

TVET NATIONAL EXAMINATIONS, LEVEL 5

MARKING GUIDE

EXAM NAME: FOREST PROTECTION

SECTOR: AGRICULTURE AND FOOD PROCESSING

TRADE: FORESTRY

MARKS:

/100

DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES:

This Exam paper is composed of Three Sections (A, B, C). Follow the instructions given below, and answer the indicated questions for a total of 100 marks

Section A: Fourteen (14) questions, all **Compulsory** **55 marks**

Section B: Among the five (5) questions, attempt any three (3) **30 marks**

Section C: Among the two (2) questions, attempt any one (1) **15 marks**

01. Depending on their mode of propagation and their position in relation to the ground surface, distinguish different types of forest fires. (3marks)

Answer:

Different types of forest fires are:

1. Crown fire
2. Ground fire
3. Surface fire,
4. Ladder fire.

Consider three (3) correct answers for **1mark** each one

02. Design a diagram that shows forest fire triangle. (3marks)

Answer:

Principle of fire triangle is: availability of oxygen, heat and fuel.



03. Forest fires are caused by natural causes as well as manmade causes. Identify at least two (2) natural causes of forest fires and three (3) artificial causes of forest fires. (5marks)

a) Natural causes of forest fires are:

- 1) Lightning which set trees on fire.
- 2) High atmospheric temperatures and dryness (low humidity)
- 3) Earthquakes;
- 4) Volcanic eruption,
- 5) Sparks from rock falls,
- 6) Rubbing

Consider two (2) correct answers for **1mark** each one

b) Artificial causes of forest fires are:

- 1) Naked flame,
- 2) Arson / poaching activities,
- 3) Discarded cigarettes,
- 4) Sparks from equipment and Power line.
- 5) Honey harvesting
- 6) Shift cultivation

Consider three (3) correct answers for **1mark** each one

04. Outline any six (6) tools, materials and equipment that should be used for fighting against forest fire outbreak. **(3marks)**

Answer:

Six (6) tools materials or equipment used for fighting against forest fires outbreak are:

1. Hand-hoe, *8. PPE*
2. Shovel, spade, *9. First aid kit*
3. Extinguisher, *10. Sand / soil*
4. Air plane, *11. Pipe*
5. Special truck, *12. Blanket*
6. Helicopter, *13. Water*
7. Mobile phone. *14. Fire*

Consider six (6) correct answers for **0.5mark** each one

05. Preventive or curative methods may be used in forest fires control. Illustrate three (3) curative methods that could be used for fighting against forest fires. **(3marks)**

Answer:

Three (3) curative methods used in forest fire control are:

1. Use of sand, *6. Use of fire break*
2. Use of extinguisher, *7. Use of blanket*
3. Use of water,
4. Use of fire against fire, and
5. Use of brooms.

Consider three (3) correct answers for **1mark** each one

06. Assume that you are fighting against the fire by using extinguisher. Identify the steps to follow while using fire extinguisher. **(4marks)**

Answer:

The steps to follow while using fire extinguisher are:

1. Use upright pin; *Pull up the pin*
2. Pull the pin while holding the extinguisher away from you to unlock the mechanism;
3. Aim low toward the base of the fire from approximate 2meters;
4. Squeeze the handle to release the extinguishing agent;
5. Sweep the nozzle side to side to extinguish fire from the base of flame.

Consider four (4) correct answers for **1mark** each one

07. If the initial seedlings survival rate is too low, it is necessary to perform gap filling.

As forest technician, explain what is:

- a) Survival rate of planted seedlings, **(2marks)**
- b) Gap filling. **(2marks)**

Answer:

a) Survival rate is the ratio between resisting seedlings and planted seedlings in percentage. /2marks

b) Gap filling is the operation carried out to replace any seedlings that may have died, damaged (or are struggling) after planting. /2marks

08. Normally trees are managed as agricultural crops in order to encourage their development and increased production. List and explain three (3) methods of clearing applied in young forest plantation. **(3marks)**

Answer:

a) Clean /Total clearing: Grasses and bushes are cut over the whole plantation area. (1mark)

b) Spot/Radius clearing: Grasses are only cut over a circle of 1m radius around individual planted seedlings or along the line of planted trees. (1mark)

c) Line clearing: The undesirable vegetation is cut along the lines of planted trees over a width of 1.5 m on each side of the line. (1mark)

09. Identify the procedures to follow when performing pruning of branches from a standing tree. **(5marks)**

Answer:

The procedures to follow when performing pruning of branches from a standing tree are:

1) The first cut is a shallow notch made on the underside of the branch, outside the branch collar. This cut will prevent a falling branch from tearing the stem tissue as it pulls away from the tree. (1mark)

2) By holding the branch to be cut, the second cut should on the topside of the first cut, (1mark) all the way through the branch, leaving a short stub. By so doing the cut becomes clean and can heal without problems. (1mark)

3) The stub is then cut just outside the branch bark ridge/branch collar, completing the operation. (1mark)

4) Never remove more than 50% of the live crown of any tree; prune until 1/3 of the tree height, (1mark)

10. Determine the characteristics and dimensions of an escape route prepared by a feller during tree felling. **(4marks)**

Answer:

a) When felling tree, escape route should be clear (free from obstacles). (1mark)

b) Then, it should have an adequate work area round the base of the tree. (1mark)

c) Escape route would be approximately 2 -6m round the tree. (1mark)

d) Escape route could be created at 45° to the sides and back. (1mark)

11. Outline at least five (5) symptoms that show a tree that is severely attacked by pests.

(5marks)

Answer:

Five (5) symptoms that show a tree that is attacked by pests are:

- 1) Chewed foliage on trees and shrub *g) Necrosis*
- 2) Distorted foliage *10. Leaf curl or roll*
- 3) Spots on tree and shrubs
- 4) Holes in the bark of tree or shrubs
- 5) Sticky substances */ gum / Resins*
- 6) Yellowing of foliage
- 7) Stunted leaf of growth

8) Wilting
Consider five (5) correct answers for **1mark** each one

12. A farmer has orchard composed by 4000 apples. This orchard was attacked by apple green crinkle disease. Calculate incidence rate if the total affected apples per year equal to 1000 apples.

(4marks)

Answer:

$$\text{Disease incidence rate} = \frac{\text{Number of infected plant}}{\text{Total number of health and infected plants}} \times 100 \quad /2\text{marks}$$

$$\text{Thus, disease incidence rate} = \frac{1000\text{plants}}{4000\text{plants}} \times 100 = 25\% \quad /2\text{marks}$$

13. Identify any four (4) examples of tools or equipment used in pest and disease control.

(4marks)

Answer:

Four (4) examples of tools or equipment used in pest and disease control are:

- 1) PPE (Gloves, Respirator), *8) Electronic balance*
- 2) Bait station, *9) Spoon*
- 3) Knapsack sprayer, *10) Bucket*
- 4) Insect net,
- 5) Duster,
- 6) Gloves Respirator,
- 7) UV-Flashlight.

Consider four (4) correct answers for **1mark** each one

14: Today in our country, we have a serious question of obtaining mangoes fruits on the market due to fungal diseases that cause losses of production in terms of quality and

quantity. How can you prevent fungal diseases in mangoes orchard?
(5marks)

Answer:

The following are the measures to apply for preventing fungal disease in mangoes orchard:

- 1) Start by planting health stock,
- 2) Practice the rotation,
- 3) Properly select plant cultivar resistant to fungal,
- 4) Control the weeds,
- 5) Always make a plan to grow health trees,
- 6) Choose planting sites based on plant needs,
- 7) Avoid overheard watering,
- 8) Water early in the day,
- 9) Have a health and well balanced soil,
- 10) Don't work a wet garden,
- 11) Treat with a trusted, proven fungicide.

Consider five (5) correct answers for **1mark** each one

SECTION B: Attempt any Three (3) questions

(30 marks)

15. Considering the young forest plantation of *Pinus patula*, plan/organize the necessary forest management operations that should be done within that forest from the date of planting until its final harvesting. **(10marks)**

Answer:

The necessary forest management operations that should be done within that forest plantation are:

- | | |
|------------------------------|---------------------|
| 1) Protection, | 8. |
| 2) Beating up /gap filling, | 9. |
| 3) Weeding /clearing, | 10. |
| 4) Pruning, | 11. Coppicing |
| 5) Thinning, | 12. Mulching |
| 6) Harvesting, | 13. Pest +d control |
| 7) Replanting/ Reforestation | 14. Fertilization |

Consider five (5) correct answers for **2marks** each one.

16. Diseases contribute to a significant loss of forest resources. Explain powdery mildew disease in term of causing agent, symptoms, propagation mode and example of affected tree species. **(10marks)**

Answer:

- a) Causing agent of powdery mildew: *Erysiphe spp.* /2marks
- b) Symptoms: White powdery appearance of leaves. /2marks
- c) Damage: Breaks photosynthesis. /2marks
- d) Mode of propagation: pores are carried to plant by wind, insect and splashing water. /2marks
- e) Example of affected species: ^{Guava} Mango. ^{Citrus} /2marks
^{Apple}

17. Fences are physical structures constructed around forest to serve a number of function such as fire break, wind break or animal's destruction.

a) Distinguish live fences to dead fences. (4marks)

b) Identify at least three (3) types of died fences. (6marks)

Answer:

a) Live fence: A living fence is a fence made of living trees and shrubs. /2marks

Live fence is made from thorny or non-thorny plants. It can also be called a green fence, or hedge. /2marks

Dead fence is made from non-living things. like stones, mud, bricks, barbed wire, bamboo, or even cut branches can be used to make a fence. /2marks

b) Three (3) types of died fence are:

1. Barbed wire: also known as barb wire, is a type of steel fencing wire constructed with sharp edges or points arranged at intervals along the strands.
2. Timber board or wooden fences: The most popular ones include picket, post and vertical board fences. Posts are fit into a constructed brick wall.
3. Electric fences: is a barrier that uses electric shocks to deter people and/or other animals from crossing a boundary.
4. Chain link fences: a fence of heavy steel wire woven to form a diamond-shaped mesh.
5. Stones/ bricks fences: Stone fences come in two main varieties: gabion fence and faux stone fence.

Consider three (3) correct answers for 2marks each one.

18. The following list of tree species Umuvumu, Umukoni, Umuhati, umuko, Umuyenzi are used to construct fences. Give the scientific name and family for each tree species. (10marks)

Answer:

Nº	Vernacular name	Scientific names (5marks)	Family (5marks)
1	Umuvumu	<i>Ficus thonningii</i>	MORACEAE
2	Umukoni	<i>Euphorbia dawei</i>	EUPHORBIACEAE
3	Umuko	<i>Erythrina abyssinica</i>	FABACEAE

4	Umuhati	<i>Dracaena afromontana</i>	ASPAGARACEAE
5	Umuyenzi	<i>Euphorbia tirucalli</i>	EUPHORBIACEAE

19. Discuss on the factors that encourage the propagation of diseases into the forest plantation. **(10marks)**

Answer:

The factors that encourage the propagation of diseases into the forest plantation are:

1. Soil moisture content:

High or low soil moisture may be a limiting factor in the development of certain root rot diseases. High soil moisture levels favor development of destructive water mold fungi, such as species of *Pythium*, and *Phytophthora*.

2. Planting density:

When plants show high density, it is easy for a disease to spread.

3. Climate:

Wind:

Here we think about the temperature where most of pathogens are active with their optimum temperature.

4. Soil nutrients: *level =*

Greenhouse and field experiments have shown that raising or lowering the levels of certain nutrients required by plants frequently influences the development of some infectious diseases.

5. Presence of weeds:

Weeds may harbor plant pests and therefore act as a source of infestation for the trees. They also provide a moist microclimate suitable for the development of plant diseases.

6. Composition: *of forest*

Mixed forests have high resistance to pest and diseases than pure forests.

Consider five (5) correct answers for **2marks** each one.

7. *Material/ tools & equipment*
8. *Animal / livestock*

presence of pathogens

SECTION C: Attempt only one (1) question

(15 marks)

20. Weeds are one of the most serious threats to young newly planted trees.

a) Based on their live span, list and explain three (3) classes of weeds.

(6marks)

b) Give the characteristics of weeds.

(9marks)

Answer:

a) Based on their live span, weeds are classified as follows:

1) Annual weeds: Which grow to maturity in one year, setting their seeds before dying off.

/2marks

2) Biennial weeds: Which take two years to mature and set seeds. */2marks*

3) Perennial weeds: Which survive for several years, and live indefinitely. /2marks

b) Characteristics of weeds are:

- 1) A tendency to produce large quantities of seeds;
- 2) Seeds adapted to disperse widely, often by several methods, including animals and humans, wind, water and agricultural implements;
- 3) Seeds that establish very quickly once they have germinated;
- 4) An ability to rapidly colonize disturbed sites;
- 5) Having a number of ways in which they can reproduce;
- 6) Producing chemicals that can inhibit the growth of neighboring plants;
- 7) An adaptation to a range of difficult growing conditions including soils and climate;
- 8) Exotic weeds that have been introduced from another region often do not have natural predators or diseases that would normally help to keep them in check in their natural habitat;
- 9) Longevity of seeds;
- 10) Weeds can survive adverse weather conditions;
- 11) Weeds are aggressive and persistent in trampling;
- 12) Some weeds mature at the same time with crops and being harvested with crops.

Consider nine (9) correct answers for **1mark** each one.

21. Cultural methods are the cheapest and friend of environment. Discuss on different silvicultural activities that minimize the risk of pests and diseases attack in orchard. **(15marks)**

Answer:

Silvicultural activities that minimize the risk of pest and diseases attack are:

- 1) Weeding: it is the activity of removing unwanted plants that can compete crops within a plantation. ↴
- 2) Pruning: it consists of reducing lower branches on trees for maintaining the required sunlight as well as keeping increasing the quality of timber. ↴
- 3) Thinning: Thinning in forestry is the selective removal of trees, primarily undertaken to improve the growth rate or health of the remaining trees. ↴
- 4) Pollarding: it is a system in which the upper branches of a tree are removed, promoting a dense head of foliage and branches. Traditionally, trees were pollarded for one of two reasons: for fodder to feed livestock, or for wood. ↴
- 5) Coppicing: is the process of cutting trees down, allowing the stumps to regenerate for a number of years (usually 7 - 25) and then harvesting the resulting stems. ↴

6) Clearing: this is the activity of removing all things that can hinder the growth of seedlings.

7) Mulching: A protective covering, usually of organic matter such as leaves, placed around plants to prevent the evaporation of moisture, keep the freezing of roots, and avoid the growth of weeds

8) Use of resistant tree species.

Consider five (5) correct answers for **3marks** each one.

g) *Sanitation:*

END OF ASSESSMENT!