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B.Sc. Honours Part-II

Retest Examination 2017

Sub: Microbiology

Full Marks= 50

Time: 3 Hours

Group A

I. Write the correct answer of the following questions:

2X10= 20

1. The ability of a cell to bind DNA to its surface and import it is required for which genetic process?

A) Specialized transduction B) Transformation C) Conjugation D) Generalized transduction

2. The virus mediated gene transfer using genetically modified bacteriophages is called

A) Transfection B) transduction C) transformation D) conjugation

3. Specialized transduction is mediated by

A) Lytic phages B) lysogenic phages C) Both lytic and lysogenic phages D) T4 phages

4. Transduction was discovered by

A) Griffith B) Zinder and Lederberg C) Lederberg, Hayes and Woolman D) Iwanowsky

5. Hfr strains of bacteria:

A). do not have an "F" (fertility) factor. B.) have an "F" factor plasmid.

C). have an "F" factor integrated in the bacterial chromosome.

D). transfer the genetic information to other bacteria with high frequency

6. Which method of gene transfer involves direct contact between the bacteria?

A) Conjugation. B) Transduction. C) Transformation. D) All of these.

7. Which of the following is a description of generalized transduction?

A) Inaccurate excision of prophage can occasionally remove a small portion of the bacterial chromosome.

- B) Random pieces of bacterial DNA can become incorporated into a phage coat.
C) Pieces of bacterial DNA may be released into the culture medium when a cell is lysed.
D) All of these. E) None of the above.

8. Which of the following events is most likely due to bacterial transformation?

- A) A formerly non-toxic strain of *Corynebacterium diphtheriae* becomes toxigenic.
B) A gene for gentamicin resistance from an *Escherichia coli* chromosome
C) A non-encapsulated strain of *Streptococcus pneumoniae* acquires a gene for capsule formation from the extract of an encapsulated strain.
D) A strain of *Neisseria gonorrhoeae* starts producing a plasmid-encoded beta-lactamase similar to that of another Gram-negative strain.

9. The formation of a mating pair during the process of conjugation in *Escherichia coli* requires..

- A) sex pilus B) Integration of Transposon
C) Lysis of the donor D) Transfer of both strands of DNA

10. The form of genetic exchange in which donor DNA is introduced to the recipient by a bacterial virus is

- A) Transfection B) Transduction C) Conjugation D) Transformation

11. Which type of genetic exchange in bacteria is susceptible to the activity of deoxyribonuclease?

- A) Transfection B) Transduction C) Conjugation D) Transformation

II. Answer any five:

1X5 =5

- 1) What are F⁺ and F⁻ bacteria?
- 2) What is transduction? Who discovered it?
- 3) What is meant by Hfr?
- 4) Why is bacterial conjugation often described as a form of sex, although it differs in many respects from eukaryotic sex?
 - a) Because conjugation in bacteria generally results in genetic recombination, just as during meiosis in eukaryotes.
 - b) Because bacterial conjugation involves the coming together of two individuals, like in eukaryotic sex.

- c) Because bacterial conjugation is a special form of reproduction, just as eukaryotic sex.
- d) Because eukaryotic sex has probably evolved from bacterial conjugation.
- 5) Give an example of conjugative plasmid.
- 6) Match the mechanism for horizontal gene transfer with its description.

1. Conjugation	A. Virus mediated gene transfer
2. Transposition	B. Uptake of naked DNA from the environment.
3. Transduction	C. Transfer of a plasmid via a mating bridge.
4. Transformation	D. Transfer of DNA fragments between two insertion sequences

7) In Avery's experiment in which he showed that DNA is the genetic molecule, the acquisition of the virulence genes would be an example of

- A. Transformation
- B. Transduction
- C. Conjugation
- D. Electroporation

Group B

I. **Answer any Five questions** 3X5

1. What is divisome complex? What is its role?
2. What is diauxic growth? Give an example.
3. A log phase inoculum of 10^6 cfu/ml of was transferred from tryptic soy broth (TSB) to both fresh minimal salt medium and a fresh TSB medium. What will be the difference of growth pattern in these two cases?
4. What is the basic structure of gram negative cell wall peptidoglycan?
5. How many generation it will take for one bacterium to produce 32768 bacteria?
6. What is the difference between facultative anaerobe and obligate anaerobe bacteria?
7. What are the roles of SOD and catalase in bacteria?

II. Answer the following questions:

5X3

1. Explain different phases of bacterial growth.
2. What is the basic process of cell wall peptidoglycan synthesis in bacteria?
3. How thioglycolate containing medium can differentiate bacteria in terms of their ability of oxygen utilization and tolerance?