

2021

BIOCHEMISTRY — HONOURS

Paper : CC - 10

(Basic Microbiology and Microbial Genetics)

Full Marks : 50

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer **any five** questions from the following : 2×5
- (a) Give two examples of obligate intracellular parasites.
 - (b) How does conjugation differ from transformation?
 - (c) Define bactericidal and bacteriostatic antibiotics with proper example.
 - (d) How do you sterilize culture media containing fetal bovine serum?
 - (e) How do you define generation time?
 - (f) Differentiate between asexual and sexual reproduction.
 - (g) Define chromophore and auxochrome with proper example.
 - (h) Explain why some bacteria cannot be stained by Gram's method of staining.
 - (i) Give one example of photoautotroph and chemolithotroph.
 - (j) Distinguish between psychrophiles and thermophiles.
2. Answer **any two** questions from the following :
- (a) (i) How do the cell walls of Gram-positive bacteria differ from that of Gram-negative bacteria?
(ii) Define mordant with an example.
(iii) Why do Gram-negative bacteria fail to retain the colour of primary stain? 2+1½+1½
 - (b) (i) Name one sulfur utilizing and one iron oxidizing bacteria.
(ii) Differentiate between selective media and differential media with proper example. 2+3
 - (c) (i) Describe briefly the lytic and lysogenic cycles of a virus.
(ii) Define : Endogenote and Exogenote. 3+2
 - (d) (i) State briefly the mode of action of streptomycin and tetracycline.
(ii) What are Koch's postulates? 2+3

Please Turn Over

Answer *any three* questions, taking at least *one* from *each unit*.

Unit-1

3. (a) What is the significance of five kingdom classification? What limitations are there?
 (b) How do eubacteria differ from archae bacteria?
 (c) Define synthetic media citing example. Why petri plates should be incubated upside down?
 (3+2)+2+(2+1)
4. (a) How do you define CFU?
 (b) What is acid fast staining?
 (c) What is the importance of inclusion bodies in bacteria?
 (d) Define obligate aerobe, obligate anaerobe, microaerophile and facultative anaerobe. 2+2+2+4

Unit-2

5. (a) Distinguish between halophiles and halotolerant citing examples.
 (b) What are the macro- and micro-nutrients required for bacterial growth? What is the purpose of using semi solid media?
 (c) What is water activity?
 (d) How does plasmid differ from episome?. 3+(2+1)+1½+2½
6. (a) What method of sterilization would be appropriate for each of the following?
 (i) Inoculation needle
 (ii) Vitamin solution
 (iii) Tissue culture room
 (b) Define decimal reduction time.
 (c) Draw a bacterial growth curve and label different phases of bacterial growth.
 (d) Give examples of an antifungal and an antiparasitic drug. (1+1+1)+2+3+2

Unit-3

7. (a) How does transduction differ from transformation?
 (b) What are the differences between generalized transduction and specialised transduction?
 (c) DNA from a strain of bacteria with the genotype $a^+ b^+ c^+ d^+ e^+$ was isolated and used to transform a strain of bacteria that was $a^- b^- c^- d^- e^-$. The transformed cells were tested for the presence of donated genes. The following genes are found to be co-transformed.
 (i) a^+ and d^+ (ii) c^+ and d^+ (iii) b^+ and e^+ (iv) c^+ and e^+ .
 State what is the order of genes on the bacterial chromosome with justification. 3+3+4

(3)

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8. (a) Draw the basic structure of bacteriophage T4 and label it properly.
(b) How do you define Hfr strains?
(c) Are antibiotics useful against viruses?
(d) How was it proven that DNA is the genetic material of bacteria?

3+2+2+3
