

2016**M.Sc.****3rd Semester Examination****MICROBIOLOGY****PAPER—MCB-304***Full Marks : 40**Time : 2 Hours*

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Separate answer scripts to be used for each groups.

Group — A**[Marks : 20]**

Answer any *two* questions.

1. (a) Define bioprocess ? How does the impeller speed affect bioprocess in an agitated bioreactor ? 1+2
- (b) Classify the types of impeller used in mechanically agitated bioprocess design. 3

(Turn Over)

- (c) What is 'Anti-foam' agent? Give example. 1+1
- (d) Elucidate the role of baffles in bioprocess efficiency. 2
2. (a) What do you mean by steady state kinetics in a continuous culture? 1
- (b) What factors affected the downstream processing and its efficiency? 2
- (c) Explain the operational significance of steady state kinetics in modern bioprocess technology. 4
- (d) When an aerobic fermenter of capacity 550 liters is supplied with a flow of 240g/min of O₂, only 0.5% of supplied O₂ gets solubilised in the liquid medium and the growing *Azotobacter Vinelandii* utilizes another 3.5% of supplied O₂, calculate the mass transfer to headspace assuming 20% headspace Sp. gravity of air 0.63 and 1 litre = 988g. 3
3. Write short notes on any two of the following : 2×5
- (a) Bubble Column bioreactor ;
- (b) Newtonian fluid ;
- (c) Reynold's number ;
- (d) Scale up of fermentation.

Group — B

[Marks : 20]

Answer any *two* questions.

4. How will you improve the microbial strain for industrial use? Briefly describe the process of malting? What is Sparkling wine and how is it prepared? How are microbial strains preserved? 2+2+(1+3)+2
5. Write the advantages of whole cell immobilization. Write the mechanism, suitability and disadvantage of calcium alginate mediated cell immobilization. What are the different methods of cell immobilization and write its principle. Write the cross linking surface chemistry for protein immobilization. 2+3+(1+2)+2
6. Write short notes on (any *two*) : 4×2 $\frac{1}{2}$
- (a) What is GATT?
- (b) Copy right and Trade Secret ;
- (c) How glutamic acid is produced in industry?
- (d) Elucidated in brief the commercial application of acetic acid.
- (e) Intellectual Property Right.