



**WEST BENGAL STATE UNIVERSITY**  
B.Sc. Honours 5th Semester Examination, 2021-22

**MCBACOR11T-MICROBIOLOGY (CC11)**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.  
Candidates should answer in their own words and adhere to the word limit as practicable.  
All symbols are of usual significance.*

**Answer Question No. 1 and any *four* from the rest**

1. Answer any *four* questions from the following: 2×4 = 8
- (a) What is solid state fermentation?
  - (b) What do you understand by scale-up of fermentation?
  - (c) Why are antibiotics called secondary metabolites?
  - (d) What is Crabtree effect?
  - (e) How is vinegar concentrated?
  - (f) What is fusel oil?
  - (g) What are the disadvantages of using synthetic media?
  - (h) Why is lactose a preferred carbon source for penicillin production?
2. (a) What is fed-batch fermentation? 2
- (b) Mention the different types of fed-batch fermentation and their salient features. 3
- (c) What is chemostat and how is chemostat applied to monitor fermentation? 1+2
3. (a) What do you mean by homolactic and heterolactic fermentation? 2
- (b) A continuous cell culture being carried out in a stirred tank bioreactor ( $V = 3$  liter) in terms of its cell mass concentration ( $X$ ) and substrate concentration ( $S$ ). The flow rates of the feed stream and exit stream are equal ( $F = 5$  ml/min) and constant. If the specific growth rate  $\mu = 0.3S/(1+S)$  per hour, what will be the steady state concentration of  $S$  (g/L)? 4
- (c) Mention the function of sparger. 2
4. (a) What are the benefits of semi-synthetic penicillin over benzyl penicillin? 2
- (b) What are the different mechanisms that enable the microorganisms to avoid overproduction of primary metabolites? 3
- (c) What are auxotrophic mutants? How are they important industrially? 1+2

5. (a) Mention the differences between seed fermentor and production fermentor. 3  
(b) How are anaerobic organisms preserved? 2  
(c) What desirable changes occur in the wine during ageing? 3
6. (a) What is amylolytic enzyme and what is its downstream processing in industry? 3  
(b) Describe the surface culture method use in citric acid production. 3  
(c) Indicate genetically engineered strains used for vitamin B12 production. 2
7. (a) Explain the Trickling generator process for vinegar production. 4  
(b) Name the strain used for vinegar production. What is mother of vinegar? 1+1  
(c) Under which condition does *Aspergillus niger* produce citric acid in large quantity? 2
8. (a) What are the importance of Secondary screening? 2  
(b) Name the most frequently used cross linking agent for Enzyme immobilization. 2  
(c) Write briefly about azeotropic distillation. 2  
(d) What are the application of fluidized-bed reactor? 2

**N.B. :** *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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