks. ✓
 - Cast-iron should be allowed to cool down slowly after welding. ✓
 - A cast-iron should never be submerged in water to cool it down.
 - The run can be lightly tapped with a small hammer while it is cooling down.
 - This action helps to relieve the tension around the weld. (Any 10) (10)
- 4.2
- Requires a smaller melting pool, big enough to create the expected penetration. ✓
 - Done by reducing the size of the flame. ✓
 - Or using a slightly thicker welding rod. ✓
 - Force of the flame will help to keep the molten metal positioned. ✓ (4)
- 4.3
- 4.3.1
- A – Longitudinal shrinking ✓
 - B – Angular shrinking longitudinally ✓
 - C – Angular shrinking ✓
 - D – Lateral shrinking ✓ (4)
- 4.3.2
- Amount of welding ✓
 - Number of welding runs ✓
 - Degree of resistance ✓
 - Original state or condition of parts that must be welded
 - Welding procedure (Any 3) (3)

- 4.3.3
- Pre-setting ✓
 - Welding of patch work ✓
 - Clamping ✓
 - Spot welding ✓
- (4)

- 4.4
- Metal against metal friction ✓
 - Serious jolts or shocks of metal against rock ✓
 - Jolts and shocks ✓
 - Serious scraping ✓
- (4)

- 4.5 **Neatness 2 Marks** ✓✓



(6)
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QUESTION 5: TOOLS, IMPLEMENTS AND EQUIPMENT

- 5.1 5.1.1
- Lubricate regularly ✓
 - Sharpen all blades ✓
 - See that all screens are in working order or in place ✓
 - Replace worn V-belts ✓
 - Make sure all V-belts are tight ✓
 - Repair damaged or broken parts immediately ✓ (6)
- 5.1.2
- Welger system ✓
 - Vermeer system ✓ (2)
- 5.1.3
- Slip clutch ✓
 - Screens ✓
 - Shear bolts ✓
 - Ram-stop safety mechanism ✓ (4)
- 5.2 5.2.1
- Very quick way of getting your crop from the land ✓
 - Very reliable method of harvesting ✓
 - Economical ✓
 - Labour saving ✓
 - Accurate record-keeping ✓
 - Computers do the whole harvesting process with little input from the operator
 - Single operation (Any 5) (5)
- 5.2.2
- Loss of kernels may occur ✓
 - The wrong drum speed may break the kernels ✓ (2)
- 5.3 5.3.1 Universal joint ✓ (1)
- 5.3.2
- Strong ✓
 - Must not become loose (secured) ✓
 - Weight-saving ✓
 - Must provide adequate/efficient protection ✓ (4)
- 5.4 5.4.1
- Engine-oil levels ✓
 - Gearbox-oil levels ✓
 - Final drive-shaft oil levels ✓
 - Leakages in cooling systems ✓
 - Leakages in fuel systems ✓
 - Leakages in hydraulic systems ✓
 - Instruments
 - Battery
 - Tire pressure
 - Fuel level (Any 6) (6)

- 5.4.2
- Type of use ✓
 - Maximum drive requirements ✓
 - Texture of the soil ✓
 - Type of tractor ✓
- (4)
- 5.5
- Single-action hydraulic cylinder ✓
 - Double-action hydraulic cylinder ✓
- (2)
- 5.6
- To adjust the cross-angle of the implement ✓
 - in relation to the tractor ✓
- (2)
- 5.7
- To adjust the angle of the implement ✓
 - in relation to the tractor's movement ✓
- (2)
[40]

QUESTION 6: WATER MANAGEMENT

- 6.1 6.1.1 • Open drains ✓
• Closed drains ✓ (2)
- 6.1.2 • The bottom of the trench is loosely packed with large stones ✓
• It is then covered with smaller stones ✓
• Finally it is covered with gravel and soil ✓ (3)
- 6.1.3 • Installation costs are very high ✓
• Blockages occur from time to time ✓
• and are expensive to correct ✓
• The installation requires technical skills and knowledge (Any 3) (3)
- 6.1.4 (a) Open drain
(b) Stone drain
(c) Septic tank
(d) Fishbone drain
(e) Sieve (5)
- 6.1.5 • Depends on the depth of the impervious subsoil layer and the soil texture ✓
• Sandy soil ✓ – stone may be placed from 1,0 m to 1,5 m deep ✓
• Clay soil ✓ – the stone are shallower and usually from 0,4 m to 1 m deep ✓ (5)
- 6.1.6 • House sewer ✓
• Septic tank ✓
• Distribution box ✓
• Absorption field ✓ (4)
- 6.2 6.2.1 • The sewage that seeps through the open bottom and portholes in the sides of the walls can cause clogging up with overuse ✓
• The introduction of detergents and other material slows the bacterial action ✓ (2)
- 6.2.2 • Excessive quantities of detergents ✓
• Laundry waste ✓
• Bleach ✓
• Household chemicals ✓
• Caustic drain openers (Any 4) (4)
- 6.3 • Use only toilet paper ✓
• No plastics or non degradable plastics ✓
• No cigarette buds and rags
• No disinfectants should be used
• No bleaches and oils (Any 2) (2)

[30]

TOTAL SECTION B: 160
GRAND TOTAL: 200