Education and Sports Development

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NORTH WEST PROVINCE

PROVINCIAL ASSESSMENT

GRADE 11

AGRICULTURAL SCIENCES

MARKING GUIDELINE
JUNE 2017

MARKS : **150**

TIME : **2 ½ hours**

This MARKING GUIDELINE consists of 08 pages

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SECTION A

QUESTION 1

1.1 **MULTIPLE CHOICE:**

1.1.1 D ✓
1.1.2 C ✓
1.1.3 B ✓
1.1.4 B ✓
1.1.5 A ✓
1.1.6 D ✓
1.1.7 A ✓
1.1.8 C ✓
1.1.9 A✓
1.1.10 B ✓

(10 x 2) (20)

1.2 **MATCHING COLUMNS:**

1.2.1 A only ✓✓
1.2.2 Both A and B ✓✓
1.2.3 B only ✓✓
1.2.4 B only ✓✓
1.2.5 A only ✓✓

(5 x 2) (10)

1.3 **AGRICULTURAL TERMS/ PHRASES:**

1.3.1 Isotopes ✓✓

1.3.2 Glycosidic bond ✓✓

1.3.3 soil texture ✓✓

1.3.4 Gravity/ Force of gravity/ Gravitational force ✓✓

1.3.5 Soil classification ✓✓

(5 x 2) (10)

1.4 **CHANGING THE UNDERLINED WORD(S):**

1.4.1 Macro - elements ✓
1.4.2 Isomers ✓
1.4.3 Denitrification✓
1.4.4 Field water capacity ✓
1.4.5 Acids✓

(5 x 1) (5)

TOTAL SECTION A: [45]

SECTION B

QUESTION 2

2.1.1 Organic Compounds

A. Ammonia (NH_3) ✓

B. Water (H_2O) ✓

C. Methane (CH_4) ✓

D. Ethanol (C_2H_5OH) ✓

E. Carbon dioxide (CO_2) ✓ (5)

2.1.2 Water molecule

- Covalent bond✓
- Sharing of valence electrons/ Sharing of pair of electrons between atoms✓✓ (3)

2.1.3 Compound E is Carbon dioxide

- Global warming✓✓ (2)

2.2.1 General name for the gas

- Methane✓ (1)

2.2.2 Molecular formula

- CH_4✓ (1)

2.2.3 Properties of the gas mentioned in 2.2.1

- Odourless✓
- Colourless✓
- Toxic✓
- Flammable ✓ any 2 (2)

2.3.1 Compound illustrated

- Sodium chloride✓ (1)

2.3.2 Chemical formula

- NaCl✓ (1)

2.3.3 Chemical bond involved explained

- Ionic bond✓
- Formed when one atom gains a valence electron and another loses an electron✓✓

- The atom lose an electron forms a positive charge/ the one that gains become negative✓✓
- Positive and negative charges will attract each other✓✓ (3)

2.4.1 Name and numbers in an atom $_{40.08}Ca^{20}$

- 20 represent atomic number✓: Number of protons in the nucleus of an atom✓✓
- 40.08 represent mass number✓: The sum of protons and neutrons in the nucleus of an atom✓✓ (6)

2.4.2 **Give the number of protons, neutrons and electrons:**

- Protons is 20✓
- Neutrons is 20✓
- Electrons is 20✓ (3)

2.4.3 Ca is the symbol for Calcium✓ (1)

2.5 **Difference between acids and bases**

Acids	Bases
Tastes sour and have a strong smell✓	Feels slippery or soapy✓
Gives off hydrogen ions✓	Accepts hydrogen ions✓
Has a pH of 0 – 6✓	Has a pH of 8 - 14✓
Examples: Hydrochloric acids, Lemon juice (Citric acid), Vinegar (Ethanoic acid) ✓	Examples: Sodium hydroxide, Calcium oxide (Lime), Ammonia, Baking soda✓

(6)

[35]

QUESTION 3 (BASIC CHEMISTRY AND SOIL SCIENCES)

3.1.1 Ester bond✓ (1)

3.1.2 Condensation✓ (1)

3.1.3 Fructose molecule/ compound✓ (1)

3.1.4 $C_6H_{12}O_6$✓ (1)

3.2.1

A. CH_3COOH✓

B. Baking soda✓

C. Water✓

D. CO_2✓ (4)

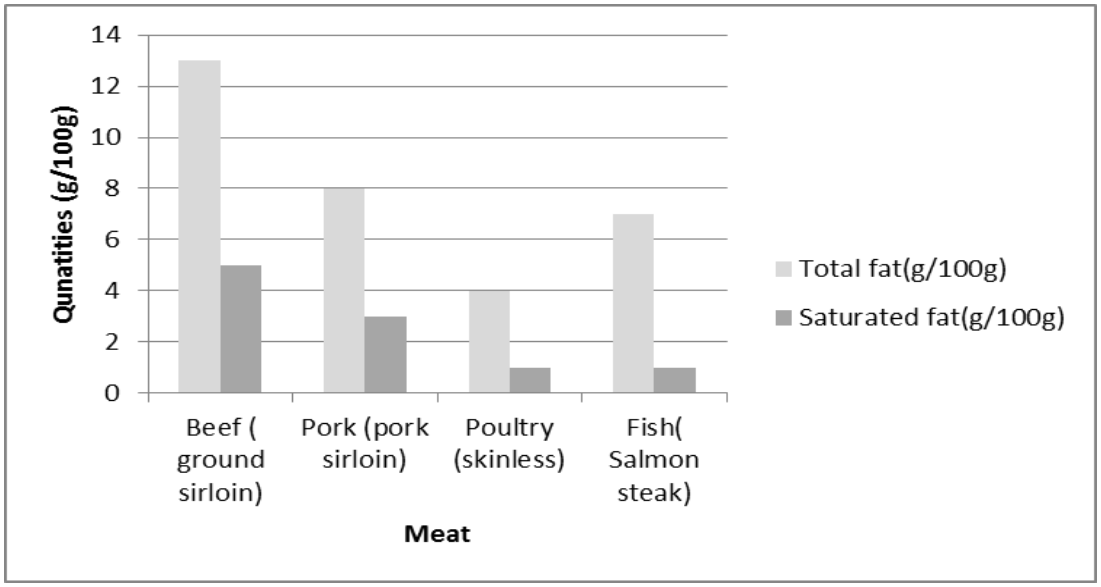
3.2.2 Pure water has a pH of 7✓ (1)

3.2.3 High pH (Baking soda is a base/ Alkaline is 8 – 9 pH) ✓ (1)

3.2.4 Sodium Acetate (CH_3COONa) ✓ (1)

3.3.1 Bar graph:

Title: Bar graph to compare the total fat and saturated fat content of different meat types



Marking of Bar graph:		
Criteria	**Yes**	**No**
Bar graph	1✓	0
Heading/ Title	1✓	0
Correct labelling of X-axis	1✓	0
Correct labelling of Y-axis	1✓	0
Indication of unit	1✓	0
Accuracy	1✓	0

(6 x 1) (6)

3.3.2 **Negative effects of the high consumption of fats in human health**

- Obesity: too much fat in the body✓
- High blood pressure/ cholesterol levels high ✓
- Blocking of blood vessels/ hard fatty deposits in the blood vessels/ heart attacks or stroke✓ any 2 (2)

3.3.3 **Definition of concept cholesterol:**

- a waxy, fat – like substance that is found in all cells of the body✓✓
- is a soft, waxy, fatty substance in the blood which plays an important role in cell membrane and hormones✓✓ any 1 (2)

3.3.4 **Difference between fats and oils**

Fats	Oils
Solid at room temperature✓	Liquid at room temperature✓
Contains saturated fatty acids✓	Contains unsaturated fatty acids✓
Linked to high levels of blood cholesterol and heart disease✓	Healthier to eat and may protect people from coronary heart disease✓
Examples: Fatty cuts from red meat✓	Examples: olive oil, sunflower oil✓

(4)

SOIL SCIENCES

3.4.1 **Using texture triangle to determine soil textural class**

A. Loam✓
B. Clay – loam✓
C. Sandy – loam✓
D. Silt – clay – loam✓
E. Clay✓ (5)

3.4.2 **Soil textural class associated with conditions indicated:**

A. E✓ (1)
B. A✓ (1)
C. B✓ (1)

3.4.3 **Reasons for a farmer to know the textural class of his/ her farm:**

- The soil texture will determine the type of crops he/ she can plant✓
- The type of irrigation system he/ she can install or use✓
- The type of drainage he/ she can use✓
- He/ she will be able to assess the efficacy of various fertilizers and soil additives✓

Any 2 (2)

[35]

<u>QUESTION 4</u>: SOIL SCIENCES

4.1.1 **Soil structure based on shape of structural units**

A. Platy structure✓
B. Prismatic structure✓
C. Blocky structure✓
D. Spheroid structure✓ (4)

4.1.2 **Factors that influence the development of soil structure:**

- Soil texture, especially clay content✓
- Organic matter content✓
- Soil structure and the colloidal matter in the soil✓
- Climate✓
- Type of clay mineral✓
- Plant roots✓

- Alternating moisture and drought✓ **any 2** (2)

4.2 **Calculation of bulk density**

Formula: Bulk density = $\frac{\text{Mass of dry soil g/ kg}}{\text{Volume of dry soil cm}^3}$✓

Bulk density = $\frac{850\text{ g}}{520\text{ cm}^3}$✓

Bulk density = 1, 63 g / cm^3✓ (3)

4.3 **The relationship between bulk density and porosity.**

- The bulk density of the soil is inversely related to the porosity of that soil✓✓
- This means that the more pore spaces in the soil, the lower the bulk density✓✓
- The greater the pore space volume (porosity) in the soil, the lower the bulk density✓✓
- If the bulk density of the soil increases, porosity decreases✓✓
- If bulk density of the soil decreases, the porosity increases✓✓ **any 1** (2)

4.4 **Soil colour interpretation**

4.4.1 Grey colour✓ (1)
4.4.2 Yellow colour✓ (1)

4.5.1 **Loss of soil water in nature**

A. Transpiration✓
B. Evaporation✓
C. Run – off ✓
D. Percolation✓ (4)

4.5.2 **Measures to reduce or control water loss by:**

Transpiration	Run – off
Avoid irrigation during the hottest part Of the day✓	Never leave sloping soils without plant cover in rainy season✓
Planting windbreaks to help break the power of the wind✓	Use contour walls to control run – off of water✓
Planting crops with a short growing season✓	Organic matter can be tilled into the soil increase water infiltration✓
Planting crops with a small leaf surface in relation to their root system✓	Use gypsum on soil surface to increase Water infiltration✓
Limit nitrogen application to prevent the formation of large leaves✓	Running terraces across the slope ✓

(2 x 2 = 4)

4.6 **Soil profiles**

4.6.1 B✓ (1)

4.6.2 A✓ or C✓ (1)

4.6.3 D✓ (1)

4.7. **Binomial soil classification**

4.7.1 Diagnostic horizons (1)

4.7.2 **Soil characteristics used for series classification**

- Soil texture✓
- Lime content✓
- pH ✓
- Organic matter✓
- Colour✓
- Base status✓
- Water retention capacity✓ any 2 (2)

4.8.1 **Identifying the acidity and alkalinity of soil colloid based on adsorbed cations:**

A. Acid soil✓ (1)

B. Neutral soil✓ (1)

4.8.2 **Table to compare the saline and sodic soils under:**

	Saline soil	Sodic soil
pH condition	Less than 8, 5✓	Between 8, 5 and 10✓
Dominant salts	Ca^{++} and Mg^{++}✓	Na^{+}✓
Surface appearance	White brack or salt crystal crust✓	Black crust✓
Corrective measures	Over – irrigation to leach Out salts✓	Over – irrigation to leach out salts✓
	Improve drainage✓	Apply gypsum✓

(2 x 3 = 6) **[35]**

TOTAL SECTION B [105]

GRAND TOTAL [150]