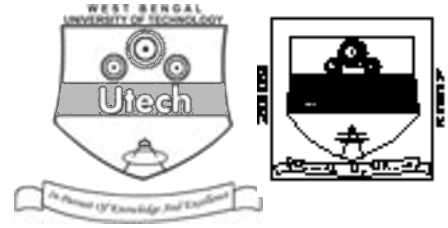


**INDUSTRIAL MICROBIOLOGY & ENZYME TECHNOLOGY ( SEMESTER - 4 )**

**CS/B.TECH (BT-N )/SEM-4/BT-402/09**



1. ....  
Signature of Invigilator

2. ....  
Signature of the Officer-in-Charge

**Reg. No.**

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**Roll No. of the Candidate**

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**CS/B.TECH (BT-N )/SEM-4/BT-402/09**

**ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009**

**INDUSTRIAL MICROBIOLOGY & ENZYME TECHNOLOGY ( SEMESTER - 4 )**

Time : 3 Hours ]

[ Full Marks : 70

**INSTRUCTIONS TO THE CANDIDATES :**

- This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
- In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
  - For **Groups – B & C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
- Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
- Read the instructions given inside carefully before answering.
- You should not forget to write the corresponding question numbers while answering.
- Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
- Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
- You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
- Rough work, if necessary is to be done in this booklet only and cross it through.

**No additional sheets are to be used and no loose paper will be provided**

**FOR OFFICE USE / EVALUATION ONLY**

Marks Obtained

**Group – A**

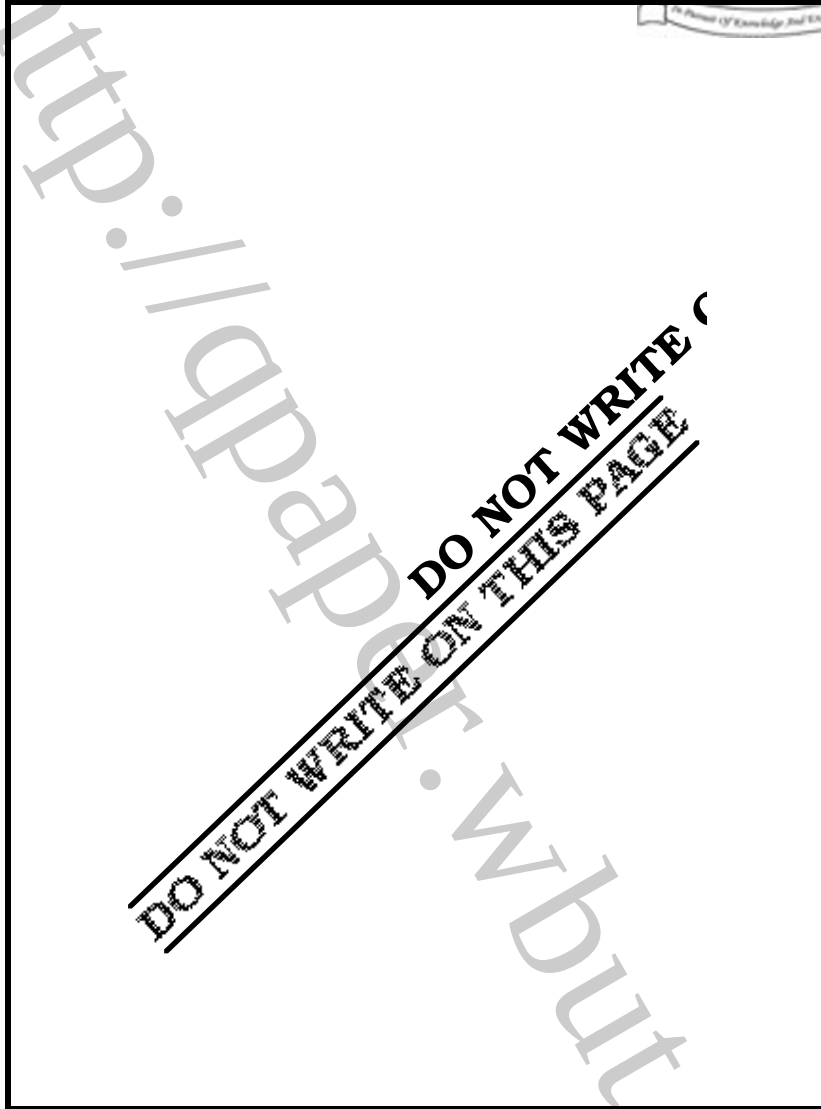
**Group – B**

**Group – C**

Question Number																				Total Marks	Examiner's Signature	
Marks Obtained																						

.....  
**Head-Examiner/Co-Ordinator/Scrutineer**

**4471 (08/06)**





**ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009**  
**INDUSTRIAL MICROBIOLOGY & ENZYME TECHNOLOGY**  
**SEMESTER - 4**



Time : 3 Hours ]

[ Full Marks : 70

**GROUP – A**

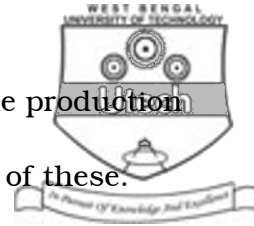
**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10
- i) Commercial streptomycin production is carried out by using
- |                      |                             |                          |
|----------------------|-----------------------------|--------------------------|
| a) <i>S.aureus</i>   | b) <i>S.griseus</i>         |                          |
| c) <i>S.pyogenes</i> | d) <i>Streptococcus sp.</i> | <input type="checkbox"/> |
- ii) Xanthan is
- |                        |                          |                          |
|------------------------|--------------------------|--------------------------|
| a) Homo polysaccharide | b) Hetero polysaccharide |                          |
| c) both (a) and (b)    | d) none of these.        | <input type="checkbox"/> |
- iii) Frame shift mutagens intercalate into the DNA molecule and cause errors which result in
- |                                 |                        |                          |
|---------------------------------|------------------------|--------------------------|
| a) formation of cross-links     | b) formation of dimers |                          |
| c) alteration of reading frames | d) changes in bases.   | <input type="checkbox"/> |
- iv) Lyophilization is the storage of commercial strain through
- |  |  |                          |
|--|--|--------------------------|
| a) Sporulation                         |  |                          |
| b) Freeze-drying                       |  |                          |
| c) Boiling and subsequent condensation |  |                          |
| d) vegetative reproduction.            |  | <input type="checkbox"/> |



v) Vitamin  $B_{12}$  is produced as the by-product of

- a) Streptomycin production      b) Lysine production  
c) Glutamic acid production      d) none of these.



vi) Citric acid production is the example of

- a) Bacterial fermentation      b) Mold fermentation  
c) both (a) and (b)      d) none of these.

vii) Extremophilic enzymes are obtained more from

- a) fungi      b) yeast  
c) virus      d) archaea.

viii) Enzyme used for blood sugar measurement is

- a) glucose isomerase      b) glucose epimerase  
c) glucose hydrogenase      d) glucose oxidase.

ix) Enzyme used in fruit juice processing is

- a) Pectinase      b) Amylase  
c) Cellulase      d) Protease.

x) Between thermophilic and psychrophilic enzymes which one is useful for commercial application ?

- a) Only thermophilic is useful  
b) Only psychrophilic is useful  
c) Both (a) and (b) are useful  
d) None of these.



- xi) A Newtonian fluid shows
- a non-linear response to stress
  - deformation
  - both (a) and (b)
  - none of these.




- xii) The mathematical formation for the law of conservation of mass is designated as
- energy equation
  - Arrhenius equation
  - Continuity equation
  - Momentum theorem.

### GROUP – B

#### ( Short Answer Type Questions )

Answer any *three* of the following questions.

3 × 5 = 15

- What is Xanthan ? How is it produced by fermentation ? 2 + 3
- What are base analogs ? Can they be used for strain development ? State at least two examples. 2 + 1 + 2
- What are extremophile microorganisms ? Give a broad classification. Give two of extremophile microorganisms used commercially. 1 + 2 + 2
- How does chemical modification of enzyme give stability ? Give at least two examples indicating enzymes and modifications done. 2 + 3
- Write notes on Navier-Stokes equation and its application. 5

### GROUP – C

#### ( Long Answer Type Questions )

Answer any *three* of the following questions.

3 × 15 = 45

- Describe in detail the requisites of a fermentation process. What do you understand by submerged and solid state fermentations ? Discuss the merits and demerits of solid state fermentation. 4 + 3 + 8
- What damage does *uv* inflict on DNA ? What are the mechanisms by which damage is repaired and corrected ? Discuss how mutagenesis by *uv* is used for strain development. 2 + 7 + 6



9. What are the different characteristics of an enzyme protein to be thermostable ? How is site directed mutagenesis done to change an amino acid ? Give two examples for successful attempt to improve stability of enzymes by a single amino acid replacement.
- 4 + 6 + 5
10. What are broad spectrum and narrow spectrum antibiotics ? Draw a schematic diagram for penicillin production. How is penicillin recovered ? Mention one strain involved in this production.
- 4 + 6 + 4 + 1
11. a) Briefly explain the experimental method for determination of flow properties of a non-Newtonian fluid such as fermentation broth.
- b) A fermentation broth ( density =  $1068 \text{ kg/m}^3$  ) is flowing through a pipe ( length  $15.0 \text{ m}$  and inside diameter  $0.0528 \text{ m}$  ) at an average velocity of  $0.08 \text{ m/s}$ . The flow properties of fluid are : consistency index =  $16.0 \text{ N.S}^n / \text{m}^2$  , flow behaviour index =  $5.0$  ( Dimensionless ). Calculate the pressure drop for laminar flow.
- 6 + 9

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END