

2020

BIOTECHNOLOGY

(Theory)

Full Marks : 70

Pass Marks : 21

Time : Three hours

All the questions are compulsory.

The figures in the right margin indicate full marks for the questions.

For question Nos. 1 to 4 are of objective type questions carrying 1 mark each, select the most appropriate one from the given alternatives A, B, C and D and rewrite the same.

1. What is the number of predicted genes in *Saccharomyces cerevisiae*? 1
 - A. 20000
 - B. 13600
 - C. 6340
 - D. 5000

2. Hybridoma is a fusion product of 1
 - A. B cell and T cell
 - B. T cell and Leucocytes
 - C. B cells and myeloma cells
 - D. B cell and cancerous cells

P.T.O.

3. Proteolytic enzyme used in the cheese industry is 1
- A. Alcalase
 - B. Papain
 - C. Glucose isomerase
 - D. Chymosin
4. Suggest the type of restriction enzyme which can recognise and cut DNA within a specific sequence. 1
- A. Type I
 - B. Type II
 - C. Type III
 - D. Type IV

For question Nos. 5 to 14 are of very short answer type questions carrying 1 mark each.

5. Define essential amino acids. 1
6. Which protein is administered in patients for cancer therapy and autoimmune diseases? 1
7. How branched chain amino acids are essential for the biosynthesis of muscle proteins? 1
8. How electroporation technique can act during the transfer of rDNA to the recipient host? 1
9. Why creation of Bioinformatic Databanks are necessary? 1
10. In continuous culture, addition of fresh nutrient medium in limited amount is required before the nutrient medium is fully exhausted. Why? 1
11. Differentiate between organogenesis and somatic embryogenesis. 1
12. How can you slow down fruit ripening by using genetic engineering methods. 1

13. "Southern hybridisation technique is essential in all rDNA experiments".
Predict its possible aim. 1

14. "Disposal of plastics in big cities is one of the greatest problems". Suggest one
genetically engineered product to overcome this event. 1

*For question Nos. 15 to 24 are of short answer type -II questions carrying
2 marks each.*

15. List two ways to measure microbial growth. 2

16. Distinguish between chymotrypsinogen and chymotrypsin. 2

17. Why alkaline phosphatase are used in cloning experiments? 2

18. List two differentiating points between structural genomics with that of
functional genomics. 2

19. How nutrient medium can be sterilized before it is used for culturing microbes?
2

20. Distinguish between uses of callus culture and cell suspension culture by giving
two points. 2

21. Several useful proteins discovered from blood and plasma are responsible for
blood coagulation. Analyse it with two examples. 2

22. "The invention of the PCR technique has revolutionised every aspect of modern
biology". Analyse this statement by giving two supporting points. 2

23. Appropriate preservation for a microbial strain, producing desired product is
necessary for future use. Suggest two techniques to preserve this strain from
lost of viability. 2

24. Plants encounter both biotic and abiotic stresses, which may lead to reduction in
crop yield and quality. Analyse it by giving two compounds to cope with abiotic
stress conditions. 2

For question Nos. 25 to 31 are of short answer type-I questions carrying 3 marks each.

25. What is Entrez? Give two applications of it. 3
26. Enumerate three properties of DNA polymerase required in DNA replication. 3
27. How Prof. Ingo Potrykus and Dr. Peter Beyer developed 'Golden Rice' which is enriched with β -carotene? 3
28. Differentiate between roller bottle and spinner culture in scale-up methods of animal culture process. 3
29. "Not all genetic variations are beneficial". Analyse this statement by giving three human diseases. 3
30. You are advised to grow micro-organisms in large-scale under controlled environment. Suggest an instrument to fulfil this task and write its working mechanism. 3
31. Draw a schematic diagram of the various parts of a mass spectrometer and label electromagnet and amplifier. 3

For question Nos. 32 to 34 are of long answer type questions carrying 5 marks each.

32. What is erythropoietin? Write two mechanisms of production and two uses of it. 5
33. Enumerate five general characters of a plasmid. 5
34. "Kappa casein, a functional non-catalytic protein behaves like a lipid molecule". Analyse this statement with five functional properties and mode of action. 5