



education

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NORTH WEST PROVINCE**

PROVINCIAL ASSESSMENT

GRADE 11

AGRICULTURAL SCIENCES P1

NOVEMBER 2019

MARKS: 150

TIME: 2 ½ HOURS

This question paper consists of 10 pages and 1 data sheet.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO sections: SECTION A and SECTION B
2. Answer ALL the questions.
3. Start EACH question in SECTION B on a NEW page.
4. Number the answers correctly according to the numbering system used in the question paper.
5. You may use a non-programmable calculator.
6. Show ALL your calculations, including formulae, where applicable.
7. Write neatly and legibly.

SECTION A**QUESTION 1**

- 1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (1.1.1 to 1.1.10), for example 1.1.11 D.
- 1.1.1 A pure substance consisting of two or more different atoms is called a...
- A mixture
 - B element
 - C compound
 - D isotope
- 1.1.2 Group IA on the periodic table is also known as
- A halogens
 - B alkali metals
 - C transition metals
 - D alkali earth metals
- 1.1.3 Which ONE of the following is not true for elements within a group on the periodic table:
- A Same number valence electrons.
 - B Have the same outer electron arrangement.
 - C Similar chemical properties.
 - D Same number of atomic orbitals
- 1.1.4 Methanol is made up of ...
- A one carbon, three hydrogen and one hydroxide atom.
 - B one carbon, three hydrogen and two hydroxide atoms.
 - C two carbon, six hydrogen and one hydroxide atom.
 - D two carbon, six hydrogen and two hydroxide atoms.
- 1.1.5 Glycerol is the building block of all ...
- A Fats
 - B Peptides
 - C Glucose
 - D Amino-acids

- 1.1.6 The ideal soil texture for crop cultivation.
- A Clay
 - B Sand
 - C Loam
 - D Silt
- 1.1.7 The optimal temperature for seed germination, growth and production of crop.
- A 5 °C
 - B 25 °C
 - C 35 °C
 - D 15 °C
- 1.1.8 The horizon which makes up the upper layer of the soil and which usually consists of fresh and partly decomposed organic material.
- A E-horizon
 - B A-horizon
 - C B-horizon
 - D O-horizon
- 1.1.9 Nitrification is the biological oxidation of ammonium nitrogen to ...
- A nitrogen fixing bacteria.
 - B the organic form in plant tissue.
 - C gaseous nitrogen.
 - D nitrite and nitrate.
- 1.1.10 Before organic material changes to humus it consists of the following:
- A Celluloses and hemicelluloses
 - B Carbohydrates, proteins, fats
 - C Carbon dioxide and methane.
 - D Alkanes and alkynes
- (10 x 2) (20)

- 1.2 Choose a term in COLUMN A that matches a description in COLUMN B. **A ONLY, B ONLY, BOTH A AND B**, or **NONE** of the items in COLUMN A. Write: **A only, B only, A and B** or **none** next to the question number (1.2.1 to 1.2.5) for example 1.2.6. B only.

COLUMN A			COLUMN B
1.2.1	A	Attracted to water	Hydrophilic
	B	Repelled by water	
1.2.2	A	Propanol	C ₂ H ₅ OH
	B	Ethanol	
1.2.3	A	Bio-molecules	Lipids
	B	Fats	
1.2.4	A	Weak structure	Soil particles not arranged into aggregates.
	B	Amorphous	
1.2.5	A	Symbiotic relationship	Rhizobium bacteria
	B	Legume family plants	

(5 x 2) (10)

- 1.3 Give ONE word/term for each of the following descriptions. Write only the word/term next to the question number (1.3.1 to 1.3.5).

1.3.1 Reaction between acids and bases.

1.3.2 The substance that is formed when two monosaccharide molecules join together.

1.3.3 The attraction of a substance for itself.

1.3.4 Forcing together to form a solid.

1.3.5 Forming of soil particles into a crumbing structure.

(5 x 2) (10)

1.4 Change the UNDERLINED WORD/S in each of the following statements to make them TRUE. Write only the answer next to the question number (1.4.1 to 1.4.5).

1.4.1 A gas has both a definite shape and volume.

1.4.2 Group VIIA are noble gases where the elements each has seven electrons each in their outer orbitals.

1.4.3 A heterogeneous soil colour is usually an indication of favourable soil conditions.

1.4.4 Living organisms in the soil cause germination activities.

1.4.5 The soil pH is measured on a scale of 1 to 10.

(5 x 1) [5]

TOTAL SECTION A: 45

SECTION B

QUESTION 2: BASIC AGRICULTURAL CHEMISTRY

Start this question on a NEW page.

2.1 Use the Periodic table to answer the questions that follow.

2.1.1 Draw a Helium atom to show all the components. (4)

2.1.2 Calculate the molecular mass of ONE water molecule. (4)

2.1.3 Name the chemical bonding that forms Sodium Chloride. (2)

2.1.4 Give the chemical formula for ammonia. (3)

2.2 An atom has an atomic number of 19. Use the Periodic table to answer the questions below.

2.2.1 Identify the element described above. (1)

2.2.2 Calculate the amount of neutrons of this element. (4)

- 2.3 Biological value represents the quality of the protein. The higher the biological value the better the quality of protein. The data provided in the table below relates to the biological values (BV) of feed derived from animal and plant origin.

ANIMAL FEED	BIOLOGICAL VALUES (BV)
Fish meal	90
Soya	80
Wheat	60
Peanuts	75
Maize	50
Bone meal	100

- 2.3.1 Determine from the table above which of plant or animal based feed have the highest biological value. (1)
- 2.3.2 Draw a bar graph to compare the biological values of proteins for the different feedstuffs provided in the table above. (6)
- 2.3.3 Define essential amino-acids. (2)
- 2.4 When alcohols combine with fatty acid, an ester is formed. These esters are also known as glycerides or fats.
- 2.4.1 State the basic difference between oils and fats. (2)
- 2.4.2 Name the state (fat or oil) in which plant fats are found. (2)
- 2.5 The most common disaccharides are Lactose, Sucrose and Maltose.
- 2.5.1 Identify the substance that is commonly used in our homes that contains lactose. (2)
- 2.5.2 Which monosaccharide is needed to form sucrose, together with glucose and water? (2)

[35]

QUESTION 3: SOIL SCIENCES

Start this question on a NEW page.

3.1 Make use of the table below to answer question 3.1.1–3.1.2.

Quantity of moisture available	Available % withdrawal	Quantity water withdrawn	Type of soil
60 mm/m	60%	3.1.1.1	3.1.2.1
170 mm/m	50%	3.1.1.2	3.1.2.2
240 mm/m	40%	3.1.1.3	3.1.2.3

3.1.1 Calculate the quantity of moisture that can be withdrawn for 3.1.1.1, 3.1.1.2 and 3.1.1.3. Show your formula and all your calculations, write it down next to the question number (3.1.1.1, 3.1.1.2 and 3.1.1.3). (9)

3.1.2 Use your calculations in **QUESTION 3.1.1** to determine the type of soil for 3.1.2.1, 3.1.2.2 and 3.1.2.3. Write the answer next to the question number (3.1.2.1, 3.1.2.2 and 3.1.2.3). (3)

3.2 Bulk density (BD) were calculated for TWO soil types. Soil 1 BD: 1,33 Mg/m³ Soil 2 BD: 2,66 Mg/m³.

3.2.1 Give the definition for bulk density. (2)

3.2.2 State the type of soil, soil 1 or soil 2, which can be classified as clay soil. (2)

3.2.3 Explain your answer in **QUESTION 3.2.2**. (3)

3.3 In order for the negative charge of clay and humus colloid to be neutralised, the colloid tends to adsorb positively charged ions like in the elements Na, Ca, K, Mg and H. Which of these elements are commonly found in the following:

3.3.1 Brackish soil (2)

3.3.2 Sweet soil (2)

3.3.3 Acid soil (2)

- 3.4 We recognise three types of soil water.
- 3.4.1 Name the THREE types of soil water and give TWO characteristics for each. (9)
- 3.4.2 Which type of soil water is available for plants to use? (1)
- [35]**

QUESTION 4: SOIL SCIENCES

Start this question on a NEW page.

- 4.1 A soil profile is the succession of horizons which are visible in a vertical section through soil. The layers of soil horizons are the result of environmental and human factors.
- 4.1.1 Place the following horizons in the right order:
A, C, B, O, E, R (6)
- 4.1.2 Use your answer in **QUESTION 4.1.1** to classify the horizons into the following categories:
Topsoil, subsoil and substrata. (6)
- 4.2 Soil alkalinity results in deterioration of the soil structure, and especially crust formation and compaction of the top layer.
- 4.2.1 Identify the potential result of soil alkalinity on water availability and crop production. (2)
- 4.2.2 What will you expect the pH of alkaline soil to be when tested? (2)
- 4.3 Earthworms live on plant and animal residue in the soil. They tunnel through the soil and while they move through the soil, they swallow some of the soil. This is excreted again after being mixed with faeces. Their tunnels contribute to the air and water circulation in the soil.
- 4.3.1 Give another name for the plant and animal residue. (2)
- 4.3.2 Which colour will the soil most likely be when a lot of plant and animal residue is present? (2)
- 4.3.3 Identify FOUR requirements for soil organisms to flourish in soil. (4)
- 4.3.4 Name FOUR factors that influence the conversion of plant material. (4)

4.4

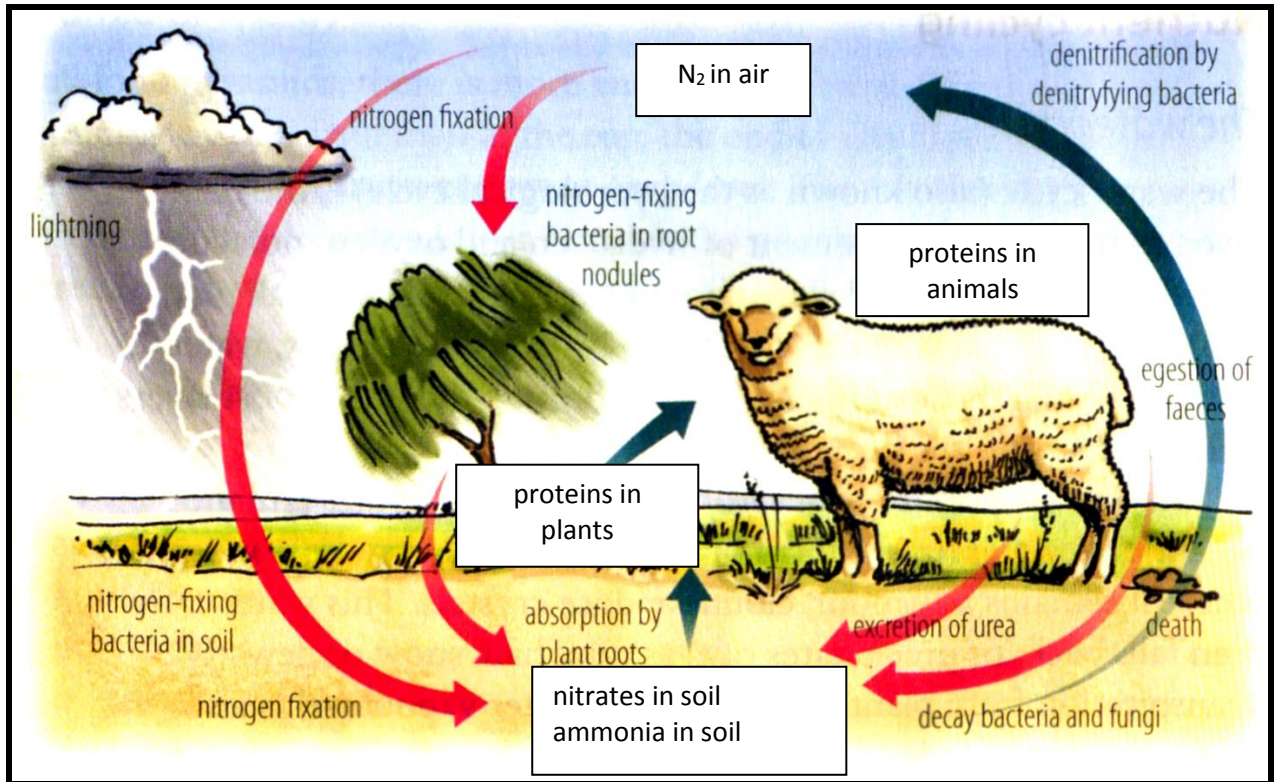


Diagram 1

- 4.4.1 Identify the cycle as shown in the figure above. (2)
- 4.4.2 State the FOUR main processes associated with the process identified in QUESTION 4.4.1. (4)
- 4.4.3 Name the element essential in this cycle. (1)

[35]

TOTAL SECTION B: 105**GRAND TOTAL: 150**

THE PERIODIC TABLE OF ELEMENTS/DIE PERIODIEKE TABEL VAN ELEMENTE

(I)	(II)	(III)	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(I)	(II)	(III)	4	5	6	7	8	9	10	11	12	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
1 H 1	2 He 4	3 Li 7	4 Be 9	5 B 11	6 C 12	7 N 14	8 O 16	9 F 19	10 Ne 20	11 Na 23	12 Mg 24	13 Al 27	14 Si 28	15 P 31	16 S 32	17 Cl 35,5	18 Ar 40
19 K 39	20 Ca 40	21 Sc 45	22 Ti 48	23 V 51	24 Cr 52	25 Mn 55	26 Fe 56	27 Co 59	28 Ni 59	29 Cu 63,5	30 Zn 65	31 Ga 70	32 Ge 73	33 As 75	34 Se 79	35 Br 80	36 Kr 84
37 Rb 86	38 Sr 88	39 Y 89	40 Zr 91	41 Nb 92	42 Mo 96	43 Tc 98	44 Ru 101	45 Rh 103	46 Pd 106	47 Ag 108	48 Cd 112	49 In 115	50 Sn 119	51 Sb 122	52 Te 128	53 I 127	54 Xe 131
55 Cs 133	56 Ba 137	57 La 139	58 Ce 140	59 Pr 141	60 Nd 144	61 Pm 146	62 Sm 150	63 Eu 152	64 Gd 157	65 Tb 159	66 Dy 163	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175	86 Rn
87 Fr 226	88 Ra 226	89 Ac	90 Th 232	91 Pa 231	92 U 238	93 Np 237	94 Pu 242	95 Am 243	96 Cm 247	97 Bk 247	98 Cf 251	99 Es 252	100 Fm 257	101 Md 258	102 No 259	103 Lr 261	

Electronegativity → Elektronegatiwiteit	2,9 Cu 63,5	Symbol Simbool
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Approximate relative atomic mass Benaderde relatiewe atoommassa	2,9 Cu 63,5
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