**Name ………………………………………………………………………………………Random no: ………………………….**

**P515/3 AGRICULTURE PRACTICAL TEST:**

**1. You are provided with specimens A, B, C and D which are pastures for feeding livestock.**

**a i) Identify the specimens.**

A – Centro *(Centrosema pubescens).*

B – Elephant grass  *(Pennisetum* *purpureum).*

C – Rhodes grass *(Chloris gayana).*

D – Silver leaf desmodium *(Desmodium uncinuatum).*

**ii) Give the general name of the specimens.**

-Pastures.

**iii) Name two nutritional values / common nutrients supplied by the specimens in animal nutrition.**

-A and D –Proteins.

-B and C –Carbohydrates.

**iv) Place the specimens in two groups according to their similarity in nutrient composition.**

-A and D –Legume pastures.

-B and C –Carbohydrates.

**b i) Classify the specimens into two named groups / broad families, giving reasons for your classification in each case.**

|  |  |  |
| --- | --- | --- |
| **Specimen** | **Crop family / group** | **Characteristics/reasons.** |
| A and D | -Leguminaceae (Legume family) | -Net work venation. –Broad leaves.  -Tap root system. -Pods with seeds.  -Root nodules |
| B and C | -Gramineae (Grass family) | -Parallel venation. –Narrow leaves.  -Fibrous root system. –Seeds in form of grains |

**ii) From the specimens, suggest the most suitable combination for establishment in a ley or mixed pasture (sward).**

-A + B -B + D -A + C -C + D

**iii) Give reasons for your choice of combination above / benefits of growing the specimens together as mixed pastures**.

-They fix nitrogen into the soil hence increase in soil fertility.

-They improve on the nutrient content of pastures since they supply a balanced ration.

-They cover the soil surface hence controlling soil erosion.

-They increase on the palatability of pastures for animal feeding.

-They improve on the digestibility of pastures hence reducing bloat in animals.

-They suppress weed growth hence controlling them in a pasture land.

-Specimen A and D have longer grazing periods due to their high resistance to drought and trampling (destruction).

-Specimen A and D have deep tap roots to tap / re-cycle leached nutrients.

**iv) From the features of the specimens, suggest one method of propagation for each.**

A –Seeds.

B –Stem cuttings / splits of root stock.

C –Seeds / Tuft splits.

D –Seeds.

**c i) Suggest one method of preserving each specimen on the farm.**

A, B and D –Silage.

C –Hay.

**ii) Examine the specimens A and B and suggest qualities which make them suitable as animal feeds.**

**Specimen A:**

-It’s highly vegetative with a high leaf to stem ratio.

-Has high moisture content hence easily digestible by animals.

-Has seeds hence easily propagated / established by the farmer.

-Has a suitable height for easy grazing by animals.

-It’s nutritious due to it’s protein supply to the animals.

**Specimen B:**

-Highly leafy and vegetative with a high leaf to stem ratio.

-Hs a suitable height for easy animal grazing.

Has nodes on it’s stem for easy propagation or establishment as an animal pasture.

-It does not flower early hence long grazing period i.e provides fodder to the animals all year round.

**d i) What adaptations does the structures named in b(iv) above got to effectively propagate?**

**A (Seeds):**

-Has a hard seed coat which enables it to with stand heat without getting damaged.

-Has a degree of dormancy in the soil.

-It is produced in large numbers to increase chances of survival.

**B (Stem cuttings):**

-The stem is succulent with stored food.

-It has nodes for easy sprouting of the splits / buds into young plants.

**ii) Give the advantages of the named method of propagation of specimen B.**

-There is no need for pollination agents in the field.

-The off springs are true to type because of no mixture of hereditary characteristics.

-New plants (clones) mature faster than when using seeds.

- There is uniformity in plant population.

-Hazards of fertilisation are avoided.

**iii) State two shortcomings of using the family of specimen B and C AS THE ONLY source of nutrition for a growing ruminant animal.**

-Nutrient content varies with the stage of growth and so the animal may be malnourished.

-The supply of mainly maintenance energy during the dry season can lead to under production.

**ei) suggest the method of improving / managing the above specimens after their establishment**.

-Perimeter fencing / paddocking to allow rotational grazing.

-Broadcasting nitrogen fertilizers to increase soil fertility for better growth.

-Weed control to reduce competition for nutrients.

-Controlled burning to encourage fresh growth for animal grazing.

-Grazing management with correct stocking rate of animals to reduce over grazing.

-Over sowing / over seeding with improved grass and legume pasture species.

-Drainage of waterlogged areas to reduce infection of animals with parasites.

-Irrigation where possible to ensure vigorous growth of pastures.

-Topping of the fibrous parts of the pasture to encourage fresh growth.

**ii) Comment on their palatability as animal feeds.**

-A and D – Moderately good.

-B – Good.

-C – Fair when young.

**2. Specimens E, F, G, H and I are work shop tools used at the farm.**

**ai) Identify the specimens.**

E – G-clamp.

F –Hand saw / Cross cut saw.

G –Smoothing plane.

H –Piece of timber.

I –Tape measure.

**ii) State the functions played by each of the specimens.**

E –It’s used for gripping / holding timber firmly during planing, nailing, gluing and screwing.

F –It’s used for cutting specimen H along the grains.

G –It’s used for finishing / smoothening surfaces of specimen H after the jack plane has been used.

I –It’s used for taking measurements of required length of specimen H.

**iii) Examine the specimens carefully and describe the distinguishing features that enable them to perform their functions efficiently.**

**Specimen E:**

* Has a clamp for gripping the work during operations like sawing, planing, etc.
* Has adjustable bar / extension to allow clamping of objects.
* Has a handle for holding during operation.

**Specimen F:**

* Has a thin and skewed blade for easy passing along the grooves of specimen H (wood).
* Has alternate or zig-zag teeth arrangement to ease it’s cutting action.
* Has a wooden handle to reduce vibration or friction on the operator.

**Specimen G:**

* Has a sharp cutting iron for finishing specimen H (wood)
* Has a handle for handling and controlling it during operation.
* Has a flat smooth bottom which easily slides over the wood.
* It’s shorter in length to enable it to remove easily small curves and depressions on the wood.
* Has adjustable knob which adjusts the cutting blade to allow it to produce fine / coarse shaves on wood.

**Specimen I:**

* Has a long and flexible tape with the calibrated scale for easy taking measurement.
* Has a protective casing to protect it and also reduce damage.

**bi) Describe how the specimens fan be used together to construct a simple feed trough for feeding chicks.**

- Place specimen H on the cutting surface (table).

- Fix specimen E onto H to allow a firm grip for easy cutting.

- Take measurements of H using specimen I of required length and width for the feed trough.

- Use specimen G for finishing the surface of H.

- Cut H with specimen F to obtain a required shape of the feed trough for chicks.

**ii)** **Suggest the care and maintenance practices of the specimens in good working condition**

**Specimen E**

* Regular lubrication of bolts and nuts with grease to prevent rusting.
* Replacing any damaged parts with new ones to increase it’s efficiency.
* Using it only for the designed work.

**Specimen F:**

* Replacing broken handles with new ones before use.
* Sharpening the teeth regularly using a file.
* Oiling the blade after u se to prevent friction.
* Removing the tops of un even using a flat file.
* Using plastic guards to protect the teeth during storage and transportation.
* Using it for the right job / purpose it’s meant for.

**Specimen G:**

* Re-sharpening the cutting iron regularly to increase efficiency .
* Tightening loose screws and nuts.
* Oiling before storage to prevent rusting.
* Regular setting of the cap iron and cutting iron (blade).

**Specimen I:**

* Keeping in a protective casing to reduce it’s damage.
* Using it only for the work it’s designed for.
* Keeping away from cutting objects and petroleum products.

**ci) Describe the teeth arrangement of specimen F.**

* The teeth are arranged in alternate / zig zag pattern on the blade.

**ii) Give a reason for your answer in c(i) above.**

* To provide a wide gap to enable it’s blade to run with ease in the groove / cut in the timber.
* To ease it’s cutting action on timber (specimen H).

**iii) Describe how you would adjust specimen F for cutting.**

* Cutting across the grains of H (wood) using the forward part of the blade.
* Cutting along the grains of H using the lower end / base part of the blade.

**d) What are the advantages and disadvantages of using H as a building material.**

**Advantages:**

* It’s easily obtained in many areas
* It is cheaper as compared to other materials.
* It is easy to dismantle after use.
* It has fairly good insulating qualities.
* It resists shock and vibration.
* It is easy to work with simple or ordinary tools panga, axe, etc.
* It lasts longer if treated.
* It has many uses ie versatile.

**Disadvantages:**

* It has high susceptibility to attack by termites and beetles.
* It is a fire risk in the farm.
* It is easily spoilt by rain.
* It is bulky to transport.
* It can easily break.
* It can easily decay due to fungal attack.

**e) What factors are considered in selecting specimen H for use at the farm?**

* Resistance to warping i.e bending, twisting.
* Ability to hold nails and paint in operation.
* Workability i.e ease of sawing, shaping, etc with ordinary tools.
* Final look / appearance of it after finishing.
* Ability to accept nailing when worked on.
* Resistance to wear and natural decay by weather conditions.
* Strength i.e ability to resist breakage.
* Toughness i.e ability deflect prior to complete breakage.
* Resistance to pests and fungal attack.
* Wood defects i.e insect damage, knots caused by portions of a branch enclosed during growth.

**f) What factors may lead to failures of workshop tools to perform their functions efficiently.**

* I
* R
* O
* P
* E
* W
* Q

**g) Make a labeled drawing of specimen F:**

**3. You are provided with specimens H1, H2 and H3 that have been obtained from the same animal.**

**ai) Identify the specimens.**

* H1 –Crop.
* H2 –Glandular stomach / Proventriculus.
* H3 –Gizzard.

**ii) Mention the phylum and class of the animal from which the specimens were obtained.**

* Phylum –Vertebrata.
* Class –Aves.

**iii) To which body system of the animal do the specimens belong?**

* Digestive system of a fowl.

**iv) Of what significance / role are the specimens to the animal from which they were obtained?**

* H1 –Stores partially fermented food.

-It is where fermentation and softening of food occurs.

* H2 –It is where chemical digestion of food takes place.
* H3 –It grinds / crushes food materials using grit and muscular walls.

**b) Display H3 such that the two openings on the specimens are clearly seen.**

**i) Make a well labeled drawing of H3.**

**ii) Cut the specimens longitudinally using a knife to display the inner contents of the specimens. Observe and describe the contents of each specimen.**

* H1 –Contains whole stored food which is partially fermented.
* H2 –Contains coarse crushed food materials.
* H3 –Contains grit (small stones) or gravel.

-It contains fine and crushed food.

**iii) Remove the contents from each specimen. Observe and compare the internal structures of the specimens.**

**Specimen H1 :**

* It’s smooth, shiny with a thin layer.
* It is membranous with elastic walls.

**Specimen H2:**

* It is thick and coarse.
* It is glandular i.e has glands for secretion of pepsin enzyme.

**Specimen H3:**

* It is double layered i.e has two layers.
* It has thick and hard muscular walls.
* It has two openings to facilitate filing in and emptying of specimen H3.
* It has rough / horny epithelium covering the inner side of it.

**iv) Make a labeled drawing of the longitudinal section of H3.**

1. **From the observations above, describe how each specimen is adapted to it’s function in animal.**

**Specimen H1**:

* Has a thin layer with large and elastic walls to increase the surface area for storage of

food.

- It’s membranous to ease fermentation of the stored food.

**Specimen H2:**

* It is glandular for secretion of Pepsin enzyme and Hydrochloric acid.

**Specimen H3:**

* Has grit stored inside for grinding / crushing of food.

- Has thick and red powerful muscles to aid in mechanical crushing of grains.

- Has a horny / rough epithelium covering the inner surface to prevent injury to the muscle tissues by grit during muscle contraction.

- Has inlet opening for entry of food from H2 and outlet opening to the duodenum for emptying it.

- Has oval shape to be able to contain more food for mechanical grinding inside it.

1. **From your observations, describe the process of digestion inside the specimens.**

-H1 –Food materials from the beak are partially stored and fermented with mucus.

-H2 –**Pepsin enzyme** is secreted from it’s inner walls which acts on proteins and also **Hcl** that provides suitable pH for the action of **pepsin enzyme.**

-H3 –The **grit** crushes / grinds food substances with the help of it’s muscular contractions.

**e i) Name the parts of the ruminant animal system which has similar functions as H1, H2 and H3.**

* H1 –Rumen.
* H2 –Abomasum.
* H3 –Omasum.

**ii) State how the size of H1 limits food intake in the animal.**

* It receives whole and un crushed food materials from the beak due to the absence of teeth.

**iii) How does H2 limit digestion of food in the animal**

* It does not contain grit so it’s un able to crush some food materials especially grains to allow activity of enzymes.

1. **What management practices should the farmer use to make the animal overcome the limitations above?**

* Adlid feeding to cater for the small size of it’s beak.
* Provision of well prepared and clean grit in the litter of poultry houses.
* Provision of water adlib to aid the digestion of food.
* Allowing the animal to get out of the shelter so that they get access to sandy particles in the run / range.
* Provision of smashed food / mash instead of the whole grain.

**4. You are provided with specimens J, K and L. Carry out the following tests on the specimens using the following procedure.**

* **Label two boiling tubes provided as J and K. Put 10 cm3 of sample J in boiling tube labeled J, followed by 5cm3 of water. Stir the mixture thoroughly using a glass rod and then allow it to stand for 1o minutes.**
* **Repeat the same procedure soil sample K.**

**ai) Record your observations in each boiling tube.**

* J –The clear suspension settles quickly at the bottom.
* K –Suspension remains dirty / cloudy, some particles remained in water while others settled.

**ii) Add a spoonful of L into each boiling tube. Stir the contents of both tubes again thoroughly. Allow the contents to stand for 20 minutes. Record your observations.**

* J -………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….
* K –There was random movement and assembling of particles which quickly settle to the bottom of the tube to leave a clear solution above the soil.

**bi) Draw and label the experiment as observed in a (ii) above.**

**ii) Give an explanation for your results of the experiment in a (ii) above.**

* J………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..
* K –Specimen L contains Ca2+ which is positively charged which is adsorbed (held) by clay colloids which are highly negatively charged which neutralize the colloids.

**OR**

* Ca2+ form bridges between clay colloids forcing the colloids to electrostatically pull each other forming clamps of clay particles which become heavy in water leading to

rapid settling of particles to the bottom of the boiling tube.

**ci) From your results above, state the effect of L on each soil sample.**

* Soil sample J –Substance L has no effect on J.
* Soil sample K –Substance L causes flocculation of particles of soil sample K.

**ii) Suggest the identity of substance L.**

* Calcium carbonate / Lime**.**

**d) Explain how the farmer can benefit from the knowledge gained in the experiment.**

* Improveson the soil structure which leads to good drainage, aeration and workability of soil that improves on crop yields.
* Helps the farmers to know and modify / improve soil p H.
* Helps the farmer to improve on the nutrient content of the soil through the addition of major nutrients like calcium and magnesium into the soil.

Helps the farmer to control the prevalence of fungal and bacterial infections in the soil.

**5. You are provided with specimens P, Q, R, and S which are damaged crop parts.**

**a i) Identify the specimens.**

* P –Coffee leaf destroyed by **Leaf miner**.
* Q –Coffee leaf attacked by **Coffee leaf rust**.
* R –Beans damaged by **Bean bruchids / weevils**.
* S –Cassava plant leaves infected with **Mosaic.**

**ii) Identify the cause of the damage of each crop part .**

* P –Pest damage.
* Q –Disease damage by Fungi.
* R –Pest damage.
* S –Disease damage by Mosaic virus.

**bi) Describe the defects on each specimen.**

**Specimen P :**

* Has brown tunnels on the upper leaf surface ( epidermis) that reduces the leaf area for photosynthesis.
* Has damaged lamina with veins left intact.

**Specimen Q :**

* Has tiny pale yellow spots on the under surface of leaves.
* Leaves are covered with a yellow – orange powder / dust.
* Orange fungal spores are formed on the underside of the leaf.
* The spots may turn brown and later n ecrotic.

**Specimen R:**

* Has circular / round tunnels created by the larvae.
* Has round holes with flaps.

Specimen S:

* Hass distorted / wrinkled / mottled leaves.
* Has yellow and mottled leaves.
* Vein clearing.

**ii) Basing on observations on the defects, describe how the condition of each specimen is caused.**

* P –The larvae eat the leaves thus creating tunnels.
* S –The larvae bores into the seeds and eats the contents inside.

**iii) Outline the damages / effects of the above defects on each specimen**.

**Specimen P:**

* It creates tunnels on the leaf hence reducing the leaf area for photosynthesis.
* It leads to falling off of leaves.

**Specimen Q:**

* Orange lesions created on the leaf reduce the surface area for photosynthesis.

**Specimen R:**

* –The tunnels created reduce the cotyledon contents hence low viability.
* It reduces on food reserves from the cotyledon of the specimen.
* It reduces on the quality for human consumption.
* It reduces on the marketability due to low quality of specimen.

**Specimen S:**

* Reduction in yield as a result of poor tuber formation.
* Stunted growth due to reduction in the rate of photosynthesis.

**iv) State the causal agent of each of the condition in each of the specimens.**

* P –Leaf miner (*Leucoptera meyricki*).
* Q –Fungus (*Hemileia vistatis).*
* R –Bean bruchid (*Acanthoscelides obtectus*).
* S –Virus.

**c i) Name the ways though which the causal agents in Q and S can be spread in the crop field**

**Specimen Q**

* Rain splash in wet conditions.
* Wind currents.
* Insects and birds wondering among the plants that carry spores from infected plants to the healthy ones.

**Specimen S:**

* White flies (*Bemisia tabacci).*
* Use of infected stem cuttings for planting.

**ii) State the family of organisms to which the organism causing and spreading the above conditions in P and R, belong**.

* P (Leaf miner) –Lyonetiidae family.
* Q (Bean bruchid) –r..

**iii) Give the treatment s given to crops with damages like those of specimen S.**

* Spraying with recommended insecticides to kill the white fly.
* Uprooting and destroying all infected plant material.
* Using clean stem cuttings for planting.

**iv) Classify the specimens according to the following headings.**

|  |  |
| --- | --- |
| **Pest damage** | **Disease damage** |
| P | Q |
| R | S |

1. **Suggest the control measures of each condition on the specimen.**

**Specimen P:**

* Spraying with recommended pesticides.
* Use of resistant crop varieties.

**Specimen Q:**

* Open pruning of the plant.
* Spraying with recommended fungicides .
* Regular weeding.
* Use of resistant varieties.

**Specimen R:**

* Thorough drying of seeds before storage.
* Seed dressing with Lindane dust.
* Proper cleaning of the store.
* Fumigation of stores.
* Mixing of seeds with ash or pepper.

**Specimen S:**

* Use of clean stem cuttings for planting.
* Spraying against white flies using recommended pesticides.
* Uprooting and destroying of the infected plants.
* Practicing of good crop rotation.
* Growing of resistant crop varieties.
* Good field hygiene / sanitation.

**END.**

**s**