M.Sc. 3rd Semester Examination, 2022

MICROBIOLOGY

(*Fermentation Technology/Food Microbiology*)

PAPER – MCB-303.1 &303.2

Full Marks : 40

Time : 2 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

PAPER – MCB-303.1

(*Fermentation Technology*)

[*Marks* : 20]

Answer any **two** of the following questions : 2×2

1. Mention the role of sparger and baffle in bioreactor.

2. What is scale up in fermentation ?

3. How industrial scale fermenter can be sterilized ?

4. What is Kla ?

Answer any **two** questions from the following : 4×2

5. 'Airlift bioreactor provides better mixing than bubble column bioreactor'—explain. 'Mechanical foam breaker is generally preferred over antifoam agents'—Justify. $2 + 2$

6. State the advantages of solid-state fermentation over submerged fermentation. What is fed-batch operation of fermentation ? $3 + 1$

7. What are the advantages of fermentation by immobilized cells over free cell ? State any one process of enzyme immobilization. $2 + 2$

8. How different process parameters can be monitored and controlled in stirred-tank bioreactor ? 4

Answer any **one** question from the following : 8×1

9. What is Raynolds number ? How it is related with flow pattern of fluid ? Why down-stream processing is necessary in any fermentation industry ? Elucidate the general strategy of down-stream processing that could be followed for post-fermentative purification of any intracellular soluble metabolites. $(1 + 2) + (1 + 4)$

10. Write short notes on (any *four*) : 2×4

(*i*) Importance of continuous fermentation

(*ii*) Trickle bed fermenter

(*iii*) Oxygen transfer in bioreactor

(*iv*) Types of SSF

(*v*) Sterilization of medium containing heat-labile component.

PAPER – MCB-303.2

(*Food Microbiology*)

[*Marks* : 20]

Answer any **two** questions : 2×2

11. What are the characteristics of lactic acid bacteria (LAB) ?

12. Mention the names and uses of top and bottom yeasts for beer production.

13. Define sterilization, pasteurization, blanching and canning.

14. Why is aflatoxin considered as a potent food intoxicant ?

Answer any **two** questions : 4×2

15. Sketch the production of sauerkraunt.

16. Why is fermented food healthier over unfermented ?

17. Describe the major causes of food spoilage.

18. What is phosphatase test performed ? Name the natural antimicrobial component present in milk.

Answer any **one** of the following questions : 8×1

19. Discuss briefly the principle of food preservation. Explain how salt act as preservative of food. 8

20. What are the necessity of production of genetically modified (GM) food ? Discuss the ethical issues and practical challenges of production of GM food. $3 + 5$