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GRADE 11

NOVEMBER 2017

**AGRICULTURAL SCIENCES P2
MARKING GUIDELINE**

MARKS:

150

This marking guideline consists of 8 pages.

SECTION A**QUESTION 1**

- 1.1 1.1.1 C ✓✓ Xylem (2)
- 1.1.2 B ✓✓ ii, iii and iv (2)
- 1.1.3 B ✓✓ Drip irrigation (2)
- 1.1.4 A ✓✓ eutrophication. (2)
- 1.1.5 D ✓✓ stem cuttings. (2)
- 1.1.6 D ✓✓ Grain and fruit damage before reaching maturity (2)
- 1.1.7 C ✓✓ oxygen. (2)
- 1.1.8 B ✓✓ Tensiometer (2)
- 1.1.9 B ✓✓ nitrogen. (2)
- 1.1.10 C ✓✓ secondary cultivation. (2)
- (20)
- 1.2 1.2.1 D ✓✓ Failure of viable seed to germinate (2)
- 1.2.2 F ✓✓ Cutting, turning and shattering of the soil with rotary tillers (2)
- 1.2.3 I ✓✓ Microbial conversion of nitrate to nitrogen gas (2)
- 1.2.4 E ✓✓ Receives pollen during pollination (2)
- 1.2.5 A ✓✓ Required for nitrogen fixation (2)
- (10)
- 1.3 1.3.1 Sodicity ✓✓ (2)
- 1.3.2 Systemic herbicides ✓✓ (2)
- 1.3.3 Mutation ✓✓ (2)
- 1.3.4 Hydroponics ✓✓ (2)
- 1.3.5 Monoculture ✓✓ (2)
- (10)
- 1.4 1.4.1 Pipe drains ✓ (1)
- 1.4.2 Vegetative ✓ (1)
- 1.4.3 Osmosis ✓ (1)
- 1.4.4 Necrosis ✓ (1)
- 1.4.5 Compost ✓ (1)
- (5)

TOTAL SECTION A: 45

SECTION B:**QUESTION 2: PLANT NUTRITION**

- 2.1 2.1.1 (a) Granum/Grana ✓ (1)
- (b) Stroma/Fluid matrix ✓ (1)
- 2.1.2
- Oxygen emission ✓
 - Manufacturing of sugars/carbohydrate ✓
 - Stored excess plant parts like fruits are used as food by man ✓
 - Stored plant parts are used as raw materials for manufacturing/production ✓ (Any 2 x 1) (2)
- 2.1.3
- Roots ✓
 - Tubers ✓
 - Stems ✓
 - Leaves ✓
 - Fruits ✓
 - Seeds ✓ (Any 2 x 1) (2)
- 2.1.4
- Energy is used/stored in photosynthesis. ✓ (1)
 - Energy is produced/released in respiration. ✓ (1)
- 2.2 2.2.1 Active ion uptake ✓ (1)
- 2.2.2 Active ion uptake ✓ (1)
- 2.2.3 Passive ion uptake ✓ (1)
- 2.3 2.3.1
- It improves soil structure ✓
 - It improves water retention ✓
 - It is a rich source of nitrogen ✓ (3)
- 2.3.2 Calcite/Calcitic agric lime/ CaCO_3 ✓
Dolomitic agric lime/ $\text{CaCO}_3 \cdot \text{MgCO}_3$ ✓ (2)
- 2.3.3
- Storage and handling of the manure ✓
 - The type of animal ✓
 - The age of the animal ✓
 - The type of feed given to the animals ✓ (Any 3 x 1) (3)

2.4 2.4.1 Compound/Mixed fertiliser ✓ (1)

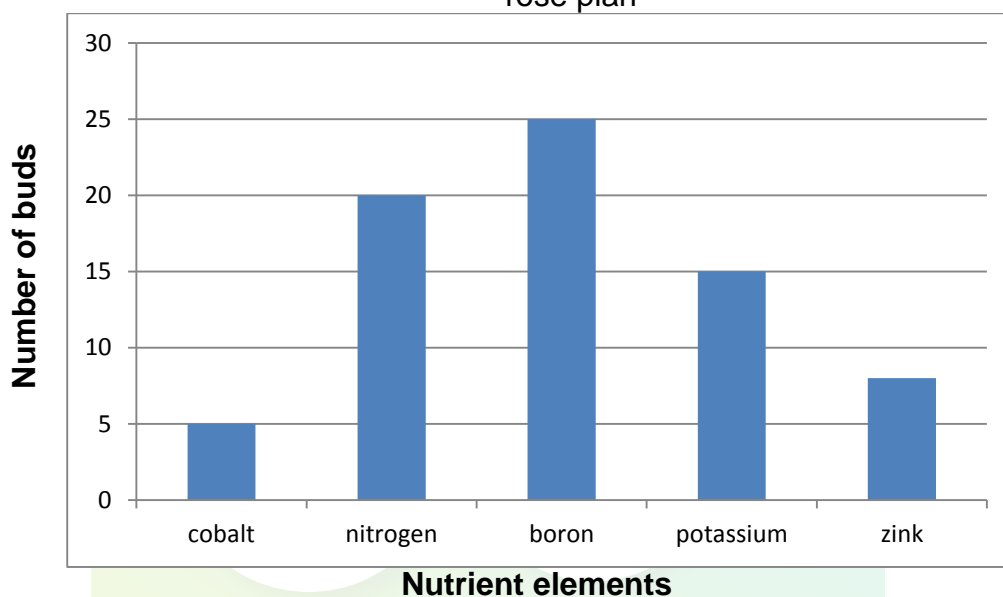
- 2.4.2
- The picture indicates a mixture ratio of 2:3:2 ✓
 - The bag contains more than one type of fertiliser ✓ (Any 1 x 1) (1)

2.4.3 N = 3 P = 2 K = 1

Total: $3+2+1=6$ ✓

% nitrogen = $\frac{3}{6} \times 30 = 15\%$ (4)

2.5 2.5.1 The effect of different nutrient elements on the formation of buds in rose plan



- Bar graph ✓ (1)
 Correct heading ✓ (1)
 Correct plotting/proportional plotting ✓ (1)
 Labelling and units on y-axis ✓ (1)
 Labelling and units on x-axis ✓ (1) (5)

2.5.2

Macro elements	Micro elements
Nitrogen ✓	Cobalt ✓
Potassium ✓	Zinc ✓
	Boron ✓

(5)
[35]

QUESTION 3: PLANT REPRODUCTION

- 3.1 3.1.1 FIGURE 3.1(a) Hypogeal germination ✓
 FIGURE 3.1(b) Epigeal germination ✓ (2)
- 3.1.2 • Scarification ✓
 • Priming ✓ (2)
- 3.1.3 • Enough soil moisture ✓
 • Favourable temperature ✓
 • Enough oxygen ✓
 • Ideal growth medium ✓ (Any 3 x 1) (3)
- 3.2 3.2.1 FIGURE 3.2(a) Grafting ✓
 FIGURE 3.2(b) Budding ✓ (2)
- 3.2.2 • They produce plants that are true to type ✓
 • Grafted plants and budded plants produce fruits earlier than seed grown plants. ✓
 • They require no pollination ✓
 • To impart disease resistance or hardiness, contributed by the root ✓
 • To reduce the occurrence of seed borne diseases ✓ (Any 3 x 1) (3)
- 3.3 3.3.1 Cross pollination ✓ (1)
- 3.3.2 • Plants produce large amounts of dry pollen grains ✓
 • Flowers are small and dull in appearance ✓
 • The corolla is either absent or very small ✓
 • Flowers have large styles and anthers ✓
 • Flowers are not scented ✓ (Any 3 x 1) (3)
- 3.3.3 • Insects ✓
 • Mammals ✓
 • Birds ✓
 • Water ✓
 • Mice ✓ (Any 3 x 1) (3)

- 3.4 3.4.1
- They only affect the part of the plant they are applied ✓
 - They are suitable for annual plants ✓
 - They do not affect root crops ✓
 - Leaves can resurrect after a period of time without total destruction ✓ (Any 3 x 1) (3)
- 3.4.2
- Weeds grow easily in disturbed environments ✓
 - Weeds produce large quantities of seeds ✓
 - Weeds seeds have a long life span ✓
 - Weeds have many seed dispersal methods ✓
 - Most weeds are native/adaptable to the environment within which they compete with cultivated crops ✓ (Any 3 x 1) (3)
- 3.4.3
- Weeds compete with crops for moisture/space/nutrients/light ✓
 - Weeds interfere with the harvesting of crops ✓
 - Weeds serve as host plants for insects and pests ✓
 - Weeds that are thorny pose health hazards to plants ✓ (Any 3 x 1) (3)
- 3.5
- Use the right product for the pest to be controlled ✓
 - Use the right quantity of the pesticide ✓
 - Apply the product at the correct stage ✓
 - Ensure the correct interval for the application of the product ✓
 - Follow the safety directions such as wearing cloths ✓
 - Do not dispose chemicals into water source ✓ (Any 4 x 1) (4)
- 3.6
- Fertilisers – Farm seeds, Agricultural Remedies and Stock Remedies Act, 1947 ✓
 - Agricultural Pest Act, 1983 ✓
 - Agricultural Products Standards Act, 1990 ✓
 - Conservation of Agricultural Resources Act, 1983 ✓
 - The Plant Breeders' Right Act, 1976 ✓
 - Genetically Modified Organisms Act, 1997 ✓ (Any 3 x 1) (3)
- [35]**

QUESTION 4: OPTIMAL RESOURCES

- 4.1 4.1.1
- Farmers move away from blanket fertiliser application ✓
 - Farmers apply fertiliser to specific poor area ✓
 - It allows farmers to compare harvest information ✓
 - Farmers identify non fertile spots in their fields ✓
- (Any 3 x 1) (3)

- 4.1.2
- Global position systems/GPS/Satellites ✓
 - Computers ✓
 - Maps ✓
 - Data cards ✓
- (Any 2 x 1) (2)

- 4.1.3
- Capital/it's expensive/loan/financial assistant ✓
 - Lack of knowledge/technical know-how maintenance skill ✓
 - Lack of support/equipment like combine harvester and tractors ✓
- (Any 2 x 1) (3)

- 4.2 4.2.1 **Flood irrigation**
Flood irrigation is an irrigation system where the whole surface of the soil ✓ is flooded. ✓

Sprinkler irrigation

With sprinkler irrigation, water is forced under pressure through a rotating spray to reach the soil's surface ✓ in the form of separate drops. ✓

(4)

- 4.2.2
- Where the slope is level/flat ✓
 - When the water is plentiful and cheap ✓
 - When a strong stream of water is available ✓
 - Where the soil is not sandy ✓
- (Any 2 x 1) (2)

- 4.2.3
- Not much labour is required ✓
 - There is no loss of water through seepage ✓
 - Water is measured accurately ✓
 - It is possible to irrigate uneven soils ✓
 - Water is applied uniformly ✓
- (Any 2 x 1) (2)

- 4.3 4.3.1
- | Bare cultivation | Mulching |
|-----------------------|-------------------------|
| B/Compaction occurs ✓ | D/No compaction ✓ |
| C/Weak aeration ✓ | A/Better air movement ✓ |
- (4)

- 4.3.2 Mulching refers to the spreading of any loose material such as saw dust, leaves on the soil surface ✓ to protect the soils ant roots from the effects of rain drops, crusting and evaporation. ✓
- (2)

- 4.3.3
- Mulching prevents soil surface evaporation ✓
 - It retain soil moisture ✓
 - It controls weeds ✓
 - It prevents erosion ✓
 - Prevents incidence of rain drops ✓
 - It protects plant roots ✓
 - It decomposes to increase organic fertiliser to the soil ✓ (Any 2 x 1) (2)
- 4.4 4.4.1 Hydroponics ✓ (1)
- 4.4.2
- The pH of the medium should be neutral ✓
 - It should provide support to the plant ✓
 - It should retain moisture and allow space for good moisture exchange ✓
 - It should have sufficient pores to allow circulation of air around the root system ✓
 - It should provide protection to the roots against temperature fluctuations ✓ (Any 3 x 1) (3)
- 4.4.3
- No soil is needed, plants can be grown anywhere as long as there is light ✓
 - Lower water cost as the same water can be reused ✓
 - It is easier to control nutritional levels ✓
 - There is no need for tilling, watering, fumigation and weed eradication ✓
 - It is easier to control plant pests and diseases as plant containers can be moved easily ✓
 - Hydroponics uses less fertiliser ✓
 - The growing season is extended ✓ (Any 2 x 1) (2)
- 4.5
- To provide aeration for roots to breath ✓
 - To enhance oxygen flow in the soil for microbial activities ✓
 - To reduce accumulation of brack salts in the top soil ✓
 - To reduce production risk ✓
 - For field operation such as ploughing ✓ (Any 2 x 1) (2)
- 4.6
- They grow better and faster ✓
 - Some people prefer eating the exotic breeds ✓
 - They are more fertile, breed easily and produce many young ones ✓
 - They are more in demand and provide a large market ✓ (Any 3 x 1) (3)
- [35]

TOTAL SECTION B: 105

GRAND TOTAL: 150