

M.Sc. BOTANY
FOURTH SEMESTER
MICROBIOLOGY
MSB-402 E

(Use separate answer scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

(PART-A : Objective)

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1x20=20

- The primary use of Koch's postulates is to:
 - Clearly identify and characterize a particular microorganism.
 - Isolate microorganisms from diseased animals.
 - Demonstrate that a disease is caused by a microorganism.
 - Develop vaccines for specific disease.
- Arbuscular mycorrhizal fungi(AMF) belong to:
 - Basidiomycota
 - Deuteromycota
 - Glomeromycota
 - Ascomycota
- Expression vectors differ from a cloning vector in having:
 - An origin of replication
 - Suitable marker genes
 - Unique restriction sites
 - Control elements
- Any DNA molecule that has the ability to replicate in an appropriate host cell, to which the desired gene are integrated for cloning, is called as:
 - Plasmid
 - Linker
 - Vector
 - Adapter
- Gene therapy targets:
 - Genotypes.
 - Phenotypes.
 - Either a or b depending on the application.
 - Both genotypes and phenotypes.
- Which of the following ions are required for the activity of Type II restriction enzymes?
 - Ca²⁺
 - Mg²⁺
 - Cl²⁺
 - Mn²⁺
- Restriction enzymes capable of making internal cuts in a DNA molecule is called:
 - Restriction exonuclease
 - Restriction endonuclease
 - Both a and b
 - S1 nuclease
- High BOD indicates:
 - Less polluted water
 - Less number of organisms
 - More polluted water
 - None of these
- IMViC test is carried out to distinguish the presence of:
 - E. coli* from *Clostridium*
 - E. coli* from *Enterobacter aerogenes*
 - E. coli* from *Streptococcus*
 - E. coli* from other bacteria

10. An obligatory association between two different species that is beneficial to both populations of organism is:

- a. Parasitic
- b. Protocooperative
- c. Predatory
- d. Mutualistic

11. Nitrite to nitrate is carried out in nitrogen cycle by:

- a. *Nitrosomonas*
- b. *Pseudomonas*
- c. *Nitrobacter*
- d. *Thiobacillus denitrificans*

12. Pure plasmid DNA was isolated from a bacterium. Restriction enzyme digestion of this plasmid with either *Bam* HI or *Eco* RI resulted in two DNA fragments. A double digestion of the same plasmid with both these enzymes resulted in three DNA fragments. For this it is concluded that the isolated plasmid DNA is:

- a. Double stranded and linear
- b. Double stranded and circular
- c. Single stranded and linear
- d. Single stranded and circular

13. Receptor for acetosyringone is coded by:

- a. VirA
- b. VirB
- c. VirG
- d. VirE

14. For *Agrobacterium*, opines are source of:

- a. Phosphorus
- b. Hydrogen
- c. Carbon
- d. Nitrogen

15. The recombinant DNA technology was engineered by:

- a. Stanley Norman Cohen.
- b. Howard Temin.
- c. Stanley Norman Cohen and Herbert Boyer.
- d. Bateson and Punnett.

16. The fluctuation test was used to determine:

- a. Randomness of mutation
- b. Rate of Mutation
- c. Degree of mutation
- d. Hot spot of mutation

17. The enzyme involved in resolution of Holliday junction:

- a. RuvA
- b. RuvB
- c. RuvC
- d. RecA

18. The activity of RecBCD enzyme is:

- a. Nuclease and helicase
- b. Helicase
- c. Nuclease
- d. None

19. Which of the following is called as filamentous bacteria?

- a. Mycoplasmas
- b. Spirochetes
- c. Actinomycetes
- d. Vibrios

20. Now a days which of the following are known as "magic circles"?

- a. Plasmids
- b. Genes
- c. Amyloplasts
- d. Elaioplasts

(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. What is rhizosphere? Discuss the different types of microbial interactions in the rhizospheric soil. 2+8=10
2. Write a note on different sampling techniques of air microflora. 10
3. What is bacterial species concept? Write a note on methods of bacterial characterization. 2+8=10
4. Write a note on oxygenic and anoxygenic photosynthesis in bacteria with proper example. 10
5. What is genetic recombination? Discuss the Holliday model of homologous recombination emphasising the proteins involved. 2+8=10
6. What is mutagen? Discuss the different types of mutagen with proper example. 2+8=10
7. What is gene therapy? Discuss the different strategies of gene therapy. 2+8=10
8. Write a note on advanced cloning vectors with proper diagram. 10

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