P. P. SAVANI UNIVERSITY
Third Semester of B.Sc. Examination
December-2021
SSMB2010–Microbialogy Physiology-I
13.12.2021, Monday **Time: 09:00 a.m. to 11:30 a.m.** **Maximum Marks: 60**

Instructions:
1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

Section-I (Total Marks - 30)

Q.1 **Short Questions** **[10]**

1.1 **Objectives** **[05]**

1.1a Which of the following is a characteristic of beef extract?
- **A** product resulting from the digestion of proteinaceous materials
- **B** aqueous extract of lean beef tissue
- **C** aqueous extract of yeast cells
- **D** complex carbohydrate obtained from certain marine algae

1.1b Some organisms can use reduced inorganic compounds as electron donors and are termed as
- **A** Lithotrophs
- **B** Phototrophs
- **C** Chemotrophs
- **D** Photo-organotrophs

1.1c The generation time for E.coli is _____
- **A** 20 minutes
- **B** 35 minutes
- **C** 2 minutes
- **D** 13 minutes

1.1d Which of the following are functions of water in the culture medium?
- **A** nutrients must be in aqueous solution
- **B** cofactor of enzymes
- **C** provides resistance to sudden transient temperature changes
- **D** it is a chemical reactant, nutrients must also be present in aqueous solution and provide resistance to sudden temperature changes

1.1e Bacteria which obtain energy from sunlight are called
- **A** Chemotrophs
- **B** Lithotrophs
- **C** Organotrophs
- **D** Phototrophs

1.1f The organism which grows best above 45°C are called
- **A** Psychrophilic
- **B** Mesophilic
- **C** Thermophilic
- **D** None of these

1.1g Which of the following is used as a solidifying agent for media?

- **A** Beef extract
- **B** Peptone
- **C** Agar
- **D** Yeast extract

1.1h The straightforward method of binary fission explains how bacteria

- **A** grow in nutrient agar
- **B** evolve
- **C** move
- **D** reproduce

1.1i Lag phase is also known as _____

- **A** period of initial adjustment
- **B** transitional period
- **C** generation time
- **D** period of rapid growth

1.1j Organisms; using organic compounds as electron donors are called

- **A** Lithotrophs
- **B** Phototrophs
- **C** Chemotrophs
- **D** Organotrophs

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a Give one example of enrichment media.

1.2b The growth of bacterial population follows a geometric progression. True/False?

1.2c Name the type of bacteria which uses Co_2 as a sole source of carbon for growth.

1.2d What is the importance of agar in media preparation?

1.2e Nitrifying bacteria belongs to the nutritional class of_____.

Q.2 Short Notes (Attempt any two) **[06]**

A Methylotrophs

B Classify cultural media based on consistency.

C Active transport

Q.3 Explain in detail (Attempt any two) **[14]**

A Explain in detail about mixotrophs and their possible combinations.

B The principle of microbial nutrition based on carbon sources and energy requirements.

C Types of diffusion

Section-II (Total Marks - 30)

Q.1 Short Questions [10]

1.1 Objectives [05]

1.1a Which of the following is not an example of photoautotrophs?

A Cyanobacteria
B Iron bacteria
C Daisies
D Blue green algae

1.1b The mode of nutrition in which one organism obtains nutrition from other organisms is known as

A saprophytic nutrition
B heterotrophic nutrition
C autotrophic nutrition
D symbiosis

1.1c The portion of the growth curve where rapid growth of bacteria is observed is known as

A Stationary phase
B Decline phase
C Log phase
D Lag phase

1.1d What is the general generation time of *Escherichia coli*

A 20 minutes
B 40 minutes
C 60 minutes
D 80 minutes

1.1e In which of the following phase secondary metabolites are produced during growth?

A Stationary phase
B Decline phase
C Log phase
D Lag phase

1.1f The entry of glycerol into the bacterial cells is by

A Passive diffusion
B Facilitated diffusion
C Group translocation
D Active diffusion

1.1g The principal intracellular cation is?

A NA^+
B Ca^+
C K^+
D Cl^-

1.1h What is the concentration of agar in solid media?

A 3 to 4 %
B 1.5 to 2 %

C 0.5 %
D 3 to 5 %

1.1i In the medium other than nutrients, if any substance is used in excess, that medium is

A Indicator medium
B Special medium
C Enriched medium
D Sugar medium

1.1j Which of the following are functions of Maintenance Media?

A Used for determining the type of growth produced by bacteria
B Used for assay of vitamins, amino acids
C Used for the maintenance of the viability and physiological characteristics
D Used for determining the bacterial content

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a What is the difference between autotrophic, heterotrophic bacteria?
1.2b What is the batch culture process for bacteria of fungi?
1.2c Ion carriers are located in.....bacterial cell.
1.2d Write the composition of nutrient broth media.
1.2e What is the meaning of organic and inorganic carbon sources in culture media?

Q.2 Short Notes (Attempt any two) **[06]**

A Macronutrients
B Chemolithotroph
C Selective media

Q.3 Explain in detail (Attempt any two) **[14]**

A Discuss in detail about growth kinetics of bacteria
B Explain in detail about maintenance media and enrichment media.
C Describe Passive and facilitated diffusion with diagram