education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

PREPARATORY EXAMINATION 2008

MEMORANDUM

MARKS: 150

TIME: 2 hours

This memorandum consists of 10 pages.

SECTION A

Question 1.1

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

(10 x 2) (20)

Question 1.2

	ONLY A	ONLY B	A and B	None
1.2.1	A	B	C	D
1.2.2	A	B	C	D
1.2.3	A	B	C	D
1.2.4	A	B	C	D
1.2.5	A	B	C	D

(5 x 2) (10)

Question 1.3

1.3.1 Moisture / water / H_2O√√

1.3.2 Soil form√√

1.3.3 Photosynthesis√√

1.3.4 Selective herbicides / weedicides / weedkillers√√

1.3.5 Drainage√√

(5 x 2) (10)

Question 1.4/Vraag1.4

1.4.1	Hydroponics√
1.4.2	broadcasting√
1.4.3	Active ion absorption√
1.4.4	humification √
1.4.5	nitrogen / N_2 √

(5 x 1) (5)

TOTAL SECTION A : 45

SECTION B			
QUESTION 2			
2.1	**Soil morphology**		
	2.1.1	A √	
		B √	
		C √	
		R √	(4)
	2.1.2	Fresh / undecomposed and partly decayed / decomposed√ organic matter√	(2)
2.2	**Soil air**		
	2.2.1	• Decrease in chemical reactions (particularly oxidation) in the soil / Any (4 x 1)	(4)
	2.2.2	• Inability of seeds to germinate√	
	2.2.3	• No decay / decomposition of organic matter in the soil√	
	2.2.4	• Decreased microbial activity / population√	
2.3	**Soil structure**		
		Crumb√	(1)
2.4	**Soil temperature**		
	2.4.1	B√	(1)
	2.4.2	Sun rays strike area B more perpendicularly / at right angles. √ Rays strike surface A obliquely√ and are therefore reflected√. **OR** More sun rays are concentrated on a smaller area in B√ and on a wider area in A√. Any (2x1)	(2)

2.5	**Photosynthesis**		
	2.5.1	Thylakoid / granum / quantasome√	(1)
	2.5.2	Oxygen (O_2) √	(1)
	2.5.3	Glucose√	(1)
	2.5.4	Carbon dioxide (CO_2) √ **OR** Water (H_2O) √	(1)
2.6	**Organic fertilizers**		
	2.6.1	Leaching is the washing away / loss of plant nutrients√ along with seepage water beyond the reach of plant roots. √ Adsorption is the adherence of plant nutrients√ to the surfaces of soil colloids. √ Max:4	(4)
	2.6.2	Few positive charges develop on organic colloids√. The negatively charged nitrate ions (NO_3^-)√ are electrostatically attracted√ and adsorbed on the organic colloids√ more colloids √ more charges for anion adsorption √ less leaching nitrate ions √ Max:2	(2)
	2.6.3	Ammonium ion (NH_4^+)√	(1)
2.7	**Plant improvement**		
	2.7.1	Genetically Modified√	(1)
	2.7.2	• Genes from frost-tolerant fish are put in plants in order to withstand very low temperatures√ • Genes from viruses are put in plants to make them disease-resistant√ • Unwanted genes that cause browning in potatoes and apples when they are bruised or cut can be removed. √ Any (2x1)	(2)
2.8	**Optimal resource use**		
	2.8.1	A√. Potassium (K) √ and Nitrogen (N) √	(3)
	2.8.2	Molybdenum (Mo) √	(1)
	2.8.3	D√ / E √	(1)

2.9	**Soil survey**		
		• The soil dept √ • The physical properties of the soil / texture/ structure / aeration√ • Suitability of soil for a particular crop√ • Drainage requirements of soil √ • Fertilizer requirements of the soil / soil pH √ • Tillability of the soil√ • Degree of land preparation required√ • Suitability for irrigation√ Any (2x1)	(2)
			[35]
QUESTION 3			
3.1	**Soil texture**		
	3.1.1	Sand√	(1)
		- Balanced fertilization to provide both micro- and macro-nutrients√	
		- Judicious application of lime √	
		- Provision of water through sprinkler or micro irrigation, but not flood irrigation √	
		- Planting windbreaks across the direction of prevalent winds√	
		- Strip cultivation√	
		- Regular application of nitrogenous fertilizers in split doses at short intervals √	
		- Application of organic matter √ Any (4x1)	(4)
	3.1.2	Sample A√	(1)
	3.1.3	Sample C√ It has the highest clay content / most micro-pores will be found in this soil / smaller paricle sizes are more dominant √	(2)
3.2	**Soil colour, water and pore space**		
	3.2.1	Plot B√	(1)
	3.2.2	Plot A√	(1)

	3.2.3	Destruction of granular structure√ through smearing action√	
		Continuous cultivation will lead to faster oxidation of organic matter√ and the resultant destruction of crumb structure√ Lower fetility due to exploitary cultivation √ More soil erosion / less vegetation to bind the soil √ Any (4)	(4)
3.3	**Plant protection**		
	3.3.1	Mechanical weed control√	
		Use of herbicides / chemical weed control√	
		Biological weed control√ Any (2x1)	(2)
	3.3.2	Prevention√	
		Monitoring√	
		Minimize the use of chemical methods √	
		Selection of the most appropriate controls√ Any (2x1)	(2)
3.4	**Sexual reproduction in plants**		
	3.4.1	Gynoecium / carpel / pistil√	(1)
	3.4.2	D√	(1)
	3.4.3	Cross pollination√	(1)
	3.4.4	The first male gamete (n chromosomes) fuses with the ovum / egg cell (n chromosomes)√ to form the zygote / embryo (2n) of the seed√ The second male gamete (n chromosomes) fuses with the endosperm cell (2n chromosomes) √ to form the endosperm (3n chromosomes) of the seed. √	(4)
3.5	**Absorption and storage of water**		
		- Drastic decrease in photosynthesis. √	
		- Wilting of plants as a result of loss of turgidity. √	
		- General decrease in biological reactions in plants. √	
		- Reduction in transportation of nutrients in plants. √	
		- Lack of control of plant temperature. √	
		- Decrease in crop production / yield. √ Any (3x1)	(3)

3.6	**Optimal resource utilization**		
	3.6.1	Sinking wells, boreholes or tubewells√ and erecting pumps to collect water for irrigation. √	(2)
	3.6.2	'Muthi' plants √ Traditional healers√	(2)
	3.6.3	Thatch grass. √ Used in the contruction of roofs / shelter√	(2)
	3.6.4	No water source for irrigation / water source dried up	(1)
			[35]
QUESTION 4			
4.1	**Soil classification**		
	4.1.1	A horizon√	
		B horizon√	(2)
	4.1.2	The blocky structure of the soil as indicated in the report√ could be due to the presence of manganese compounds. √ or the mother rock composition√ contained minerals that was responcible for the dark colour. √ Any(2)	(2)
4.2	**Soil microbiology**		
	4.2.1	Ammonification – NH_4^+ / ammonium √ Nitrification – NO_3^- / nitrate √ Denitrification – NO_2^- nitrite √.	(3)
4.3	**Colloidal matter**		
	4.3.1	B√	(1)
		Montmorillonite√ / vermiculite √ / illite √ Any 1	(1)
	4.3.2	• Making of earthenware pots for storing grains, water as well as for cooking. √ • Sealing dams walls.√	(2)

	4.3.3	• Adsorb nutrients / negatively charged colloids (cations) √ • in large quantities / large adsorption surfaces. √ • Release nutrients elements (ions) quite readily √ • during the normal weathering processes. √ Any (3)	(3)
4.4	**Farming practices and malnutrition**		
	4.4.1	Maize / mealies / corn√	
		Sunflower√ Jatrofa√	
		Peanuts√	
		Wheat√	
		Sorghum√	
		Barley√	
		Oats√	
		Rye√	
		Sugarcane√	
		Millet√	
		Sugar beet√ Any (2x1)	(2)
	4.4.2	• People should have access to agricultural resources such as land, technology, credit and training. √ • Small-scale irrigation and rainwater harvesting should be encouraged. √ • Appropriate technology that small-scale farmers can afford should be developed to improve agricultural production and processing. √ • Agricultural land reform should be linked to other support services such as training, access to credit and effective extension services. √ Any (2x1)	(2)
4.5	**Fertilizers**		
	4.5.1	Limestone Ammonium Nitrate (LAN) √	
		Urea√	(2)
	4.5.2	Nitrogen (N) √	(1)

4.6	**Fertilizer mixtures**		
		2 + 3 + 2 = 7√	
		Mass of phosphorus in a bag (100 kg) = $\frac{3}{7}$ x 28 √	
		= 12 kg √	
		Number of bags which will contain 42 kg = $\frac{42\ kg\ √}{12\ kg}$	
		= 3,5 bags √	(5)
4.7	**Asexual reproduction**		
		Ginger - rhizome √	
		Garlic - bulb / clove √	(2)
4.8	**Optimal resource use - irrigation**		
	4.8.1	B / Micro-spray / micro-jet √	(1)
	4.8.2	A / Drip irrigation √	(1)
4.9	**Drainage**		
	4.9.1	C – Grid √ Contour lines indicate this drainage system best suiterd for level / flat soil surfaces√	(2)
4.10	**Crop rotation**		

1 Sweet potato √	2 Maize
4 Sorghum√	3 Peanut √

OR

			1 Peanut √	2 Maize	
			4 Sorhum√	3 Sweet potato √	(3)
					[35]
				TOTAL SECTION B:	**105**
				GRAND TOTAL:	**150**