

## SARDAR PATE UNIVERSITY

CLASS : S.Y. B.Sc. (III SEMESTER)

SUBJECT : MICROBIOLOGY

CODE NO.: US03CMIC01 FUNDAMENTALS OF MICROBIOLOGY -1

DATE : NOVEMBER 8, TUESDAY, 2011 MAX. MARKS : 70

TIME :10.30A.M. TO 1.30 P.M.

ALL QUESTIONS ARE COMPULSORY

Q.1. Multiple Choice Questions

(10)

(i) Who among the following was not involved in disproving spontaneous generation

- (a) Aristotle (b) Spallanzini (c) J. F. Tyndall (d) Jan Baptista

(ii) Technique of pasteurization was given by

- (a) Robert Koch (b) Louis Pasteur (c) A. V. Leeuwenhoek (d) Edward Jenner

(iii) Which technique was developed by winogradsky and Beijerinck for the selective isolation and study of some distinct physiological groups of bacteria?

- (a) Enrichment culture technique (b) Use of selective media (c) Use of enriched media  
(d) Continuous culture technique

(iv) Which component of the dye has the property to undergo electrolytic dissociation ?

- (a) Chromophore (b) Auxochrome (c) Fluorochrome (d) Cytochrome

(v) The difference in the refractive index to observe the microorganisms is a principle of which of the following microscopic technique

- (a) Fluorescence Microscopy (b) Bright Field Microscopy (c) Phase contrast Microscopy  
(d) SEM

(vi) In Fluorescence Microscopy which component removes any remaining exciter wavelengths without absorbing longer wavelengths of fluorescence object

- (a) Fluorochrome (b) Dark Field Condensor (c) Exciter Filter (d) Barrier filter

(vii) Bursting of protoplast can be prevented by preparing it in a \_\_\_\_\_ medium.

- (a) Hypertonic (b) Isotonic (c) Hypotonic (d) None of the above

(viii) A periplasmic space within the cell wall is found in \_\_\_\_\_ bacteria and the space contains \_\_\_\_\_.

- (a) Gram negative, Peptidoglycan (b) Gram positive, Lipids (c) Gram Negative, Outer membrane  
(d) Gram Positive, Porin Proteins

(ix) PHB granules are used for storage of

- (a) Carbohydrates (b) Sulfur (c) Lipids (d) Phosphate

(x) Endospores are resistant to

- (a) Dessication (b) Staining (c) Radiation (d) All of the above

Q.2. Short Answer Questions. Answer any Six questions out of Eight. (12)

- (a) Draw a neat labelled ray diagram of compound microscope.
- (b) What is the contribution of Paul Ehrlich in the field of Medical Microbiology.
- (c) Define stain and give example of acidic, basic and neutral stain.
- (d) What is the difference in role of mordants and accentuators in staining.
- (e) Why was the introduction of the use of Agar important to microbiology.
- (f) Draw a typical prokaryotic cell and label all its parts.
- (g) What are the differences between protoplast and spheroplast.
- (h) What are the various cytoplasmic inclusions present in bacterial cell. What function might be associated with each of these.

Q.3. (a) Enlist the various contributions of Louis Pasteur in the field of Microbiology (05)

(b) What are Koch Postulates (03)

OR

Q.3 (a) What is spontaneous generation theory and explain in brief how was it disproved. (05)

(b) Describe the process of Tyndallization (03)

Q.4 (a) Discuss the contributions of Emil Von Behring and Elie Metchnikoff in the field of Medical Microbiology. (04)

(b) Justify- Process of staining is physico-chemical. (04)

OR

Q.4. (a) What is regressive staining. Discuss the role of decolourisers in staining process. (04)

(b) Describe the contribution of Beijerinck and S. Winogradsky in the field of agricultural Microbiology. (04)

Q.5 (a) What is differential staining? Describe Acid fast staining. (05)

(b) Give principle and procedure of negative staining (03)

**OR**

Q.5 (a) Explain principle and explain the working of compound microscope. (05)

(b) What is supra vital and intravital staining (03)

Q.6.(a) Discuss the principle, working and applications of phase contrast microscopy with suitable ray diagram. (08)

**OR**

Q.6 (a) Explain TEM and Limitations of electron microscopy. (05)

(b) Discuss the role of the following in microscopic technique : (03)

(i) Auramine O

(ii) Liquid Nitrogen

(iii) Barrier Filter

Q.7.(a) Explain the structure and function of bacterial flagella (05)

(b) Explain the basic chemical composition of cell wall (03)

**OR**

Q.7. (a) Explain the structure of Gram Negative Cell wall (04)

(b) Write a note on morphology of bacteria (04)

Q.8. (a) Discuss the structure and function of Endospore. (04)

(b) Write about Nuclear material and Vacuoles (04)

**OR**

Q.8. (a) Write a note on structure and function of cell membrane (05)

(b) Write a note on cyst and mesosomes (03)

----- **ALL THE BEST** -----

(3)

## SARDAR PATEL UNIVERSITY

B.Sc. IIIrd Semester B.Sc.

## FUNDAMENTALS OF MICROBIOLOGY-II

Date: 9.11.2011

Time: 10:30-1:30

Subject: Microbiology

Course No: US03CMIC02

Marks: 70

**Q-1 Select the correct answer for each question from the option given below [10]**

1. Which mode of nutrient uptake is observed in kingdom fungi as per the Whittaker's five kingdom concept?  
(A) Absorptive (B) Ingestion (C) Photosynthetic (D) All
2. What will be the % similarity between organism A and Organism B having 60 similar characters out of 200 characters compared?  
(A) 60% (B) 30% (C) 20% (D) 10%
3. Which organisms use CO<sub>2</sub> as the sole source of carbon?  
(A) Organotroph (B) Lithotroph (C) Heterotroph (D) Autotroph
4. Human pathogens belong to which of the following category?  
(A) Thermophiles (B) Mesophiles (C) Psychrophiles (D) Barophiles
5. Time interval required for each cell to divide is known as  
(A) Generation timer (B) Generation (C) Exponential (D) None
6. HELA is an example of which cell lines?  
(A) Primary (B) Diploid (C) Continuous (D) None
7. The growth rate is maximum and constant in which phase of typical growth curve in a closed system of microbial cultivation.  
(A) Log (B) Lag (C) Death (D) Stationary
8. On MacConkey's agar medium which organism produce pink colonies?  
(A) *Bacillus subtilis* (B) *Escherichia coli* (C) *Proteus vulgaris* (D) *Salmonella typhi*
9. The descendent of the same species is known as  
(A) Strain (B) Colony (C) Clone (D) None of these
10. Pox virus exhibit which of the following symmetry?  
(A) Helical (B) Icosahedral (C) Complex (D) None

**Q-2 Give short answer to the following questions (any six) [12]**

1. Enlist different criteria for the classification of bacteria.
2. Justify- 16SrRNA is preferred for cataloguing experiments.
3. Justify-EMB agar is a dual purpose medium.
4. Discuss the role of temperature for the bacterial cultivation.
5. What are the differences between number of generations, generation time and growth rate?.
6. Discuss cultivation of viruses using embryonated chicken eggs.
7. Define (1) Growth (2) Balance growth (3) Exponential growth.
8. Give two examples of selective and enriched media.

Q-3 Enlist major characteristics of microorganisms and discuss any three in detail. [08]

OR

- Q-3  
(A) Write brief note on Hackel's classification. [04]  
(B) Give brief account on-Bergey's manual of systemic bacteriology. [04]

- Q-4  
(A) Enlist different molecular approaches for the classification of bacteria and discuss about base composition. [04]  
(B) Write a brief note on- Numerical taxonomy [04]

OR

- Q-4  
(A) Write a brief note on-Taxonomic groups [03]  
(B) Discuss DNA homology experiments to establish the genetic relatedness between the bacteria [05]

- Q-5  
(A) Explain selective media with suitable example. [03]  
(B) Enlist different nutritional type of bacteria and discuss phototrophs and chemotrophs in detail [05]

OR

Q-5 Explain common ingredients of bacteriological media in detail. [08]

- Q-6  
(A) Enlist various methods of isolating pure culture and discuss pour plate method in detail. [04]  
(B) Enlist various methods to preserve the microorganisms in suspended state of metabolism and discuss any two methods in detail. [04]

OR

- Q-6  
(A) Define pure culture and discuss pour plate method in detail. [04]  
(B) Discuss mechanism of oxygen detoxification in aerobes. [04]

- Q-7  
(A) Discuss growth curve of bacterial cell. [05]  
(B) Write a note on synchronous growth. [03]

OR

Q-7

(A) Describe various methods for growth measurements.

[05]

(B) How the rate of bacterial growth is controlled in a chemostat?

[03]

Q-8

(A) Discuss tissue culture technique for the cultivation of animal viruses.

[05]

(B) Give brief account on genetic material of viruses.

[03]

OR

Q-8

(A) Describe lytic cycle of bacteriophage in *E. coli*.

[08]

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**SARDAR PATEL UNIVERSITY**  
**SY BSc EXAMINATION**  
**Monday, 10<sup>th</sup> October**  
**2011**  
**2.30 - 5.30 pm**  
**MI-201 MICROBIOLOGY**  
**[FUNDAMENTALS OF MICROBIOLOGY-I]**

**Total Marks:80**

**Note:** All the questions are compulsory.  
 Figure on the right indicate marks.

- Q: 1**
- a) What contribution did **Anton van Leeuwenhoek** make in the field of Microbiology. **05**
- b) "A **microbiologist** have wide range of **employment options**"- comment. **09**

**OR**

- Q: 1**
- a) Who was awarded as "**Father of Immunology**"? Why? **05**
- b) Narrate **germ theory of fermentation**. **09**
- Q: 2** Describe the structure of the **bacterial endospore** using a labeled diagram. Narrate the process of **endospore formation** and its **germination** in detail. **13**

**OR**

- Q: 2**
- a) Differentiate between Gram positive and Gram negative **cell wall**. **04**
- b) Draw precisely labeled diagram of **typical bacterial cell** with brief description of all-important structures. **09**
- Q: 3** What is **differential staining**? Describe one example including its mechanism. **13**

**OR**

- Q: 3** Write short notes on:
- a) **Resolving power** **06**
- b) **Fluorescence microscopy**. **07**

- Q.4 (A) Explain the Pour Plate method used for Isolation of Microorganisms. (07)  
 (B) Explain the mechanism of oxygen inhibition in anaerobic bacteria. (04)  
 (C) Name one medium which is Selective as well as Differential medium, and explain how it serves the purpose. (03)
- OR**
- Q.4 (A) Classify bacteria on the basis of source of energy & carbon utilised for growth. (08)  
 (B) Enlist the common ingredients of Nutrient Broth & discuss the role of each ingredient. (04)  
 (C) Define: (a) Enriched medium. (02)  
                   (b) Enrichment medium.
- Q.5 (A) What is Continuous cultivation? Describe the apparatus used for continuous Cultivation of microorganisms. (08)  
 (B) Write on : The Mathematical expression of growth. (05)
- OR**
- Q.5 (A) Draw the Growth Curve of Bacteria and explain the logarithmic phase of growth. (07)  
 (B) Explain the effect of Hydrogen ion concentration & osmotic pressure on growth of microorganisms. (06)
- Q.6 Write an Essay on: Control of microorganisms by High temperature. (13)
- OR**
- Q.6 Write notes on:  
 (a) Control of microorganisms by Aldehydes & Halogens (07)  
 (b) Phenol Co-efficient method (06)

**SARDAR PATEL UNIVERSITY  
S.Y.B.Sc. EXAMINATION**

2011

Tuesday, 11<sup>th</sup> October

2.30 p.m. to 5.30 p.m.

**SUBJECT: MICROBIOLOGY MI-202**

**(Fundamentals of microbiology II)**

**TOTAL MARKS: 80**

- Note:** (1) All the questions are compulsory.  
(2) Figures on the right indicate marks.

**Q-1**

- (A) Write about DNA as a genetic material [05]  
(B) Write a note on one gene one polypeptide [04]  
(C) Define 1. Mutation 2. Operon [04]  
3. ORF 4. Transduction

**OR**

**Q-1**

- (A) Define the following terms [03]  
1. Gene 2. Cistron 3. Intron  
(B) Write a note on Watson and Crick model of DNA. [07]  
(C) Write a note on Clover leaf structure of t-RNA. [03]

**Q-2**

- (A) Justify-Numerical taxonomy is better than phenetic classification. [09]  
(B) Write a short note on molecular chronometer [05]

**OR**

**Q-2**

- (A) Enlist different methods on molecular based classification and discuss 16s r-RNA cataloguing in detail. [09]  
(B) Write a note on-Taxonomical hierarchy [05]

**Q-3**

Write short notes on

- (A) Sulphur reducing and non reducing bacteria [07]  
(B) Actinomycetes [06]

**OR**

**Q-3**

Write short notes on

- (A) Spirocheates [07]  
(B) Rickettsia [06]

- Q.4  
(a) Write a note on algae. [08]  
(b) Describe asexual reproduction in fungi. [05]

OR

- Q.4  
(a) Write a note on heterokaryosis. [08]  
(b) Describe the role of fungi in the field of agriculture. [05]

- Q.5  
(a) Describe lytic cycle in bacteriophages. [08]  
(b) Describe the use of embryonated eggs for the cultivation of animal viruses. [05]

OR

- Q.5  
(a) Enlist and describe any two methods used for the enumeration of viruses. [08]  
(b) Write a short note on lysogeny. [05]

- Q.6 Write notes on :  
(a) Lemon air sampler [05]  
(b) Use of ultraviolet radiation for air sanitation [06]  
(c) Characteristics of industrially important organisms. [03]

OR

- Q.6  
(i) Write notes on :  
(a) Hollander and Dalla Valle's air sampler. [05]  
(b) Anderson's air sampler. [04]  
(ii) Citing an example explain the role of mold in industry. [05]

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