basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL TECHNOLOGY

NOVEMBER 2012

MEMORANDUM

MARKS: 200

This memorandum consists of 11 pages.

SECTION A

QUESTION 1

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

TOTAL SECTION A (20 x 2): 40

SECTION B

QUESTION 2: MATERIALS AND STRUCTURES

2.1
- Electroplating. ✓
- Painting Powder coating/Rubberizing. ✓
- Galvanising. ✓ (3)

2.2
- Heat resistance. (Temperature) ✓
  The adhesive itself should not distort, melt or burn when heated. ✓
- Water-resistance. ✓
  When placed in humid conditions, a water resistant adhesive should not dissolve/weaken in the water. ✓
- Elasticity. ✓
  If we want to join elastic materials, we would use an adhesive, which would still be elastic after it has become dry, e.g. Bostik and Prestik. ✓
- Load capacity. ✓
  The adhesive should be able to withstand tension. ✓
- Inflammability. ✓
  The adhesive itself must comply with the same properties where it is subjected to open flames or heat. ✓
- Duration of cohesion/adhesion.
  The period of time that an adhesive will stick, after been applied to join materials.
- Duration of usability.
  The catalyst and the accelerator can have an influence on the speed and usability of the adhesive after being mixed. (Any 5) (10)

2.3
- It connects the different roof trusses together and keeps the spaces correct/strengthening.✓
- Hold trusses upright. ✓
- Roof and ceiling is fastened to it. (Nails or screws) ✓ (3)

2.4 Pink aerolite. (Any acceptable answer) ✓ (1)

2.5 2.5.1
Strengthening with reinforcement. ✓
Reinforcement beams must be placed in a crisscross pattern in the cement foundation to prevent the shifting and cracking of the foundation. ✓
Thickness of the foundation. ✓
The thickness of the foundation must correlate with the weight of the structure. ✓ (Any 2) (4)

2.5.2
- Make sure the size/measurements of the foundation are correct. ✓
- The mixture of the cement in the foundation. ✓
- Drainage of exess water away from the foundation. ✓ (3)

2.6 2.6.1 For sun light/radiant energy penetration into room. ✓ (1)

2.6.2 Some game species can jump over the fence. ✓ (1)

2.6.3 The wire will shrink on a cold day and break. ✓ (1)

2.6.4 Half round forms will give a stronger structure against strong winds.✓ (1)

2.6.5 Isolation keeps the water from freezing inside the pipes during winter preventing the pipes from bursting. ✓ (1)

2.7
- Roofs ✓
- Water troughs ✓
- Water buckets ✓
- Gutters ✓
- Housing (Any 4) (4)

2.8
- Keep concrete moist and covered for at least 7–10 days afterwards. ✓
- Paint with curing paint. ✓ (2)

[35]

QUESTION 3: ENERGY

3.1

COLUMN A		COLUMN B
3.1.1	An alcohol biofuel used in racing cars	methanol
3.1.2	Gas from earth gas or landfills	methane
3.1.3	Fermenting and then distilling starch and sugar crops	ethanol
3.1.4	Made from crude oil	petroleum
3.1.5	Transesterification of fatty acids	biodiesel

(5)

3.2
- Damaged insulation material. ✓
- Inadequate or faulty earth leakage protection. ✓
- Open electric wires. ✓
- Overloading of electric installations. ✓
- Wrong connection of electric wires.
- Lack of knowledge. (Any relevant answer)

(Any 4) (4)

3.3
- You need to be able to capture energy✓
- from the force of the wind, ✓
- through the use of a wind turbine✓
- with a propeller blade type design. ✓
- The turbines are attached to a generator ✓
- which enables the generator to produce electrical power. ✓

(6)

3.4 Bio-fuel is any plant or animal matter ✓(organic material/residues) that is combustible and used as a fuel. ✓ (2)

3.5
- Cheaper solution to our energy needs/low cost.✓
- Biodegradable./Regenerate faster than conventional fuels✓
- Are renewable sources of energy.✓
- Can help prevent engine knocking.
- Less pollution-environmental friendly
- Engines do not require any radical changes to switch to use these fuels.

(Any 3) (3)

[20]

QUESTION 4: SKILLS AND CONSTRUCTION PROCESSES

4.1 4.1.1
A Direction of travel.✓
B Electrode.✓
C Base metal/Work piece.✓
D Weld metal/bead.✓
E Gas shield.✓ (5)

4.1.2 MIG = Metal ✓Insert/Inert✓ Gas.✓ (3)

4.1.3
- High welding speed/Faster. ✓
- Important savings in materials and weight.✓
- High mechanical properties of welding joints. ✓
- Neat and smooth seam surface. ✓
- Guaranteed welding strength for root and layer welding. ✓
- Safety against cold shuts and cracks.
- Welding in all positions, vertical up, down and overhead.
- Excellent fusion and penetration.
- Operation requires less manual skills.
- Welding area is easier to see.
- No heavy slag to control or to chip away, compressed gas seals the weld pool.
- Potentially cheaper.
- Welds a wider range of thickness.
- Welding wire runs from a spool and need not to be replaced regularly. (Any 5) (5)

4.2 4.2.1 Direct current.✓ (1)

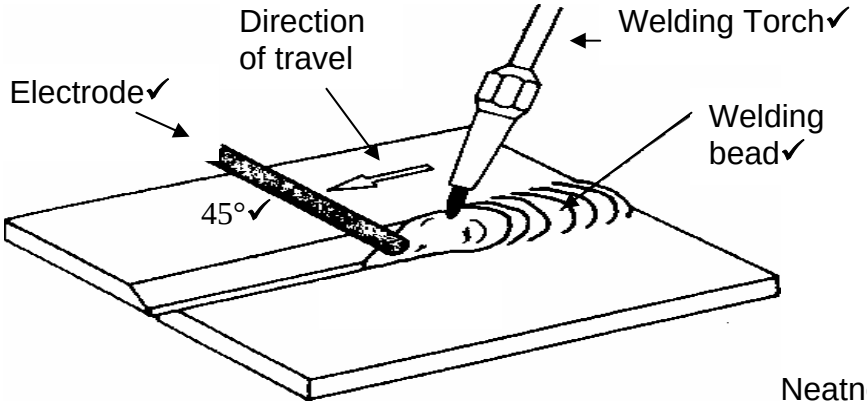
4.2.2
- More compact. ✓
- It is much lighter. ✓
- Use less current. ✓
- Uses lower ampere to weld. ✓
- More economical to use. ✓ (5)

4.2.3
- Yes.✓
- Can easily weld aluminium if you reverse the polarity of the electrodes on the welding machine.✓ (2)

4.3 Make a neat, labelled sketch of the forehand welding technique when welding with an oxy-acetylene welding apparatus.

Marks will be allocated for:

Labels 5
Sketch 2
Neatness 1



Neatness✓
Correctness of the sketch✓✓ (8)

4.4
- When metal is heated, it expands ✓
- and when it cools down it shrinks. ✓
- The shrinking of welded metal, as well as weld runs, causes distortion of sheets, when they cool down. ✓
- Shrinking takes place in all directions simultaneously ✓
- and therefore causes various types of distortion. (Any 4) (4)

4.5
- It is the process where warn parts can be built up✓
- by padding with a wear resistant metal.✓ (2)

[35]

QUESTION 5: TOOLS, IMPLEMENTS AND EQUIPMENT

5.1 5.1.1 Universal joint.✓ (1)

5.1.2 To manually grease the inner part of the universal joint, where lubrication is needed on a regular basis. ✓ (1)

5.1.3
- Strong. ✓
- Not become loose. ✓
- Weight saving.
- Must provide adequate/efficient protection. (Any 2) (2)

5.2
- Release all chains. ✓
- Release all belts. ✓
- Clean and wash machine properly✓
- Dry machine ✓
- Grease all moving parts✓
- Paint where necessary
- Cover whole machine (Any relevant answer) (Any 5) (5)

5.3

5.3.1
- Sliding gearbox. ✓
- Constant mesh gearbox. ✓
- Synchronised gearbox. ✓
- Automatic
- Semi-automatic
- Pre select
- Tip tronic (Any 3) (3)

5.3.2 Noisy/excessive wear.✓ (1)

5.4 5.4.1

$$Dg = \frac{Na \times Da}{Ng}$$

$$= \frac{1\,500 \times 200}{3\,000} \quad ✓✓$$

$$= 100 \text{ mm} ✓$$ (3)

5.4.2
- V-belts do not easily slip off pulleys. ✓
- V-belts draw tighter round pulleys when tension increases. ✓
- Lubrication is never necessary.
- V-belts are relatively strong, and do not break easily under normal circumstances.
- Cold, moist conditions, age or use does not cause V-belts to stretch or shrink.
- V-belts last longer than flat belts. (2)

5.4.3 To change the direction of rotation on the pump. ✓ (1)

5.5 5.5.1

- Driving power. ✓
- Local availability of parts and service. ✓
- Rigidity of construction. ✓
- Simplicity of control mechanisms. ✓
- Driver comfort. ✓
- Versatility.
- Proven reliability and durability.
- Cost
- Purpose
- Who is the operator Skilled or unskilled (Any 5) (5)

5.5.2

- Type of use. (Pulling a trailer or heavy implement like a plough or ripper) ✓
- Maximum drive requirements✓
- Texture of the soil. (Clay or sand) ✓
- Type of tractor. (4x4 and 2x4) (4 wheels – 8 wheels) ✓ (4)

5.6

5.6.1

- Welger system/Roller system✓
- Vermeer system/Belt or chain system✓ (2)

5.6.2

RECTANGULAR BALER	ROUND BALER	
a) Storage space optimally utilised. ✓	a) One man operation. ✓	
b) Bales handled manually. ✓	b) Low rope consumption.	
c) Continuous baling process. ✓	c) Simplistic working. ✓	
d) Bales stored easily. ✓	d) Can bale until rain starts. ✓	
e) Transport space optimally utilised. ✓	e) Roofed storage not necessary. ✓	(10)
f) Bales easily handled	f) Can be wrapped	

(Any relevant answer) **[40]**

QUESTION 6: WATER MANAGEMENT

6.1 6.1.1
- Installation costs are very high. ✓
- Blockages occur from time to time and are expensive to correct. ✓
- The installation requires technical skills and knowledge. ✓

(3)

6.1.2
- Trenches or ditches are dug to a depth of 0,5 m to 2 m. ✓
- The trench has a steady fall to enable it to carry away the superfluous water which it collects from the surrounding soil. ✓
- At the bottom of the trench, bush, poles, stones or tiles (pipes) are placed and then covered with earth. This helps with the movement of the water. ✓
- The rocks or pipes are then covered with topsoil. ✓
- In this way the whole of the drained area may be used for the cultivation of crops. ✓

(5)

6.2
- Buried deep enough not be damage by implements. ✓
- Buried in sand. ✓
- Couplings must be water tight. ✓
- Lime layer 500 mm above pipe. ✓

(3)

6.3 6.3.1
- Sewage is broken down by anaerobic bacteria in the first tank. ✓
- Very little solids remain when the watery sewerage flows
- to the second tank. ✓
- Only liquid sewerage remains and drains away through
- the outlet pipe or stone trench. ✓

(3)

6.3.2
- Do not build near boreholes/rivers or water sources. ✓
- It must be a suitable distance away from the house. ✓
- Not in the vicinity where people eat, wash or regularly work. ✓
- Drinking water installations.✓

(4)

6.3.3
- Sludge is not bio degradable ✓
- and therefore it will accumulate until the tank overflows ✓
- and therefore clog the drainage pipes and the soil into which they drain. ✓

(3)

6.3.4
- Use only toilet paper. ✓
- No plastics or non degradable materials.✓
- No cigarette buds, rags etc. should get into the tank.✓
- No disinfectants should be used. ✓
- No bleaches, oils.✓
- Don't over use

(5)

6.4
- To save water. ✓
- To prevent over-irrigation. ✓
- To prevent under-irrigation. ✓ (2)

6.5
- Between 3–5 metres✓
- Dangerous, the sides may fall in. ✓ (2)

[30]

TOTAL SECTION B: 160
GRAND TOTAL: 200