

COLLEGE OF AGRICULTURE, FISHERIES & FORESTRY

SCHOOL OF AGRICULTURE SCIENCE

Bachelor of Education: Trimester 1 Examination, 2018

AMB 602: AGRICULTURAL MICROBIOLOGY

Allocated Time: 3 hours and 10 Minutes (Reading Time) Allocated Marks: 100

Instructions:

1. This paper is consist of **four** sections. All Sections are **compulsory**. Take note of the Option given in Section D.
2. Ensure to write your names and ID Number on each sheet of paper of the answer sheet.
3. No written or printed materials are allowed into the examination room.
4. No mobile phone and other electronic device is allowed into the examination room.
5. You need to provide your own writing materials for the examination.
6. Write all your answers in the Answer sheet provided.

The table below shows the breakdown of the assessment paper and allocated time and marks.

Section	Section Description	Suggested Time	Allocated Marks
A	Multiple Choices	15 Minutes	20
B	Matching/ Fill in the Blanks	15 Minutes	20
C	Short Answer Questions	50 Minutes	30
D	Essay Questions	100 minutes	30

Section A: Multiple Choices

(10 Marks)

1. Which of the following does not involve in the study of microbiology?

- a. Morphology
- b. Physiology
- c. Breeding
- d. Classification

2. Anabolism refers to?

- a. Synthesis of more complex compounds and use of energy
- b. Breakdown a substrate and capture energy
- c. All chemical processes that occurs within a cell
- d. The physiological change of the cell.

3. Which of the following is an example of an acidophile bacteria is?

- a. Nitrobacter
- b. Rhodospirillum
- c. Chlorobium
- d. Helicobacter

4. Most of the pathogenic bacteria are known to be - :

- a. Neutrophiles
- b. Alkaliphiles
- c. Acidophiles
- d. All of the above

5. Microbes which can grow well in very dry environments are known as?

- a. Halophiles
- b. Xerophiles
- c. Halotolerants
- d. Mesophiles

6. A microbe which can be classified as a prokaryote is :-
- Algae
 - Fungi
 - Protozoan
 - Bacteria
7. Which of the following is an example of a trace element?
- Calcium
 - Nitrogen
 - Zinc
 - Magnesium
8. *Escherichia coli* is an example of :-
- Flagellate bacteria
 - Non-sporing bacteria
 - Non-capsulate bacteria
 - Fastidious bacteria
9. Psychrophiles are microbes which can withstand the temperatures of :-
- 15-20 degree celcius
 - 20-40 degree celcius
 - 50-60 degree celcius
 - Above 250 degree celcius
10. Which of the following is used by Cyanobacteria as an electron donor?
- Oxygen
 - Water
 - Sunlight
 - Carbon dioxide

11. Eukaryotes usually reproduce through the action of :-

- a. Mitosis
- b. Budding
- c. Binary fission
- d. Replication

12. Carbon is an example of a macro-nutrient needed by plants. In what way carbon is released by living organism to the atmosphere?

- a. Transpiration
- b. Condensation
- c. Respiration
- d. Photosynthesis

13. Mobile prokaryotes usually move around through the action of their :-

- a. Nucleus
- b. Chromosome
- c. Mitochondria
- d. Flagella

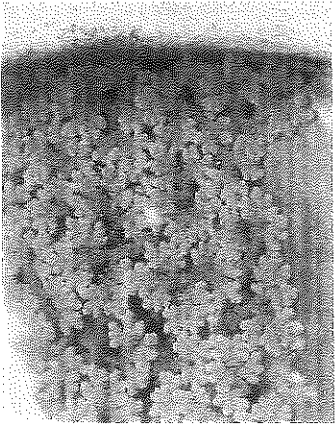
14. An example of an opportunistic fungi is :-

- a. *Verticillium chlamydosporous*
- b. *Rotlenchulus spp.*
- c. *Puccinia chondrolina*
- d. *Phragmidium violacerum*

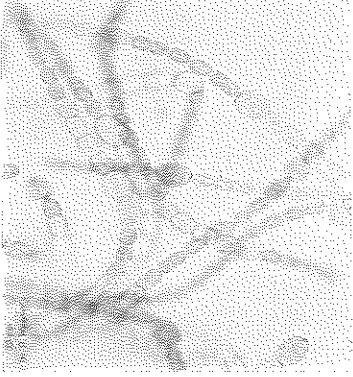
15. Which of the following microbe do not involve in the nitrogen cycle?

- a. *E. coli*
- b. *Pseudomonas*
- c. *Spirillum*
- d. *Thiothrix*

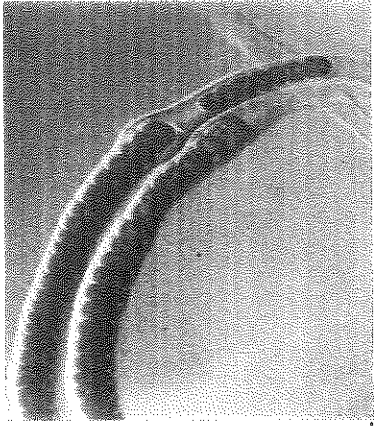
16. Which of the following diagram shows an example of the *Aulosira* bacteria?



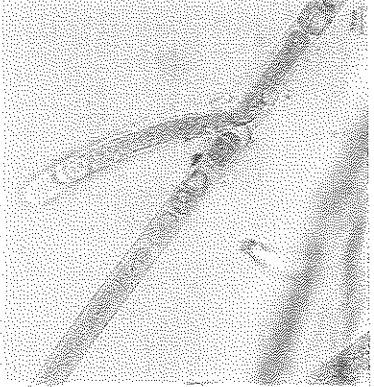
a.



b.

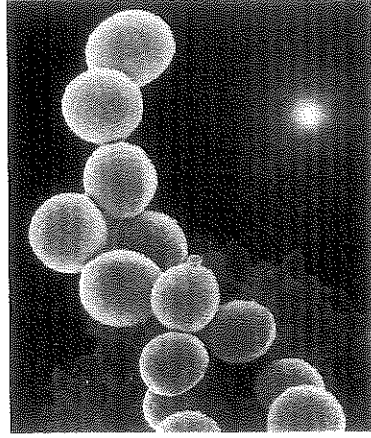


c.



d.

17. Refer to the diagram below to answer the question that follows.



The bacteria structure seen from the diagram above is an example of -:

- a. Bacilli
- b. Cocci
- c. Streptococcus
- d. Spirilli

18. An example of a fastidious bacteria is -:

- a. *Hemophilus influenza*
- b. *Escherichia coli*
- c. *Streptococcus pyogenes*
- d. *Streptococcus pneumoniae*

19. Viral strains have been used in Fiji as a biological control of insect pests. Which of the following viral strains has been used by the Ministry of Agriculture to control rhinoceros beetle around the country?

- a. Mosaic Virus
- b. Polyhidrosis virus
- c. Baculovirus
- d. Granulosis virus

20. Which of the following best describe nematodes?

- a. Nematodes unicellular organisms
- b. Nematodes only live in the soil
- c. Nematodes reproduce through binary fission
- d. Nematodes are microscopic worms

Section B (I): Matching:

(10 Marks)

Match the correct Scientist to the discovery made in the history of Microbiology.

	Year & Discovery	Scientist
A	Proposed that animals originate from soil, plants and unlike animals.	Ignaz Semmelweis
B	Introduced bacteriology	Paul Ehrlich
C	Discovered in 1762 that each disease is caused by different agents.	Robert Koch
D	Discovered the spread of puerperal sepsis in 1846	Alexander Fleming
E	Discover chemotherapy in 1915	Girolamo Fracastorius
F	Developed the first compound microscope	Ivanovsky
G	Discover Penicillin in 1928	Robert Hooke
H	Discovered that germs caused infectious diseases in 1546.	Louis Pasteur
I	Removed bacteria from diseased tobacco plant extract in 1892	Von Plenciz
J	Developed pasteurization in 1822	Aristotle

Part II: Fill in the Blanks.

(10 marks)

1. The three domains of life are classified under and
2. Molds and mushrooms are consisting of masses of which are composed of filaments called
3. Both prokaryotic cells and eukaryotic cells have and genetic material in common.
4. In the year 1928 a scientist named made the first discovery of the first

Section C: Short Answer Questions:

(30 Marks)

1. List 2 differences between a prokaryotic and Eukaryotic cell. (2 marks)
2. Differentiate between nitrification and ammonification. (2 mark)
3. Briefly describe the following structures of the cell and their functions. (5 marks)
 - a. Nucleus
 - b. Cell membrane
 - c. Mitochondria
 - d. Golgibodies
 - e. Plasmids
4. Briefly describe two beneficial microbes and their contribution to agriculture production in Fiji. (3 marks)
5. Briefly explain the term green manuring and give 2 examples of green manuring agents. (3 marks)
6. List four sources of nitrogen to the soil. (2 marks)
7. State three common types of decomposers found in the ecosystem. (1 ½ marks)
8. With the aid of the diagram, draw and label a graph showing the different temperatures i.e. Psychrophile, Mesophyll and Thermophile which these microbes can thrive. List an example each for each group of bacteria. (3 marks)

9. Differentiate between osmophiles and osmotolerant. (2 marks)
10. Briefly explain the difference between macro and micro nutrients and state 2 examples for each nutrient group. (3 marks)
11. Differentiate between chemoautotrophs and photoautotroph. (2 marks)
12. List three primary levels of growth media. (1 ½ marks)

Section D: Essay writing

(30 marks)

Choose any **three** essays of your choice from the four essays given and write 750-850 words based on the topic you have chosen. Your essay should be formatted to an academic writing essay with supporting arguments and examples. Each essay is worth 10 marks.

1. Select **any one** of the two cycles i.e. Carbon Cycle or Nitrogen Cycle and explain the importance of the cycle to agriculture production. Explain how the cycle occurs with the aid of diagrams and discuss the roles of different microbes in completing the cycle.
2. With your own knowledge on any particular microbe you have studied, explain the importance or harmful effects of the microbe to mankind, livestock and agriculture with much focus on the Taxonomy and morphology, Habitat, significance or harmful impacts and how to manage them if they are classified as pathogens.

3. Briefly explain the procedures of nematode extraction carried out in the laboratory and also state the economic importance of parasitic nematodes to agriculture. You may include diagrams to explain the structure of a nematode.

4. Describe the steps of Koch Postulates and how it contributes to the determination of pathogens from infected plants. You should consider the following areas -;

- a. Isolation
- b. Inoculation
- c. Culturing
- d. Subculturing
- e. Bacterial Streaking
- f. Pure Culture identification.

THE END