

University of Ruhuna - Faculty of Technology

Bachelor of Biosystems Technology

Level I (Semester II) Examination

September, 2020

Course Unit: BST 1262 – Basic Microbiology (Theory)

Time Allowed: 1 hour & 30 minutes

This question paper contains 06 pages including this instruction page.

Part A – Multiple Choice Questions (40 minutes)

Underline the most appropriate answer.

1. What is the cell shape of the bacterium in the given figure 'A'?

- a) Monococcus
- b) Diplococcus
- c) Diplobacillus
- d) Vibrio
- e) Sarcina

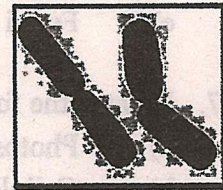


Figure 'A'

2. What is the correct statement about microalgae?

- a) They are prokaryotes
- b) All the microalgae are heterotrophs
- c) All the microalgae contain flagella and are motile
- d) All algal coenobia are non-motile
- e) Filamentous microalgae can exist branched or unbranched

3. Which of the following statements is correct with regards to the mode of nutrition in microbes?

- a) Autotrophs use CO₂ as the principal carbon source
- b) Heterotrophs use inorganic molecules as the principle carbon source
- c) Heterotrophs use CO₂ as the carbon source
- d) Phototrophs use chemical compounds as the energy source
- e) Chemotrophs use light as their major energy source

4. Select the correct 'process- microbe' combination related to the role of microorganisms in Nitrogen cycle.

- a) Nitrification- Cyanobacteria
- b) Nitrification- Rhizobium
- c) Denitrification- Nitrobacter
- d) Nitrogen fixation- Nitrobacter
- e) Nitrogen fixation- Rhizobium

5. A DNA-DNA hybridization performed between two bacterial cultures (B1 and B2) for a bacterial identification resulted 80% hybridization. What is correct statement about two bacterial cultures?

- a) B1 and B2 are the same bacterial strain
- b) B1 and B2 are the same bacterial species
- c) B1 and B2 are in different genera
- d) B1 and B2 are in different families
- e) B1 and B2 are in different classes

6. Which of the following microorganism is considered to be acellular?

- a) Bacteria
- b) Virus
- c) Algae
- d) Protozoa
- e) Fungi

7. What is the function of eye spot in algae?

- a) Photosynthesis
- b) Cellular respiration
- c) Removal of cellular wastes
- d) Receiving light stimuli
- e) Protein synthesis

8. Which statement/s is/are correct about bacterial plasmid?

- A-Plasmid is a small circular DNA molecule
- B-Plasmid is an extra chromosomal genetic element in bacteria
- C-Plasmids are not essential for the survival of the bacteria

- a) Only A
- b) A and B
- c) A and C
- d) B and C
- e) A, B and C

9. What is the phase of bacterial growth curve, where you can find a growth in cell size but not in cell number?

- a) Lag phase
- b) Exponential phase
- c) Stationary phase
- d) Death phase
- e) None of the above

10. Which of the following is/are chemical requirement/s for bacterial growth?

- A - Carbon
- B - pH
- C - Temperature

- a) Only A
- b) Only B
- c) A and B
- d) B and C
- e) A, B and C

11. Which of the following is an example for an antiseptic agent?

- a) Phenolic compounds
- b) Copper sulphate
- c) Silver nitrate
- d) Formaldehyde
- e) Chlorine compounds

12. *Neisseria gonorrhoeae* causes,

- a) Meningitis
- b) Gastritis
- c) Pneumonia
- d) Cellulitis
- e) Gonorrhoea

13. Which of the following is a highly perishable food to spoil?

- a) Sugar
- b) Potatoes
- c) Flour
- d) Meat
- e) Dry beans

14. The doubling time for the most bacterial species under optimal conditions is,

- a) 5-10 minutes
- b) 10-30 minutes
- c) 30-40 minutes
- d) 40-50 minutes
- e) 50-60 minutes

(each 04 = 05 x 5)

15. Amnesic Shellfish poisoning occurs due to the contamination of,
- Pseudo-nitzschia* sp.
 - Tryptophyton* sp.
 - Salmonella* sp.
 - Enterobacter* sp.
 - Streptococcus* sp.
16. *Listeria monocytogenes* is a bacterial pathogen in,
- Dried vegetables
 - Pasteurized milk
 - Ready to eat products
 - Meat products
 - Canned food products
17. Which of the following is a zoonotic disease?
- Tuberculosis
 - Brucellosis
 - Polio
 - Hepatitis A
 - Enteritis
18. The usual standard temperature/pressure employed in a normal autoclave is,
- 100 °C/10 psi for 10 minutes
 - 50 °C/ 50 psi for 5 minutes
 - 121°C/ 15psi for 15 minutes
 - 225 °C/ 25 psi for 25 minutes
 - 300 °C/ 30 psi for 30 minutes
19. Which of the following is an example for a viral disease?
- Amoebiasis
 - Malaria
 - Ring worm disease
 - HIV/AIDS
 - Pneumonia
20. Which of the following is the maximum permissible number of *E. coli* in drinking water according to the Sri Lankan Standards (SLS) in drinking water?
- 10/100 mL
 - 4/100 mL
 - Nil
 - 2/100 mL
 - 15/100 mL

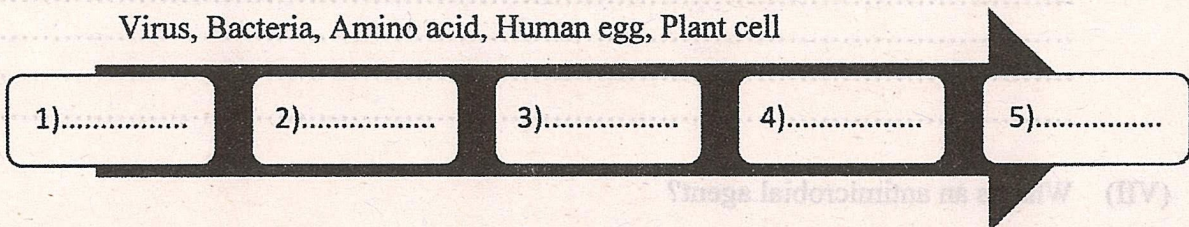
(2 × 20 = 40 marks)

Part B – Structured Questions (20 minutes)

Answer all questions in the given spaces.

- (I) Arrange the following entities in ascending order according to their relative size. (smallest (1) to largest (5))

Virus, Bacteria, Amino acid, Human egg, Plant cell



- (II) Name four (04) biological cycles in which microbes are being involved.

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- (III) Name two (02) hormones that are commercially produced using genetically engineered microorganisms.

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- (IV) Protozoans can be categorized in to four (04) major groups according to their motility and cell structure. Fill the given table with four major groups of protozoans and structures they possess for locomotion. First one is done for you.

	Group	Locomotory structure
1	<i>Sporozoa</i>	<i>No locomotory structure (non-motile)</i>
2		
3		
4		

(V) Mention three (03) major symptoms of food poisoning.

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(VI) What is the meaning of “indicator microorganisms” with respect to the microbiological examination of water?

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(VII) What is an antimicrobial agent?

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(VIII) Give two (02) examples for common food preservatives.

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(30 marks)

Part C – Essay Questions (30 minutes)

Answer only one (1) question.

01.	(I)	Draw the typical bacterial growth curve showing the major growth phases and briefly describe each phase giving reasons for its shape.	1
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	(II)	Giving suitable examples, discuss three (03) industrial applications of microorganisms in agriculture.	2
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(30 marks)

02.	(I)	Define the term “infectious diseases”.	3
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	(II)	Describe the major steps in the chain of infection. Provide suitable examples for each step you have described.	4
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(30 marks)