

MARKING SCHEME

Q1. Difference between hypogeal germination from epigeal germination

Do not write in this margin

a) Epigeal germination: The cotyledons emerge above the soil surface after germination

1 mark

b) Hypogeal germination: The cotyledons do not emerge above the soil surface after germination

1 mark

2 marks

Q2 Define the following terms:

a) Pest - Any organisms that damage plant or plant product.

1 mark

- Any organisms that is destructive to plant directly by damaging the plant or indirectly through the introduction of disease producing organism such as virus.

b) Inoculation: Is the contact of pathogen with plants or an entity, usually a micro-organism that can incite disease

1 mark

c) Pathogen: Is an agent that cause damage or diseases

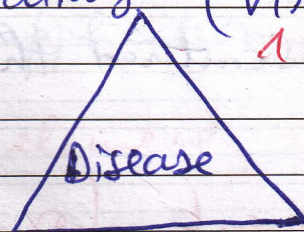
1 mark

3 marks

Q3. Pathogen (Virulent pathogen)

a)

1 mark



Hot (susceptible variety)

1 mark

environment (Favorable condition)

1 mark

b) characteristic of gymnosperm plants

Do not
write in
this margin

- They bear cones of two types, male and female
- They don't produce flowers
- Seeds are not formed inside a fruit
- They are found in colder regions where snowfall occurs
- They develop needle-like leaves
- They are perennial or woody, forming trees or bushes
- They are not differentiated into ovary, style and stigma
- They don't produce fruit
- They don't have a shell or outer covering around the seeds
- They are autotrophic, photosynthetic organisms that tend to conserve water.
- Sunken stomata and waxy leaves

Consider 4 elements each equal 0.5 mark (5 marks)

Q4. The characteristics of monocotyledonous plants are:

- Don't possess the cambium
- Have a single cotyledon
- Have a fibrous root system
- Leaves with parallel venation
- In monocotyledon flowers is a multiple of three or equal to three or combination of three

Vascular bundles occur scattered throughout the stem

Consider 5 elements, 1 mark for each

Q5.

- Cost of management market Value
- Injury / are damaged
- Damage
- Proportion of unavoidable injury

Where:

C = cost 1/1

V = Market Value 1/1

I = Injury 1/1

D = Damage 1/1

K = Proportion of unavoidable injury
(proportion reduction in injury with management) 1/1

5 marks

Q6. the precautions to consider during the use of pesticide.

- Do not eat during application
- Do not smoke during application
- Wear protective equipment during application
- Do not apply pesticide in strong wind, rainy and sunny time
- Read the label
- Do not apply pesticide alone
- Do not wear the damaged PPE
- Avoid leakage during application
- Do not apply pesticide in the direction of wind
- Do not taste pesticide during application
- Keep away livestock and children away from the application area.

Consider 4 element, 1 mark for each

Q7. The effects of light on plant

Do not write in this margin

The effect of light has the effect on plant growth by intervening in

- * Photosynthesis 1 mark
- * Photo periodism 1 mark
- * ~~Phototropism~~
- * germination 1 mark

* light is essential for chlorophyll formation and photosynthesis

* light encourage the germination of seeds and the growth of seedlings

* light triggers flowering in plants

3 marks

Q8. Definition seed germination

a) Seed germination = Is the process by which an embryo in seed develops into seedlings (young plants) 1 mark

b) Seed quality = Is the seed meeting specific purity, genetic purity, physiological standard, disease free with germination capacity and water meeting minimum standard established by seed law. 1 mark

c) Viability = Is ability of seed to germination if all necessary conditions are provided 1 mark

3 marks

Q9. Differentiate between physical and control from mechanical control.

Do not write in this margin

* Physical control : are the use extreme environment condition to control problem such as heat and cold or temperature manipulation

2 marks

* Mechanical control : This is the reduction of pest damage by use of mechanical measures such as :

- Traps
- Sounds
- Hand picking
- Construction of physical barriers
- Cultivation techniques

12 marks

4 marks

Q10. Fire (5) component of IPM

- Prevention
- Cultural
- Physical & Mechanical
- Biological
- Chemical

Consider 5 element 1 mark for each

5 marks

Q11.

a) EIL : is the smallest number of insects that will cause yield loss, equal to the insect management cost or.

is the lowest population density that will cause economic damage

1.5 mark

B) Action threshold : is the pest density at which management action should be taken to prevent an increasing pest population from reaching economic injury level or

is the pest level at which control measure should be taken to avoid loss 1.5 mark

Q12. This causes seed dormancy

- Immature embryo 1 mark
- Hard seed coat 1 mark
- Inappropriate temperature 1 mark
- Inadequate amount of moisture 1 mark
- Presence of inhibitor. 1 mark

Q13. The effect of Auxin on growth of plant

- Inhibition Senescence and abscission of mature leaves
- Promote cell division and differentiation
- Bending toward a light source (phototropism)
- Elongation of stem and root
- Downward root growth in response to gravity
- Promotion of apical dominance
- Flower formation of adventitious roots
- Parthenocary factor (seedless)

Consider 5 elements 1 marks for each

Q14. External factors

Do not write in this margin

a) * Moisture Content / water 0.5 mark

* light 0.5 mark

* Oxygen 0.5 mark

* Temperature 0.5 mark

b) Two methods to conduct germination test

* Use of papers 1 mark

* Use of sand 1 mark

* Use of water 1 mark

* Use of $KMnO_4$ 1 mark

* Use of tetrasodium salt 1 mark

Consider 2 elements

4 marks

Q15. The structure of male reproductive organism of flowers

Male reproductive organism

- Filament 1 mark

- Anther (pollen grains)
male gametes 1 mark

- Androecium / stamen

- Ovary with ovules 1 mark

- Style 0.5 mark

- Stigma 0.5 marks

- Gynoecium / pistil / carpel

4 marks

Q16. Given data

- Spray of 5 l / m^2 - Mixing rate:

- Area = 15 ha

- Tank capacity 1 part of chemical 5 part of water
1 mark

Question - Calculate required quantity of Sprayed mixture

Do not write in this margin

- calculate volume of chemical that should be added to make mixture of 20 l of mixture

$$i) 15 \text{ ha} \rightarrow 150,000 \text{ m}^2$$

$$1 \text{ m}^2 \rightarrow 5 \text{ l of mixture}$$

$$150,000 \text{ m}^2 \rightarrow 5 \text{ l} \times 150,000 \text{ m}^2 = 750,000 \text{ l of mixture}$$

2 marks

ii) 1 part of chemical + 5 parts of water
6 parts \rightarrow 1 part of chemical

$$6 \text{ l} \rightarrow 1 \text{ l}$$

$$1 \text{ l} \rightarrow 1 \text{ l}$$

6

$$20 \text{ l} \rightarrow \frac{1 \text{ l} \times 20}{6} = 3.33 \text{ l}$$

1 mark

B) Procedure of using Knapsack Sprayer:

- Read the instructions on the label of the chemical container.

- Calculate the volume of water required to dilute the chemical depend on the area where the chemical is to be applied and the type of pest to be controlled

- Put on protective clothing such as face mask, overall, rubber gloves and rubber boots before starting to handle the chemicals

- Pour half of the sprayer and add the amount of chemical required
- Make sure that the lid of the sprayer is closed and then shake it thoroughly to mix the chemical with the water.
- Add the remaining water to the correct dilution, replace the lid and shake the sprayer again.
- Point the nozzle away from your pump the sprayer until the chemical comes out of the nozzle.
- Adjust the nozzle to the correct spray strength and apply the chemical to the crop leaves.
- Spray the selected area at constant normal working speed.

Consider 5 elements each one equal 2 marks (10 marks)

Q17. The risks and precautions before pesticides application in the field are the following:

- Read and respect the label instructions and warnings
- Prepare the spray solutions outside the field
- Mix and dilute the pesticides with greatest care
- After filling the spraying tank, wash the mixing equipment used
- When spraying in the field, make sure that the spray tank rest comfortably on your back.

When walking with very toxic pesticides it is advisable, to walk in pairs

Consider 4 elements, each equal 1 mark

b) The safety measures to consider after pesticide application are the following

- Keep and left over concentrated production in its original container seal it well after use and then store it away safely.

- When a container of liquid pesticide is finished rinse the remainder of the product out of the container into the mixing tank or directly into the tank of the Knapsack Sprayer.

- When you have finished spraying, do not leave empty container lying about but dispose of these properly.

- Never eat, drink or smoke during or directly after pesticide application.

- Never use empty pesticides container to hold water or food.

- If you burn pesticides packages, never stand in the path of smoke from these fires

- Bury the chemical container after use

- Avoid disposing chemical near source of water

Q18. ~~Given data~~

- Measure the volume of chemical to be used accurately before spraying.

- Do not under any circumstances empty left over chemicals into streams or rivers

Consider 6 elements, each equal 1 mark

10 marks

Q18. a) Given data

Area : 120 ares

- Spraying rate 1600 gal/ha

- Tank capacity 15 l

- Spraying rate of water in Ha 4000 l/h (water)

- Concentration of Dimethoate 40%

i) 1 ha \rightarrow 100 ares

$$100 \text{ ares} \rightarrow \frac{4000 \text{ l} \times 120}{100} = 4800 \text{ l/water}$$

2 marks

ii) 40 gr ai \rightarrow 100 g Dimethoate

$$1 \text{ gr ai} \rightarrow \frac{100 \text{ g} \times 1600}{40} = 4000 \text{ gr of}$$

160 gr ai

Dimethoate

2 marks

100 ares \rightarrow 4000 gr Dimethoate

1 are \rightarrow 4000 gr \times 120

$$\frac{4000 \text{ gr} \times 120}{100} = 4800 \text{ g of}$$

Dimethoate / 120 ares

2 mark

iii) 4800 l of water \rightarrow 4800 of Dimethoate

1 l

$$\rightarrow \frac{4800 \text{ g} \times 15}{4800} = 15 \text{ g of}$$

15 l

Dimethoate

2 marks

iv) 15 l of water \rightarrow 1 Sprayer tank

1 l

$$\rightarrow \frac{1 \text{ Sprayer tank} \times 4800}{15 \text{ l}} = 320$$

Sprayer tank

2 marks

v) 320 Sprayers \rightarrow 120 ares

1 Sprayer \rightarrow 120 = 0.375 are

$$\frac{120}{320} = 0.375 \text{ are}$$

$$= 37.5 \text{ m}^2$$

2 marks

Q19. Plant growth

* Primary & Secondary growth 1 mark

- Primary growth : Root and shoot apex increase the length of plant

- Secondary growth : Meristems increase the diameter of plant

* Unlimited (Indetermined) growth 1 mark

Roots and shoots system of plant grow continuously from germination stage to the death or throughout the life spans of plant

- Here after harvesting regrow again

* Limited (determined growth) 1 mark

Leaves, stems and branches without flowers stop growing after attaining certain size

* Reproductive growth / phase 1 mark

After the vegetative growth, plants produce flowers which are the reproductive part of plant

* Vegetative growth / phase. 1 mark

Is the ~~ear~~ early growth of plant producing leaves, stems and branches without flowers

consider 2 elements

b) Stage of Areal growth

Do not
write in
this margin

- Vegetative stages 1 mark
- stem elongations 1 mark
- Tillering stage 1 mark
- Heading stage 1 mark
- Anthesis stage 1 mark
- Milking stage 1 mark
- Dough stage 1 mark
- Ripe seed stage 1 mark
- booting stage 1 mark

Consider 6 element

c) Symptoms is extend or internal reaction or alteration of a plant as a results of a disease or

Is observable evidence of the external disease causing agent or

~~Is~~ observable evidence of the external disease cause

or observe the visible effect of disease on the plant, or any detectable changes in color shape 1 mark

- Signs are much more specific to disease causing agent than symptoms or

- Are physical evidence of the pathogens example fungal fruiting. 1 marks

10 marks

Do not write in this margin

Q20 a) Physical quality of seed	Physiological quality of seeds
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- Dry ✓
 - Pure ✓
 - Intact (not broken) ✓
 - Occurrence of cracks ✓
 - Pest and disease attack or other damage ✓
- Consider 4 elements

- Mature ✓
 - Not old ✓
 - Intact germ ✓
 - Moisture content or germination ability ✓
- Consider 2 elements.

ii) Abnormal: Seedlings that exhibit some form of growth but have insufficient plant structure to maintain a healthy plant, such as missing roots or shoots. 2 marks

b) If germination rate is over 80%, seeds are viable and suitable for sowing 2 marks

If germination rate is under 80% seeds are not viable and suitable therefore not suitable for sowing. 2 marks

ii) Normal: Seedlings that possess essential structure which are indicative of their ability to produce useful mature plants under favorable field conditions. 2 marks

Consider 2 elements

Q21. a) Procedures of testing germination

- Obtain sample from seed lot 1 mark
- Count known number for seeds from the sample 1 mark
- Provide favorable conditions for germination 1 mark
- After few days, count germination seeds that has germinate 1 mark

$$\frac{\text{Germination seeds} \times 100}{\text{Total seed}}$$

If germination rate is over 80% seeds are viable and suitable for sowing

Do not write in this margin

If germination rate is under 80% seeds are of low viable and not suitable for sowing

b) Importance of artificial propagation are the following:

- Improving plant quality or variety 1 mark
- Disease resistance improvement 1 mark
- Improve plant yield 1 mark
- Improve plant product 1 mark

• Artificial propagation is usually used in agriculture for the propagation of those plants which produce either very few seeds or do not produce viable seeds 1 mark

• Another role of artificial propagation is that resulting plants are clones of the parent plant.

or resulting plants are identical to the parents. 1 mark

• Early maturity. 1 mark

Consider 5 elements, 1 mark for each.

DRAFT

2,11,000 : Two hundred and eleven thousand

Two hundred and eleven thousand and

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