basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL TECHNOLOGY

FEBRUARY/MARCH 2013

MEMORANDUM

MARKS: 200

This memorandum consists of 10 pages.

SECTION A

QUESTION 1

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

TOTAL SECTION A (20 x 2): 40

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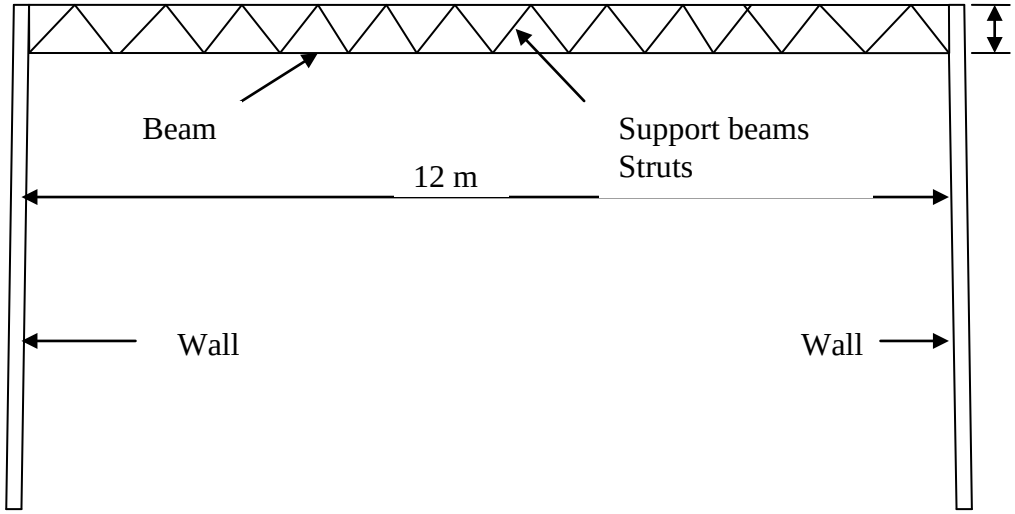
SECTION B

QUESTION 2: MATERIALS AND STRUCTURES

2.1
3. Struts✓
5. Laths✓
8. Facia boards✓
9. Gutters✓
10. Down pipe✓ (5)

2.2 2.2.1 (a) Identification of the following parts: Beams ✓ Struts ✓ Wall ✓ 12 m span ✓
Mention why you will use this type of construction in your design. ✓✓
Neatness: ✓
Correctness: ✓ (8)



The learner must include reasons for the use of the construction according to his/her design.

2.2.2 (b)
- Very strong✓
- Easy to use✓ (2)

2.3 2.3.1

INSIDE wall foundation	OUTSIDE wall foundation
A. Width: 450 mm✓	C. Width: 600 mm✓
B. Thickness: 200 mm✓	D. Thickness: 200 mm✓

(4)

2.3.2
- Half-brick wall ✓ (110 mm) ✓
- One-brick wall ✓ (220 mm) ✓
- Cavity wall ✓ (220 mm brick wall, 50 mm cavity and 220 mm brick wall) ✓ (6)

2.3.3
- English bond ✓
- Stretcher bond ✓ (2)

2.4
- Plastic wrapping can be used to cover the cement packs so that the cement is protected against moisture. ✓
- Cement bags must be stored on wooden planks to prevent it from possible moisture/damp from the floor. ✓ (2)

2.5
- On to the brickwork on the foundation; with an overlap of ± 300 mm. ✓
- Underneath all outside windowsills. ✓
- Under the floor. ✓ (3)

2.6
- Ceramic ✓
- Rubber ✓
- Plastic ✓ (3)

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QUESTION 3: ENERGY

3.1 3.1.1
- Solar power is electricity generated from the sun's rays (solar radiation). ✓
- The sun rays contain photons. ✓
- These photons are capable of transforming electrons into conduction electrons, ✓
- which means they are able to carry an electrical charge. ✓ (4)

3.1.2
- The solar panels are made of a semi-conductive material; the most common material is silicon. ✓
- The semi-conductive material contains electrons. ✓
- When photons, within the sunrays, hit the solar cells, the electrons absorb this solar energy, transforming them into conduction electrons. ✓
- If the energy of these photons is great enough, the electrons are able to become free, and carry an electric charge through a circuit to the destination. ✓ (4)

3.1.3
- That the cell is not working to its full potential.✓
- When the electrons release heat, the panel also becomes warm, interfering with other aspects of the solar cells. ✓
- Number of solar panels determines the efficiency of the system.
- Expensive panels produce more electricity than cheaper ones.
- Nearer the equator, you will receive a slightly better output.
- Objects blocking the sunrays. (Any 2) (2)

3.1.4 Direct current ✓ (1)

3.2 3.2.1
- A Geyser✓
- B Solar/hot-water panel✓ (2)

3.2.2
- Saves energy costs. ✓
- Clean energy/no environmental footprint/no pollution.
- Renewable energy source/ unlimited supply
- Where no electricity is available. (Any 1) (1)

3.3 3.3.1
- Average wind speed must be high. ✓
- No hills or mountains nearby. ✓
- No forest or collection of trees nearby. (Any 2) (2)

3.3.2
- Wind is an unreliable factor. ✓
- Wind turbines generally need a back-up system or battery system for windless days.✓
- Wind turbine construction can be very expensive. ✓
- Noise pollution. (Any 3) (3)

3.4
- Methanol ✓
- Ethanol
- Methane gas
- Butanol
- Propanol (Any 1) (1)

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QUESTION 4: SKILLS AND CONSTRUCTION PROCESSES

4.1 4.1.1
- It is an arc welding process✓
- in which individual consumable electrodes (standard welding rods) are replaced by continuously fed wire, ✓
- and an insert gas shield replaces electrode flux.✓ (3)

4.1.2
- Argon, ✓
- Helium ✓
- Carbon dioxide (CO_2) ✓ (3)

4.1.3
- Push in the direction of travel ✓
- at an 80° angle. ✓ (2)

4.1.4 CO_2 ✓ (1)

4.2 4.2.1 Flash-back arrestor ✓ (1)

4.2.2
- The function is to prevent a flame from the torch✓
- to jump back into the connection pipe causing an explosion. ✓ (2)

4.2.3
- A 45°✓
- B 90°✓
- C 45°✓ (3)

4.2.4 Neutral flame ✓ (1)

4.3 4.3.1 T-joint ✓ (1)

4.3.2
- Longitudinal shrinking ✓
- Angular shrinking longitudinally ✓
- Angular shrinking ✓
- Lateral shrinking ✓ (4)

4.3.3 Heat ✓ (1)

4.3.4
- Pre-setting ✓
- Welding of patchwork ✓
- Clamping ✓
- Spot welding ✓ (4)

4.4 4.4.1
- Worn parts can be built up by padding with a wear resistant metal by means of the process. ✓
- The type of hard facing and type of electrode used are determined by the service requirements of the parts concerned. ✓ (2)

4.4.2
- Metal against metal friction ✓
- Serious jolts or shocks of metal against rock ✓
- Scraping plus jolts and shocks ✓
- Serious scraping ✓ (4)

4.4.3
- Area to be covered must be free of corrosion ✓
- Grease or foreign substances ✓
- Do not work at too high amperage ✓
- Use a longer arc
- Clean slag from each welding run before welding over it
- Weld the piece to the desired thickness/dimensions
- Finish off with a grinder if required (Any 3) (3)

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QUESTION 5: TOOLS, IMPLEMENTS AND EQUIPMENT

5.1 5.1.1 Round bales ✓ (1)

5.1.2
- Lubrication✓
- Check all bearings, chains and gears. ✓
- Check all safety clutches.✓
- Sharpen all blades. ✓
- Check tyre pressure. ✓
- Check bolt tension.
- Inspect chassis and tyres for damage. (Any 5) (5)

5.2 5.2.1
- Sturdy construction ✓
- Replaceable wearing parts ✓
- Rotor housing should close tightly ✓
- Size of the hopper feed aperture. ✓ (4)

5.2.2

(a)	Rotor and hammers	Pulverize the fodder. ✓
(b)	Sieves	Determine the size of the final grounded product. ✓
(c)	Fan	Blows the grounded material through the sieves. ✓
(d)	Cyclone	Separates the grounded material effectively from the air. ✓

(4)

5.2.3
- Do not work on the machine while it is still in motion. ✓
- Wear safety goggles. ✓
- Ensure that there are no loose objects inside the machine before starting up. ✓
- Do not use when the rotor is out of balance. ✓
- Driving mechanism must be screened off. ✓
- Use in a well ventilated area.
- Small pieces of scrap metal must be kept away from fodder. It can cause a spark, which can result in an explosion. (Any 5) (5)

5.3 5.3.1 Double-action hydraulic cylinder ✓ (1)

5.3.2
- Pull ✓
- The space that the connection shaft takes up on the pull side of the plunger ✓
- causes a reduced area surface subjected to oil pressure and therefore a reduced force on the plungers pull side. ✓ (3)

5.4 5.4.1
- Where the top link is fitted. ✓
- In the differential housing. ✓
- At the base of the lifting arms. ✓

5.4.2 Automatic depth control mechanism ✓ (1)

5.5 5.5.1
- Computers help you to determine the yield on each specific spot on your land. ✓
- Computers help you to spot problems in the mechanics of the harvester that prevents lost of maize kernels. ✓
- Helps you to identify nutrient deficiencies in your land. ✓
- Helps to identify problem areas in your maize land. ✓ (4)

5.5.2
- Very quick way of getting your crop from the land. ✓
- Very reliable method of harvesting. ✓
- Economical ✓
- Labour saving ✓
- Computers do the whole harvesting process with little input from the driver. ✓
- Accurate record keeping
- Single operation (Any 5) (5)

5.6 5.6.1
- Engine uses (burns) oil ✓
- Worn piston rings ✓
- Worn cylinder walls ✓ (3)

5.6.2 So that components are interchangeable. ✓ (1)
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QUESTION 6: WATER MANAGEMENT

6.1 6.1.1 Tensiometer ✓ (1)

6.1.2 To determine the loss of water in a specific field. ✓ (1)

6.2 6.2.1 Open drain ✓ (1)

6.2.2 Stone drain ✓ (1)

6.2.3 Septic tank ✓ (1)

6.2.4 Fishbone drain ✓ (1)

6.2.5 Sieve ✓ (1)

6.3 6.3.1
- Natural system ✓
- Herringbone system✓
- Grid system ✓ (3)

6.3.2
- Costs to install the drains are very high ✓
- Blockages occur from time to time and are expensive to correct.✓
- The installation requires technical skill and knowledge. (Any 2) (2)

6.4 6.4.1
- For the correct calibration of the sprayers. ✓
- Effective scheduling of irrigation. ✓
- To prevent the over utilisation of the water source. ✓ (3)

6.4.2 Flow rate = $\frac{\text{Content}}{\text{Time}}$ ✓

$= \frac{8\,000}{8}$ ✓

= 1 000 ℓ/minute ✓ (3)

6.5 6.5.1
- For cleaning the tank ✓
- For inspection of the tank✓ (2)

6.5.2
- House sewer ✓
- Septic tank ✓
- Distribution box ✓
- Absorption field ✓
- Seepage pit ✓ (5)

6.6
- Pressure high enough to satisfy needs. ✓
- Prevent spillage. ✓
- Joints watertight. ✓
- Removal of spillage water. ✓
- Protect all valves. ✓ (5)

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TOTAL SECTION B: 160
GRAND TOTAL: 200