

# Fiji National University

COLLEGE OF AGRICULTURE, FISHERIES & FORESTRY

AGF 503

## Agroforestry System as Sustainable Land Management, Soil Conservation & Biodiversity Trimester 1 Examination -2014

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**TIME ALLOWED: 3 hours plus 10 minutes reading time**

### INSTRUCTIONS

1. This paper consists of two parts and 6 pages.
  2. In the first part, there are 2 questions and you have to answer **all** questions.
  3. In the second part, there are 5 questions and you have to answer **all** questions. Answer these questions in the answer booklet.
  4. Printed or written materials are **NOT** allowed in the examination hall.
  5. Pencil, ruler and calculator are needed.
  6. Make sure to indicate your identification number in all pages you use.
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### Summary of Questions

Part I	Guidelines	Total Marks
Question no 1 and 10	Select the correct answer and fill the blank	10
Question no 11 to 25	Select the correct answer from the list	15
Part II		
5 Questions	Descriptive questions	75

## Part I

Question 1 to Question 10.

(Marks 10)

Choose the correct answer from the list below and write the relevant letter in front of the respective questions

- |                      |                          |
|----------------------|--------------------------|
| a) Photosynthesis,   | k) Nitrates,             |
| b) Eutrophication,   | l) Nitrites,             |
| c) De nitrification, | m) Ammonia               |
| d) Decomposition,    | n) Atmospheric nitrogen, |
| e) Transpiration,    | o) Nitrogen dioxide      |
| f) Nitrification     | p) Carbon cycle          |
| g) De-nitrification, | q) Water cycle           |
| h) Assimilation,     | r) Nitrogen cycle        |
| i) Ammonification,   | s) Rock cycle            |
| j) Nitrogen fixation | t) Phosphorus cycle      |

1. The process in which glucose is synthesized by plants (.....)
2. The process by which soil nutrient is reduced and released to the atmosphere as a gas. (.....)
3. Ammonia is converted to nitrite, then to nitrate. (.....)
4. Plant roots absorb ammonium ions and nitrate ions in making of molecules such as DNA, amino acids, and proteins. (.....)
5. Nitrate ions and nitrite ions are converted into nitrous oxide gas and nitrogen gas. (N<sub>2</sub>) (.....)
6. Produced in the atmosphere by lightening (.....)
7. Fixation in the nodules of legumes produces this form of nitrogen (.....)
8. Full oxidation during secondary sewage treatment produces these ions (.....)
9. When mixed with water vapor, this forms acid rain. (.....)
10. The burning of fossil fuels has the greatest and most direct impact on the (.....)

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Select the correct answer among the solutions given

11. The process by which plants release water is called

- a) Condensation
- b) Evaporation
- c) Transpiration
- d) Vaporization
- e) Perspiration

12. Inorganic nutrients are released from dead organic wastes and animal wastes by

- a) Decomposers
- b) Secondary consumers
- c) Autotrophs
- d) Producers

13. Chemotrops are

- a) Organisms that obtain energy by the oxidation of electron donors in their environments.
- b) These molecules can be organic or inorganic
- c) Chemotrophs can be either autotrophic or heterotrophic.
- d) All of the above statements are correct

14. Bacteria that obtain energy for organic compound synthesis from oxidizing inorganic compounds such as ammonia, nitrites, and sulfides are

- a) Photoautotrophs
- b) Chemoautotrophs
- c) Heterotrophs
- d) Autotrophs

15. What is true about the phosphorus cycle?

- a) It enters the atmosphere as a form of gas
- b) Weathering of sedimentary rocks makes phosphate available phosphate
- c) Is incorporated into organisms' proteins
- d) All of the above
- e) All above statements a), b) and c) are not correct

16. Which of the following is known as the sedimentary cycle because its reservoir is sedimentary rock?

- a) Carbon cycle
- b) Hydrologic cycle
- c) Nitrogen cycle
- d) Phosphorus cycle.
- e) All of the above

17. Nutrients from the \_\_\_\_\_ cycle run from a terrestrial to an aquatic ecosystem which enriches the aquatic ecosystem
- Nitrogen
  - Phosphorus
  - Sulfur
  - Both a and b
  - Both b and c
18. The cycling of water through the hydrologic cycle depends on \_\_\_\_\_
- Transpiration from plants
  - Evaporation from the soil
  - Precipitation to the ocean
  - Both a and b
  - a, b and c above
19. Which of the following is contributing to an overload and disturb the carbon cycle?
- Photosynthesis
  - Cellular respiration
  - Deforestation
  - All of the above.
  - Activities of microbes
20. The largest reservoir of carbon is the
- Soil
  - Atmosphere
  - Ocean
  - Vegetation
  - Sedimentary rock
21. In nutrient cycle in general, minerals tend to be dispersed through \_\_\_\_\_
- Plant action
  - Surface runoff, Subsurface runoff and leaching
  - Evaporation
  - Assimilation
  - Conduction
22. Which is the possible path of the movements of nitrogen in the nitrogen cycle?
- Soil-air-plants-air-animals-soil
  - Air-soil-plant-animals-soil-air
  - Soil-animals-plants-soil-air
  - Air-animals-soil-plants-air
  - Air – Plant – Bacteria – Soil – Plant - Air

23. Which process is not a natural part of the c cycle
- a) Animal breathing
  - b) Using fossil fuel
  - c) Rotting leaves
  - d) Forest fire
  - e) Effect of decomposing microbes
24. One effect of high dissolved phosphorus levels in a river is...
- a) high flow rates
  - b) high turbidity
  - c) the excessive growth of aquatic plants and algae
  - d) better water quality
  - e) phosphorus used for water purification
25. An autotroph is an organism
- a) that produces complex organic compounds such as carbohydrates, fats, and proteins from simple substances
  - b) Autotrophs can be photoautotrophs or chemoautotrophs.
  - c) Autotrophs are fundamental to the food chains of all ecosystems in the world.
  - d) They take energy from the environment in the form of sunlight or inorganic chemicals and use it to create energy-rich molecules such as carbohydrates.
  - e) None of the above statements are right

## Part II

(Marks 75)

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1. Write short notes on the following terms used in agro forestry.
  01. Alley cropping 3 Marks
  02. Coppicing 2 Marks
  03. Fodder bank 3 Marks
  04. Give an example for a multipurpose tree and explain the features of it. 3 Marks
  05. Name at least 5 Characteristics should have when selecting a tree hedgerow intercrop 5 Marks
  
2. Answer the followings
  - 2.1. What is the deference between shifting cultivation and improved fallow land use practices 5 Marks
  
  - 2.2. Give five (5) characteristics of a tree appropriate for fodder production 5 Marks
  
  - 2.3. Importance of leguminous plants in alley cropping practice 2 Marks
  
3. Write short notes on the following terms
  - 3.1. Allelopathy 2 Marks
  - 3.2. In situ and ex situ conservation 2 Marks
  - 3.3. Genetic erosion in mono cropping 2 Marks
  - 3.4. Nitrogen cycle 3 Marks
  - 3.5. Sprawl effect of land use planning 2 Marks
  - 3.6 Fallow period 2 Marks
  - 3.7 Rapid appraisal 2 Marks
  - 3.8 Define the term sustainability 2 Marks
  - 3.9 Carbon sequestration 2 marks
  
4. Diagnosis and design is a tool developed to help agroforestry researchers and extension workers identify priorities in the land use system that have the greatest potential for solving problems in particular areas and arrive at sound agroforestry recommendations.
  - 4.1. List 5 stages involved in Diagnosis and Design. 5 Marks
  
  - 4.2. Differentiate macro and micro diagnosis and design methodology. 4 Marks
  
  - 4.3. Write the 3 criteria's considering agroforestry design 3 Marks
  
5.
  - 5.1 Define the term agro forestry. 4 Marks
  - 5.2 What are the advantages of agro forestry 4 Marks
  - 5.3 Describe the constraints in adopting agro forestry by the farmers 4 Marks
  - 5.4 Why we recommend applying sustainable agricultural practices while design an agro forestry projects? What are the main component in sustainable agriculture 4 Marks