2016

BIOTECHNOLOGY

[Honours]

PAPER – II

Full Marks : 90

Time : 4 hours

The figures in the right hand margin indicate marks

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

Illustrate the answers wherever necessary

[NEW SYLLABUS]

GROUP – A

(*Microbiology*)

Answer any **two** questions from the following : 15 × 2

1. (*a*) Draw the structure of HIV with labeling. Add a note on its infection mode. 3 + 2

(*b*) What do you mean by Antibiotic resistance ? Describe the chemotherapeutic effect of any Antibiotic. 2 + 3

(*c*) Schematically represent the pentose phosphate pathway. 5

2. (*a*) Draw and describe the life cycle of a spore -forming bacteria. 2 + 3

(*b*) Enlist the categories of Bacteria on the basis of DNA/RNA composition. 5

(*c*) Compare the properties of cilia and flagella. $2\frac{1}{2}+2\frac{1}{2}$

3. (*a*) Write down the structural and functional attributes of a bacterial cytoplasmic membrane. $2\frac{1}{2}+2\frac{1}{2}$

(*b*) What was the contribution of Pasteur towards microbiology ? Briefly state his experiment. 1 + 4

(*c*) Write a short note on 8-kingdom classification. 5

4. (*a*) Define microbial fermentation. Describe an important fermentation pathway. 1 + 4

(*b*) State the factors responsible for stationary phase in growth curve of bacteria. Add a note on transitional phase. 4 + 1

(*c*) Note down the basal components of a culture media. Give examples of 2 composite media alongwith their main component and purpose. 1 + 2 + 2

GROUP – B

(*Genetics*)

Answer any **five** questions from the following : 6 × 5

5. What is the difference between Nuclear DNA and Mitochondrial DNA ? 3 + 3

6. Name the biochemical technique to measure repetitive DNA in a genome. Write down its analytic procedure and its application to sequencing. Draw a supporting graph. 1 + 2 + 2 + 1

7. Name the scientists who proposed chromosome theory of inheritance. State their essential arguments. 1 + 5

8. Define Bacterial conjugation. How is it different from Transformation and Transduction. Explain the process of conjugation with the help of a drawing. 1 + 1 + 4

9. Describe the 'one-gene, one-polypeptide hypothesis'. Add a note on the 'Central Dogma' concept. 4 + 2

10. What do you mean by Non-disjunction ? Name the three forms of Non-disjunction. State the molecular mechanisms of it. 1 + 2 + 3

11. Briefly describe Prokaryotic and Eukaryotic gene clusters with examples. Distinguish between Gene clusters and Tandem Arrays. (2 + 2) + 2

12. Highlight the primary effect of Mutagens. What are the different types of mutagenic agents ? 2 + 4

GROUP – C

(*Computer Application and Bioinstrumentation*)

Answer any **five** questions from the following : 6 × 5

13. (*a*) Schematically represent the basic design of a computer. 3

(*b*) State the functions of CPU, ALU and CU. 3

14. How is process management related to modern operating system ? Briefly mention process management models. What is process synchronization ? 1 + 3 + 2

15. Distinguish between overlay and swapping memory-management technique. What do you mean by virtual memory ? State its benefits. $\left(1\frac{1}{2}\times 2\right)+1\frac{1}{2}+1\frac{1}{2}$

16. List the common operations performed by a file manager. What does GUI stand for ? Write down few items on the monitor that are meant for customizing the interface. 2 + 1 + 3

17. What is the principle of affinity chromatography ? Describe the Batch and Column set up with diagrams. 2 + (2 + 2)

18. (*a*) Explain the theory of contrifugation. Add a note on Density gradient centrifugation. 2 + 2

(*b*) Mention the basic principle of NMR spectroscopy. 2

19. (*a*) Compare the features of Bright and Dark field microscopy. 2 + 2

(*b*) Define Bragg's law. 2

20. Write down the application(s) of Absorption spectroscopy. Enlist the factors affecting absorption properties of a chromophore. 2 + 4