

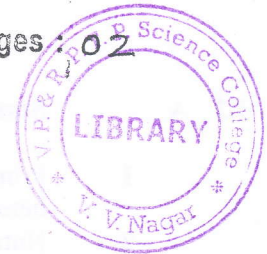
SEAT No. \_\_\_\_\_



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[161/A-22]

**SARDAR PATEL UNIVERSITY**  
**B. Sc. EXAMINATION - SEMESTER-V**  
**MICROBIOLOGY**



**US05CMIC24 (Fermentation Technology-I)**

Date: 26/11/2021  
Friday

Time: 3:00 PM to 5:00 PM  
Total marks: 70

N.B: Figures on the right indicate marks.

**Q.1 Attempt all Multiple Choice Questions. (10)**

- 1 The crowded plate technique is employed for detection and isolation of \_\_\_\_\_ producers.  
(a) Organic acids (b) Antibiotic  
(c) Amino acids (d) vitamin
- 2 Secondary metabolites are produced during the \_\_\_\_\_.  
(a) Idiophase (b) Trophophase  
(c) (a) and (b) both (d) None of the above
- 3 Which one of the following is not desirable for the media during industrial fermentations?  
(a) Maximum yield of product (b) Minimum concentration of product or biomass  
(c) Minimum yield of undesirable product (d) Maximum rate of product formation
- 4 \_\_\_\_\_ acts as inducer for pullulanase.  
(a) Maltose (b) Starch  
(c) Dextrin (d) Pectin
- 5 What do you mean by sterilization of media?  
(a) Purification of products (b) Elimination of contamination  
(c) Recovery of products (d) Formulation of media
- 6 The dynamic method of gassing out procedure involves \_\_\_\_\_ the supply of air to the fermentation.  
(a) increasing (b) changing  
(c) stopping (d) None of the above
- 7 The non-agitated fermentations are carried out in vessels of a height/diameter ratio of \_\_\_\_\_.  
(a) 1:2 (b) 3:2  
(c) 4:1 (d) 5:1
- 8 Which of the following is not a chemical method for cell disruption?  
(a) enzyme treatment (b) detergents  
(c) liquid shear (d) osmotic shock
- 9 The \_\_\_\_\_ centrifuge may be considered to be a centrifugal filter.  
(a) basket (b) decanter  
(c) tubular-bowl (d) disc--bowl
- 10 \_\_\_\_\_ chromatography depends on the highly specific interactions between pairs of biological materials.  
(a) Ion exchange (b) Thin layer  
(c) Gel permeation (d) Affinity

**Q.2 A State whether the given statements are true or false. (08)**

- 1 Primary screening reveals whether the culture is homofermentative or heterofermentative.
- 2 Nutrient solutions can be sterilized by using heat, radiation or by filtration.
- 3 The rheology of a fermentation broth has a marked influence on the relationship between  $K_{LA}$  and the degree of agitation.
- 4 Increase in surface hydrophilicity results in cell flocculation.

**B Fill in the blanks with appropriate answer.**

- 1 \_\_\_\_\_ designed enrichment culture technique to isolate desired microorganisms from soil.
- 2 \_\_\_\_\_ is the most widely used precursor in penicillin production.
- 3 \_\_\_\_\_ phenomenon is due to an inappropriate combination of air flow rate and speed of agitation.
- 4 In \_\_\_\_\_ method, high frequency vibration leads to cavitation and cell disruption.

**Q.3 Give SHORT answers to the following questions. (Attempt any ten) (20)**

- 1 What are the advantages of microbial transformation processes over chemical transformation processes?
- 2 What are the desirable characteristics of production strain in fermentation industry?
- 3 Describe briefly Auxanography.
- 4 How addition of certain inhibitors is useful in fermentation?
- 5 How yeast extracts are produced from Baker's yeast?
- 6 What are the disadvantages of batch sterilization of nutrient media?
- 7 Enlist equipments used to measure temperature in a vessel during any process.
- 8 What are the factors affecting  $K_{LA}$  value achieved in a fermentation vessel?
- 9 Define the term scale up. Enlist most important methods for scale up.
- 10 Enlist various chemical methods for cell disruption.
- 11 Draw a labelled diagram of a simple filtration apparatus.
- 12 Enlist typical agents used for precipitation of products.

**Q.4 Answer the following LONG Questions:- (Attempt any four) (32)**

- 1 Enlist the major groups of microbial fermentation processes and discuss any three in detail.
- 2 Write in detail on primary screening of growth factors producers and enzyme producers.
- 3 Enlist criteria for an ideal inoculum. Discuss inoculum size and inoculum media.
- 4 Write on substrates used as carbon sources for industrial fermentation.
- 5 Describe batch fermentation and continuous fermentation.
- 6 Discuss impellor and sparger as structural components of the fermentor.
- 7 Write on liquid - liquid extraction method in detail.
- 8 Describe continuous filters used for removal of microbial cells and solid matter.

