

SIXTH SEMESTER B.A./B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS—UG)

Microbiology

MBY 6B 14—MICROBIAL GENETICS AND GENETIC ENGINEERING

Time : Three Hours

Maximum : 120 Marks

Section A*Answer all questions.**Each question carries ½ mark.*

1. The breeding between a white-furred rabbit with black -furred rabbit give rise to grey-furred off springs. This is an example for ——— of fur colour gene alleles.
2. The Ames test is used for the screening of ——— effects of substances.
3. The exchange of segments between non-sister chromatids of homologous chromosomes during meiosis is called ———.
4. How detergents damage the cells ?
5. Name any *two* chemicals used in gene transfer techniques.
6. UV rays develop mutation by the formation of ——— in genetic material.
7. The whole-genome shot gun sequencing approach depends primarily on.
8. Which phase of mitosis is associated with separation of chromatids ?
9. What structure forms as a network of protein cables during cell division ?
10. What are the key proteins involved in the regulation of cell cycle ?
11. How many chromatids does a human diploid cell contain just prior to cell division ?
12. During cell cycle the replication of the genome takes place in ——— phase.

(12 × ½ = 6 marks)

Section B*Answer all questions. Each question carries 3 marks)*

13. In a cross of AaBb × AaBb, what fraction of the offspring can be expected to express one of the two dominant alleles, but not both ? Explain.
14. What is the difference between mutation rate and mutation frequency ?

Turn over

15. What is crossing over ? How is meiosis related to this phenomenon ?
16. Explain the competence development in *Streptococcus pneumoniae*.
17. What are the disadvantages of sonication method for cell disruption ?
18. Write on R-plasmids.
19. In what way is interspecies horizontal gene transfer similar to rDNA technology ?
20. What is RT-PCR ?
21. What are the features of GM salmon ? How does this salmon impact the environment ?
22. What might happen when a genetically modified micro-organism is released into the environment ?

(10 × 3 = 30 marks)

Section C

Answer any six of the following.

Each question carries 8 marks.

23. A cross between a black cat and a tan cat produces a tabby pattern (black and tan fur together)
 - (a) What pattern of inheritance does this illustrate ?
 - (b) What percent of kittens would have tan fur if a tabby cat is crossed with a black cat ?
24. Define mutation. Describe different types of mutations.
25. Write a note on apoptosis.
26. Write a note on restriction enzymes.
27. Describe the DNA sequencing methods.
28. What is 'terminator' technology ? Discuss the advantages and disadvantages of 'terminator' technology.
29. With suitable diagram describe the different stages of mitosis.
30. Discuss the regulation of cell cycle. Add a note on the cell cycle check points.

(6 × 8 = 48 marks)

Section D

*Write essays on any two of the following.
Each question carries 18 marks.*

31. Write notes on :

- (a) Sex linked inheritance.
- (b) Extrachromosomal inheritance.

32. Describe the mechanisms of generalized and specialized transductions in bacteria.

33. Comment on :

- (a) Current use of Genetically Modified Organisms.
- (b) Potential GMO applications.
- (c) Risks and controversies on the use of GMOs.

(2 × 18 = 36 marks)