

Seat
No.

SH - 401
Total No. of Pages : 3

M.Sc. (General) (Part-II) (Semester - III) (CBCS) (New Revised)
Examination, January - 2023

CC304MIC304 : MICROBIOLOGY (Paper-XII)

Quality Control Microbiology-I

Sub. Code : 80533/85366

Day and Date : Wednesday, 11 - 01 - 2023
Time : 2.30 p.m. to 5.30 p.m.

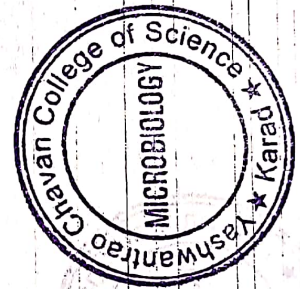
Total Marks : 80

- Instructions:
- 1) Total of FIVE questions are to be answered from the entire paper.
 - 2) Question ONE is compulsory.
 - 3) Attempt ANY TWO questions from each section Section I (Q. 2 to Q. 4) Section II (Q. 5 to Q. 7).
 - 4) Answer to all the questions are to be written in the same answer book.
 - 5) Supplements will not be provided.
 - 6) Figures to the right indicate full marks.

Q1) State whether the following statements are TRUE or FALSE and rewrite the sentences. [16]

- a) *Bacillus pumilis* is a biological indicator used for sterilization
- b) Record keeping is a part of GMP.
- c) Unsterile air is required strictly inside BSL-4 laboratories.
- d) A fume hood present in laminar airflow workbench provides personnel protection while working.
- e) Endotoxin test should be performed as per SOPs in any laboratory.
- f) In dry heat sterilization, UDAF stands for Unidirectional Air Flow sterilizing tunnels.
- g) SARS virus can be handled in BSL-3 laboratory.
- h) Laboratories of National Institute of Health (NIH) are of BSL-1 levels

P.T.O.



- j) Heat sterilization is the technique recommended by most pharmacopoeias for the filtration of fluids.
- k) Hand sanitizer must contain a minimum of 5.23% of alcohol for effective disinfection in all BSL laboratories.
- l) SOPs for handling instruments and equipments are prepared by referring World Atlas.
- m) There are 53 principles of sterilization.
- n) For sterility testing, British pharmacopoeia recommends Milk Agar for cultivation of microorganisms.
- o) For chemical sterilization, there are colour indicator tapes for formaldehyde.
- p) Thermometer is an instrument which needs to be neglected.
- q) Waste generated from BSL-4 laboratory cannot be disposed in local municipal landfills.

SECTION-I

- Q2) a) Describe in detail about code of practice and design of BSL-1 and BSL-2 Laboratories. [16]

OR

- b) Explain in detail about the good microbiological techniques followed in Pharmaceutical industries. [16]

- Q3) Attempt any TWO.

- a) Explain in brief about health and medical surveillance programme conducted in pharmaceutical industries. [16]
- b) Describe in brief about maximum containment laboratory BSL-4.
- c) Write in brief about use of biological safety cabinets and precautions taken while working in any containment laboratory.

- Q4) Write short notes on Any FOUR.

- a) Biosafety Level 2 [16]
- b) Health surveillance
- c) Storage of ampoules
- d) Standard precautions taken while handling blood
- e) Code of practice of BSL-3
- f) Emergency procedures for microbiological instrumentation.

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SECTION-II

- Q5) Describe in detail microbial control by physical and chemical methods. [16]

OR

Describe in detail biosafety guidelines and microbiological risk assessment in Biological safety cabinets. [16]

- Q6) Attempt Any TWO. [16]

- a) Explain in brief about risks and precautions taken in all biological safety cabinets.
- b) Describe in brief about sterilization effectiveness of sterile products manufactured in pharmaceutical industries.
- c) Explain in brief about selection and using of biological safety cabinet.

- Q7) Write Short notes on Any FOUR [16]

- a) Homogenizers
- b) Negative-pressure flexible-film isolators
- c) Membrane filtration
- d) Disposable transfer loops
- e) Direct inoculation.
- f) Thioglycolate Medium

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SECTION-II

Q5) Explain in detail industrial production of Vit. B 12. [16]

OR

Discuss in brief environmental and genetic control of metabolic pathway in fermentation process. [16]

Q6) Attempt (any two). [16]

- Physical concentration methods for lactic starter biomass.
- Industrial production of killed bacterial vaccine.
- Contamination problems in fermentation industry.

Q7) Write short notes on (any four). [16]

- Concept of primary metabolites.
- General applications of computer in fermentation.
- Scheme of production of lactic starter culture.
- Gluconic acid manufacturing process.
- Types of brandy.
- Pot still distillation in whisky.

Seat No.

SH-400
Total No. of Pages : 4

M.Sc. (Part-II) (Semester-III) (CBCS)
Examination, January - 2023
MIC-303 : GENERAL MICROBIOLOGY
Fermentation Technology (Paper-XI)

Sub. Code : 80532/85365

Day and Date : Monday, 09-01-2023
Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 80

- Instructions : 1) Total of five questions are to be answered from the entire paper.
2) Question No. 1 is compulsory.
3) Attempt any 2 questions from each section. Section-I (Q.2 to Q.4)
Section-II (Q.5 to Q.7)
4) Answer to all the questions are to be written in the same answer book.
5) Supplements will not be provided.
6) Figures to the right indicate full marks.

Q1) Rewrite the following sentences by filling in the blanks with the correct option from the alternatives given for each [16]

- In fermentation economics _____ is directly associated with cost of fermentation product.
i) Labour cost ii) Purity of product
iii) Capital expenditure iv) Production cost
- _____ media could find the great use in industrial fermentation process.
i) Nonsynthetic ii) Natural
iii) Synthetic iv) Living
- _____ cans in 70-360 ml capacities are ideal containers for liquid starter culture concentrates.
i) Plastic ii) Aluminium
iii) Stainless steel iv) Iron
- In Whisky production inoculum size of fermentation is _____ by volume.
i) 1-2% ii) 2.5-3.0%
iii) 5-8% iv) 2.5-4.5%

P.T.O.



- e) Rheology of fermented broth is directly related to ____ broth.
- Viscosity
 - Vibration
 - Velocity
 - Virulence
- f) In case of patent activities, genetically modified organisms should be ____.
- cultivated
 - deposited
 - patented
 - labelled
- g) Addition of ____ compound to medium allows up to 35% glucose converted to gluconic acid.
- iron
 - silicon
 - aluminium
 - boron
- h) ____ is the one of the method of fine control of metabolic pathway.
- Chelation
 - Gene expression
 - Protein turn over
 - Gene deletion
- i) Adjuvants like ____ are used to enhance vaccine immunogenicity.
- alum
 - Glycerin
 - alcohol
 - Glucose
- j) Additional buffering capacity in fermentation media is provided by ____.
- sulfates
 - phosphates
 - citrates
 - Phosphonates
- k) The optimum rate of aeration in Vt_B fermentation is about ____ vol of air/vol. of medium/minute.
- 25-50
 - 0.025-0.050
 - 0.25-0.50
 - 2-5
- l) ____ are attached horizontally to fermenter wall.
- Baffles
 - Impellers
 - pH controller device
 - Temp. controller device

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- m) The maturation period of fine brandy is extended up to ____ years.
- 20
 - 50
 - 10
 - 30
- n) ____ is measure of efficiency of conversion of substrate into biomass.
- Yield factor
 - Growth factor
 - Cultivation factor
 - Inoculum
- o) A ____ at the bottom is essential for removal of completed fermentation broth for further processing.
- safety valve
 - exit channel
 - drain
 - drum
- p) For Primary metabolite production, conditions are applied to extended growth phases.
- lag
 - exponential
 - stationary
 - preparatory

SECTION-I

Q2) Explain in detail introduction, composition, practice and problems in patent.

OR

Describe in brief fermentation vessels- airlift, tower, fedbatch and Waldhof type fermentor. [16]

Q3) Attempt (any two).

- Market potential for product and fermentation. [16]
- Sterilization of fermentation equipment and air.
- Characters and specification of ideal fermentation media.

Q4) Write short notes on (any four)

- Reynold number and power number. [16]
- Types of fermentation media.
- Rheology of fermentation broth.
- Aeration in fermentor.
- Product recovery cost.
- Legal aspects in fermentation.

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Total No. of Pages : 3

Seat
No.

M.Sc. (Gel) (Part - II) (Semester - III) (CBCS) Examination,
January - 2023

MICROBIOLOGY (Paper - IX)

MIC - 301: Biostatistics, Bioinformatics and Scientific Writing

Sub. Code : 80530/85363

Day and Date : Thursday, 05-01-2023

Total Marks : 80

Time : 02.30 p.m. to 05.30 p.m.

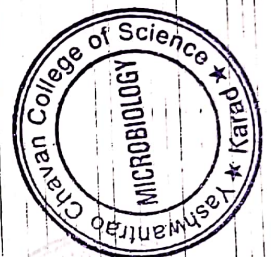
Instructions :

- 1) A total of FIVE questions are to be answered from the entire paper.
- 2) Answers to all the FIVE questions are to be written in the SAME answer book.
- 3) Question - I is COMPULSORY.
- 4) Attempt ANY TWO questions from Section - I (Q. 2 to Q. 4) and ANY TWO questions from Section - II (Q. 5 to Q. 7).
- 5) No supplements will be provided.
- 6) Figures to the RIGHT indicate FULL MARKS.

Q1) State whether the given statements are TRUE or FALSE. [16]

- a) The order of writing manuscript and order of published paper is same. ✗
- b) Increase in one value causes decrease in other mutually dependent value ✗ is called as Positive correlation. ✓
- c) Variable is a property or character of an individual under study.
- d) An additional residue found opposite to the gap in pairwise alignment is called insertion. ✓
- e) Data collected by an investigator with a specific objective is known as primary data. ✓
- f) Summary is a tentative statement that offers an answer or explanation for a problem that is tested by further investigation. ✗
- g) Qualitative variables are the descriptive variable which cannot be expressed in numbers. ✓
- h) According to Karl Pearson's coefficient r is ranged from -1 to +1. ✓

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- j) The GenBank Database is maintained by NCBI. ✓
- k) FASTA is one of three most common sequence databases. ✓
- l) Jargon is continuous use of technical words unnecessarily in manuscript. ✓
- m) A qualitative variable is also known as an attribute. ✓
- n) The organization of a poster should normally follow the IMRAD pattern. ✓
- o) Global alignment is used to find best match of both sequences in their entirety. ✓
- p) National Institutes of Health maintains PubMed as part of the Entrez information retrieval system. ✓
- q) T-test is useful in matched pair data analysis. ✓

SECTION - I

Q2) Discuss in details the basic principles, designs, the procedure and applications of ANOVA. [16]

OR

Give detailed account of measures of central tendency and skewness. [16]

Q3) Discuss in brief (ANY TWO) [16]

- a) Methods of study of correlation and its types.
- b) General procedure of hypothesis testing.
- c) Explain properties, types, rule and application of probability.

Q4) Write short notes on (ANY FOUR) [16]

- a) Applications of t-test
- b) Simple linear regression.
- c) Collection of data.
- d) Random sampling.
- e) Type I and Type II errors.
- f) Chi-square test.

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SECTION - II

Q5) Discuss in detail fundamental principles and methods of drug discovery and development. [16]

OR

Explain in detail the process of choosing appropriate journal and submitting a manuscript. [16]

Q6) Describe in brief (ANY TWO) [16]

- a) AIMRAD system.
- b) Basic principles of constructing phylogenetic trees.
- c) Legal aspects of scientific writing.

Q7) Write short notes on (ANY FOUR) [16]

- a) Data visualisation rendering tools.
- b) BLAST.
- c) Molecular modelling and simulation.
- d) Types and causes of Plagiarism.
- e) Use and misuse of words.
- f) Oral presentation in conference.

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Seat
No.

M.Sc. (Part - II) (Semester - III) (CBCS) (New Revised)
Examination, January - 2023
MICROBIOLOGY (Paper - X)
MIC-302 : Enzymology & Enzyme Technology
Sub. Code : 80531/85364

Day and Date : Saturday, 07 - 01 - 2023
Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 80

Instructions :

- 1) Total of Five questions are to be answered from the entire paper.
- 2) Question One is compulsory.
- 3) Attempt any Two questions from each section. Section-I (Q.2 to 4)
Section - II (Q.5 to 7)
- 4) Answers to all the questions are to be written in the same answer book.
- 5) Supplements will not be provided.
- 6) Figures to the right indicate full marks.

Q1) State whether the following statements are True or False. [16]

- a) Tryptophan synthase of *E. coli* is an example of oligomeric enzyme.
- b) Non competitive inhibitors bind to E-S complex only.
- c) Ligase does not require cofactor for catalytic activity.
- d) The model proposed by Koshland et al for allosterism is also called as concerted model.
- e) In intestine Chymotrypsin is modified by pepsin.
- f) Kinase transfer acetyl group from one substrate to other.
- g) Eadie Hofstee plot is known as double reciprocal plot.
- h) Ogston pointed out that there must be at least three different point of interactions between enzyme and substrate.
- i) Photooxidants are the most common pseudosubstrates used to elucidate functional groups in active site of enzymes.
- j) High levels of ALP is indicative of extrahepatic obstruction.
- k) Rectangular hyperbolic curve of enzyme substrate reaction was first demonstrated by Henri.

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- d) Specific activity of enzyme is a measure of purity of an enzyme. ✓
- m) DFP is an example of a reversible inhibitor. ✗
- n) Immobilization of enzyme to the carrier matrix by covalent bond between them is referred to as adsorption. ✗
- o) Trypsin hydrolyze peptide bond where amino acid is contributed by basic amino acid. ✓
- p) The surface charges on carrier are a cause of phenomenon called as Zulu effect. ✗

SECTION - I

Q2) Discuss in brief methods employed to identify functional groups in active sites of enzymes. [16]

OR

What is enzyme inhibition? Explain it with suitable examples and graphical representation.

Q3) Attempt (Any Two) [16]

- a) Types of specificity of enzymes. [16]
- b) Role of inorganic cofactors in enzyme activity.
- c) Hill and Adair equations for cooperativity.

Q4) Write short notes on (Any Four)

- a) Oligomeric enzymes.
- b) IUB system of nomenclature of enzyme.
- c) Significance of M-M reaction.
- d) Haldanes relationship for reversible reactions.
- e) Wilhelmy's and Browns work.
- f) Induced fit hypothesis.

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SECTION - II

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Q5) Discuss in detail applications of enzymes in medical field. [16]

OR

Explain in detail types with examples of multi-enzyme system.

Q6) Attempt (Any Two) [16]

- a) Methods used for immobilization of enzyme. [16]
- b) Enzymes as analytical tools.
- c) Detection of isoenzyme and its metabolic significance.

Q7) Write short notes on (Any Four)

- a) Industrial applications of IME. [16]
- b) Use of enzyme in conversion process.
- c) Covalent modification of enzymes.
- d) Structural aspects of pyruvate Dehydrogenase.
- e) Membrane bound enzymes.
- f) MWC model.

3CS1C-15



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Total No. of Pages : 3

M.Sc. (Part - II) (Semester - III) (Regular) (CBCS) (Revised)
Examination, November -2019

MICROBIOLOGY

MIC-301: Biostatistics, Bioinformatics and Scientific Writing

(Paper - IX)

Sub. Code : 64203

Day and Date : Thursday, 14 - 11 - 2019

Total Marks : 80

Time : 11.00 a.m. to 02.00 p.m.

- Instructions :
- 1) A total of FIVE questions are to be answered from the entire paper
 - 2) Answers to all the FIVE questions are to be written in the SAME answer book
 - 3) Question - 1 is COMPULSORY
 - 4) Attempt ANY TWO questions from Section - I (Q. 2 to Q.4) and ANY TWO questions from Section - II (Q. 5 to Q.7)
 - 5) No supplements will be provided
 - 6) Figures to the RIGHT indicate FULL MARKS

Q1) State whether following sentences are TRUE or FALSE. [16]

- a) Local Alignment is useful for comparing protein sequences that share a common motif.
- b) A sample is a subgroup of the population.
- c) The best English for scientific writing is that which gives the senses in the metaphorical words.
- d) Quantitative variable that has only fixed or finite values are called discrete variable.
- e) Correlation coefficient is a number between -1 and 0

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- f) Chi square is zero when expected frequency is lesser than the observed frequency.
- g) Standard deviation is the square of variance.
- h) A circle divided into sectors proportional to the frequency of items shown is called Bar chart.
- i) Enlarged photographs are preferable for publication in journals.
- j) High resolution photographs are preferable for publication in journals.
- k) The Nucleotide Sequence Database is maintained by NCBI.
- l) A table is constructed only when research data must be presented.
- m) A primary variable is also known as an attribute.

n) Neighbor Joining is the distance based method of building phylogenetic tree.

o) Skewness is a measure of symmetry, or more precisely, the lack of symmetry.

p) Pubmed provides access to bibliographic information in MEDLINE journals only.

SECTION - I

Q2) What is correlation? Discuss in detail types and methods of studying correlation. [16]

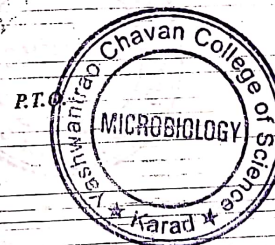
OR

What is descriptive statistics? Explain in detail different measures of it. [16]

Q3) Describe in brief (ANY TWO) [16]

- a) Methods of random sampling
- b) Collection of data
- c) Experimental design of ANOVA

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- a) Use an misuse of words in scientific writing
- b) Local and global alignment
- c) Rational drug design
- d) Use of abbreviations in scientific writing
- e) Scientific authorship
- f) BLAST

Q7) Write short notes on (ANY FOUR):

[16]

- a) Different types and examples of biological database
- b) Presenting in conference using oral and poster presentation
- c) Data visualisation

Q6) Describe in brief (ANY TWO)

[16]

Discuss in detail application of bioinformatics in modelling and simulation.

[16]

OR

Q5) Describe in detail standard structure of scientific paper

[16]

SECTION-II

- a) Type I and type II errors
- b) Student's t-test
- c) Biological applications of probability
- d) Method of hypothesis testing
- e) Estimation of population mean
- f) General procedure of hypothesis testing

Q4) Write short notes on (ANY FOUR)

[16]

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Seat No. 2975

SF-290
Total No. of Pages :3

M.Sc. (Regular) (Part - II) (Semester - III) (CBCS-R)

Examination, November - 2019

MICROBIOLOGY

MIC-303: Microbial Technology (Paper-XI)

Sub. Code :64205

Day and Date :Friday, 22-11-2019

Time : 11.00 a.m.to 02.00 p.m.

Total Marks :80

- Instructions:
- 1) Total of five questions are to be answered from the entire paper.
 - 2) Question ONE is compulsory.
 - 3) Attempt ANY TWO questions from each section. section-I (Q.2 to 4)
Section-II (Q.5 to 7)
 - 4) Answers to all the questions are to be written in the same answer book.
 - 5) Supplements will not be provided.
 - 6) Figures to the right indicate full marks.

Q1) State whether the following statements are TRUE or FALSE. [16]

- a) A sparger in Fermentor often utilizes $\frac{1}{4}$ inch holes to prevent plugging of holes for growth of mycelia forming organisms.
- b) Primary metabolites are called iodolytes.
- c) In the continuous sterilizer utilizes 1 to 5 min holding time and 120°C holding temperature for heat exchanger.
- d) L-Glutamic acid is produced by dual fermentation process.
- e) Chemostat is nutrient limited self balancing culture system.
- f) Height and diameter ratio for tower Fermentor is approximately 16:1.
- g) In the preliminary scanning cycles the logged data is compared with predefined limit values.

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- h) Trickling filter concept is applied for vinegar generator by using *Acetobacter sp.*
- i) Describing microbial process by mathematical models is an increasing interest of microbiologist and biochemical engineers today.
- j) Plate and frame filter use for recovery of Fermentor broth is batch type of filter.
- k) First category of patents is dedicated to public.
- l) Zabriskie estimated the biomass concentration by using material balance for oxygen.
- m) Citric acid is a secondary metabolite.
- n) Collection of data from different sources using computers during fermentation is called data screening.
- o) Small fermentors are used in group of 2 to 3 in laboratories for greater flexibility.
- p) Storage of cultures in refrigerators is known as cryogenic storage of cultures.

SECTION-I

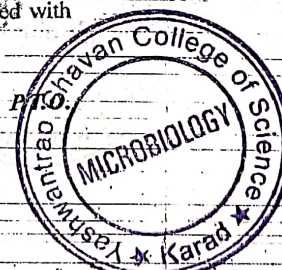
Q2) Describe the inoculum preparation and scale up in development of industrial fermentation process. [16]

OR

Explain environmental and genetic control of metabolic pathways in fermentation process. [16]

Q3) Describe in brief (Any two) [16]

- a) Sterilization of fermentation equipment
- b) Computer applications in fermentation technology
- c) Stock culture maintenance.





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[16]

Q4) Write short notes on (Any four)

- a) Fed batch Fermentor
- b) Concept of Newtonian and Non Newtonian fluids
- c) Primary screening
- d) Concepts of primary metabolites
- e) Yield coefficient
- f) Acron number and apparent viscosity

SECTION-II

Q5) What are fermentation media? Describe the types and screening of fermentation media.

[16]

OR

Explain in detail precipitation, filtration, centrifugation and ultrafiltration process use in product recovery and purification.

[16]

Q6) Describe in brief (Any two)

- a) Composition, practices and problems in patents
- b) Saccharification of cellulosic waste

Fermentation economics: Entrepreneurship and plan for fermentation industry

Q7) Write short notes on (Any four)

- a) Sources of carbon in fermentation media
- b) Market potential for product
- c) Crystallization process
- d) Utilization of cellulosic waste
- e) Whole broth processing
- f) Excise aspects of fermentations

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Total No. of Pages : 3

Seat No. 2915

M.Sc. (Regular) (Part - II) (Semester - III) (CBCS)

(Revised) Examination, November - 2019

MICROBIOLOGY

MIC - 304 : Microbial Diversity & Extremophiles (Paper - XII)

Sub. Code : 64206

Day and Date : Saturday, 23 - 11 - 2019

Total Marks : 80

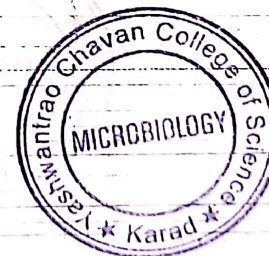
Time : 11.00 a.m. to 2.00 p.m.

- Instructions :
- 1) Total of FIVE questions are to be answered from the entire paper.
 - 2) Question ONE is compulsory.
 - 3) Attempt ANY TWO questions from each section. Section - I (Q.2 to 4)
Section - II (Q.5 to 7).
 - 4) Answers to all the questions are to be written in the same answer book.
 - 5) Supplements will not be provided.
 - 6) Figures to the right indicate full marks.

Q1) State whether the following statements are TRUE or FALSE. [16]

- a) Most of hyperthermophiles are anaerobic due to low solubility of oxygen at high temp.
- b) The largest global reservoir of hydrogen is soil.
- c) The cyanobacterial sheath may contain yellow pigment called scytonemin.
- d) *Methanospirillum* spp. are filamentous with double cell wall layer.
- e) The end products of effective bioremediation are water & CO_2 .
- f) Purple sulfur bacteria grow chemolithotrophically in dark with hydrogen as electron donor.
- g) Iron oxidizing bacteria are obligate acidophilic.
- h) In deep oil wells pressure increases with depth in earth at the average rate 0.1 atm/meter.
- i) The genus *Calothrix* belongs to family *Scytonemataceae*.
- j) ZoBell & Cobet (1974) found that some bacteria can grow as long filaments under acidic condition with sparse cross walls.

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- k) All hydrogenases have Cr as metal cofactor.
- l) In soil phenomenon of glyeing is associated with reduction iron.
- m) Magnetosomes usually consist of magnetite or ferrite.
- n) The Mol % G+C content of *Cyanobact* ranges from 65-78%.
- o) Pleomorphism is distinctive feature of barophiles.
- p) The growth of *Cyanobacteria* is stimulated by addition of 7.5 mm of Ca^{++} .

SECTION - I

Q2) Discuss in brief general characteristics of *Methanogenic* archaeobacteria. [16]

OR

Discuss in brief general characteristics of anoxygenic phototrophic green bacteria.

Q3) Attempt (ANY TWO). [16]

- a) General characteristics of halophiles.
- b) External & internal features of *Cyanobacteria*.
- c) General characters of alkalophiles.

Q4) Write short notes on (ANY FOUR). [16]

- a) Characteristics of Acidophiles.
- b) General characteristics of prochlorates.
- c) General characteristics purple nonsulfur bacteria.
- d) Genus - *Chromatium*.
- e) Characters of barophiles.
- f) Heterocysts & akinetes.





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SECTION - II

Q5) Explain mechanism of reduction of nitrate and sulfur [16]

OR

Explain in detail - Acid Rain.

Q6) Attempt (ANY TWO) [16]

- a) Microbial metabolism of xenobiotic compounds
- b) General characteristics of magnetotactic bacteria
- c) Mechanism of iron reduction.

Q7) Write short notes on (ANY FOUR) [16]

- a) Bioaccumulation & biomagnification of DDT
- b) Microbial desulfurization of organic sulfur from coal
- c) Hydrogen oxidation
- d) Mechanism of magnetosome formation
- e) Types of halocarbons
- f) Mn - reduction mechanism



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Total No. of Pages : 2

Seat No. 2975

M.Sc. (Part - II) (Semester - III) Examination, November - 2019

MICROBIOLOGY

MIC - 302 : Enzymology & Enzyme Technology (Paper - X)

Sub. Code : 64204

Day and Date : Wednesday, 20 - 11 - 2019

Total Marks : 80

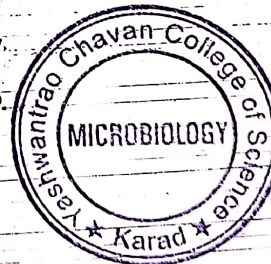
Time : 11.00 a.m. to 2.00 p.m.

- Instructions :
- 1) Total of FIVE questions are to be answered from the entire paper.
 - 2) Question ONE is compulsory.
 - 3) Attempt ANY TWO questions from each section. Section-I (Q.2 to 4)
Section-II (Q.5 to 7)
 - 4) Answers to all the questions are to be written in the same answer book.
 - 5) Supplements will not be provided.
 - 6) Figures to the right indicate full marks.

Q1) State whether the following statements are TRUE or FALSE. [16]

- a) Most of the enzymes are denatured at 45°C temperature.
- b) Organophosphorous compounds act as irreversible inhibitors
- c) Lactate dehydrogenase in vertebrates is occurred as dimer form
- d) All isomerases are required cofactor for their full catalytic activity
- e) Tetrahydrofolate is the carrier of carboxyl group
- f) The symmetry model of allosterism is also known as adair model.
- g) Beta 1,4 glucoside glucanohydrolase can also be known by its trivial name pectinase
- h) The non sequential mechanism of multi-substrate enzyme catalyzed reaction involved formation of ternary complex.
- i) Main basis for classification and nomenclature of enzyme is the chemical composition of enzyme.
- j) Iodoacetate and iodoacetamide are the substrate specific reagents.
- k) The distortion and strain catalysis is based on induced fit hypothesis.
- l) A steady state assumption for enzyme kinetics was introduced by Briggs and Haldane.
- m) Molybdenum is a metal that form all kinds of bridges in ternary complex.
- n) Lineweaver Burk plot is also called as double reciprocal plot.
- o) The Hill equation has been derived for negative homotropic cooperativity.
- p) Trypsin is genuine monomeric enzyme.

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SECTION - I

Q2) Explain in detail various types of reversible inhibitions seen in enzymes. [16]

OR

Discuss in brief types and theories of specificity of enzyme. [16]

Q3) Attempt (ANY TWO) [16]

- a) Modification of Michaelis-Menten equation
- b) Role of metal activated and metalloenzymes in enzyme action.
- c) Basic principles of enzyme classification

Q4) Write short notes on (ANY FOUR) [16]

- a) Hill equation for cooperativity
- b) Significance of irreversible inhibition.
- c) Ternary complexes.
- d) Monomeric enzymes.
- e) Ogsten's experiment
- f) Chemistry of active site.

SECTION - II

Q5) Explain in detail immobilization of enzymes [16]

OR

Discuss in brief basic concept, methods of detection, examples and metabolic significance of isoenzymes. [16]

Q6) Attempt (ANY TWO) [16]

- a) Covalent modification of enzymes.
- b) Application of enzymes in diagnosis
- c) Basic concept of allosterism and allosteric enzymes

Q7) Write short notes on (ANY FOUR) [16]

- a) Prodrug activation
- b) Arom complex
- c) Structural aspects of aspartate
- d) Catalysts in conversion process.
- e) Enzyme action in organic solvent
- f) Feedback inhibition

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Total No. of Pages : 3

M.Sc. (Part - II) (Semester - III) Examination, November - 2018

MICROBIOLOGY (Paper - XI) (CBCS-R)

Microbial Technology

Sub. Code : 64205

Day and Date : Friday, 30 - 11 - 2018

Total Marks : 80

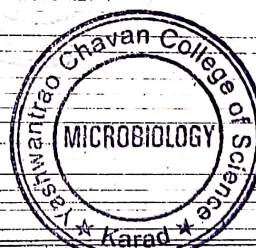
Time : 10.30 a.m. to 01.30 p.m.

- Instructions:
- 1) Total of five questions are to be answered from the entire paper.
 - 2) Question 1 is compulsory.
 - 3) Attempt any two questions from each section. Section-I (Q.2 to 4) and Section-II (Q.5 to 7).
 - 4) Answers to all the questions are to be written in the same answer book.
 - 5) Supplements will not be provided.
 - 6) Figures to the right indicate full marks.

Q1) State whether following statements are true or false. [16]

- a) Cellulosic by-products are also usable as carbon after a saccharification procedure.
- b) The crude organic antifoam agents are always added into the medium before sterilisation.
- c) Cystein is usually added in the fermentation media to maintain low redox potential.
- d) Working stock cultures must be maintained by cryogenic storage.
- e) The material of fermentor where strict aseptic conditions are required should withstand repeated sterilization cycles.
- f) Fermentation media which contain more protein or other high molecular weight peptides usually have foaming problems.
- g) Cryogenic storage of cultures is storage in liquid nitrogen.
- h) The quantity of inoculum normally used in fermentation is 10 to 60% of the medium volume.
- i) In strain improvement programmes for bacterial mutagenesis, it needs to use 0.1% UV survival doses.
- j) Information about the true potential of a microorganism for industrial usage is made available by secondary screening.

P.T.O.



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- k) Violation of the patent rights is also known as infringement.
- l) Amino acids are important constituents in fermentation media when pH is an important factor.
- m) Basket centrifuges are useful for separating bacterial masses.
- n) Height and diameter ratio for tower fermenter is approximately 16: 1.
- o) Citric acid is a secondary metabolite.
- p) "Cube root law" is used the growth of pellet in batch fermentation.

SECTION - I

Q2) a) Describe in brief environmental control of metabolic pathways. [16]

OR

b) Describe the Screening and scale up in the development of industrial fermentation processes. [16]

Q3) Describe in brief (ANY TWO) : [16]

- a) Aeration and agitation system in fermenter.
- b) Contamination problems in fermentation industry.
- c) Sterilisation of fermentation media.

Q4) Write short notes on (ANY FOUR) : [16]

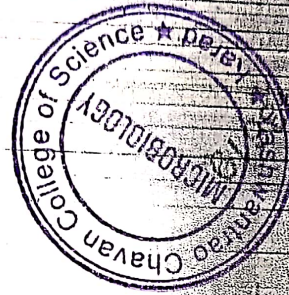
- a) Viscosity of fermentation broth
- b) Airlift fermentor
- c) Genetic control of metabolic pathways
- d) Effect of rheology on heat transfer during fermentations
- e) Concepts of secondary metabolites and their control
- f) General computer applications in fermentations

SECTION - II

Q5) a) Describe about composition, practice and problems of patents. [16]

OR

b) Describe product recovery and purification processes. [16]



-3-

- Q6) Describe in brief (ANY TWO) :
- a) Utilisation of cellulosic waste.
 - b) Precipitation and Filtration in product recovery.
 - c) Types of fermentation media.
- Q7) Write short notes on (ANY FOUR) :
- a) Entrepreneurship
 - b) Product selection process
 - c) Growth factors in fermentation media
 - d) Sterilisation of fermentation media
 - e) Antifoam agents in fermentation media
 - f) Whole broth processing

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[16]

[16]

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Total No. of Pages : 3

M.Sc. (Part - II) (Semester - III) (CBCS) Examination,

November - 2018

MICROBIOLOGY (Paper - X)

Enzymology & Enzyme Technology

Sub. Code : 64204

Day and Date : Wednesday, 28 - 11 - 2018

Total Marks : 80

Time : 10.30 a.m. to 01.30 p.m.

- Instructions:
- 1) A total of FIVE questions are to be answered from the entire paper.
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Q1) State whether the following statements are TRUE or FALSE. [16]

- a) LDH enzyme is very useful in medical diagnosis.
- b) Geometric mean is the best available estimates of K_m and V_{max} from the Eisenthal and Cornish-Bowden plot.
- c) Ping-pong bi-bi is an example of a non -sequential mechanism of ternary complex formation.
- d) Tetrahydrofolate is a carrier of amino groups.
- e) The Lineweaver-Burk plot is also known as double reciprocal plot.
- f) The graph of initial velocity of $[V_o]$ against $[S_o]$ is linear.
- g) Reaction catalyzed by lactate dehydrogenase is an example of random order mechanism.
- h) K_m is the value of S_o which gives initial velocity $= \frac{1}{2} V_{max}$
- i) Potassium can form all the kinds of bridges in ternary complexes.
- j) The model proposed by Koshland et al for allosterism is also known as the concerted model.
- k) The amino acids involved in the catalytic action in lysozyme are Glu35 and Asp52.
- l) Michaelis Menten equation is $V_{max} - V_o (S_o) / (K_m + S_o)$.

P.T.O.



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- m) The distortion and strain catalysis is based on the induced fit hypothesis.
- n) Pectinase is β 1,4 glucoside glucanohydrolase.
- o) Temporary enzyme intermediate is formed in non-sequential mechanism.
- p) The Eadie-Hofstee plot is known as a single reciprocal plot.

SECTION - I

Q2) Give a detailed specificity of enzymes. [16]

OR

Explain in brief basic concepts, kinetics and significance of enzyme inhibition.

Q3) Discuss in brief (Any Two) [16]

- a) Nomenclature of enzymes
- b) Organic cofactors in enzyme action
- c) Haldane's relationship for reversible reactions

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- a) Structure of oligomeric enzymes
- b) Basis for classification of enzyme
- c) Structure of active site
- d) Hill and Adair equations for cooperativity
- e) Kinetics of multisubstrate reactions
- f) Metal activated enzymes

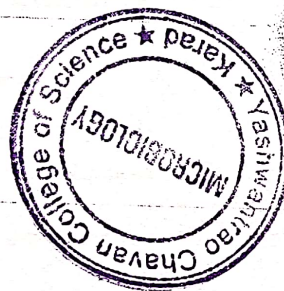
SECTION - II

Q5) Discuss in detail basic concepts, method of detection and examples of isoenzymes. [16]

OR

Describe in brief basic concepts, properties and applications immobilized enzymes.





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Q6) Describe in brief (Any Two): [16]

- a) Membrane bound enzymes in metabolic regulation
- b) Multienzyme system
- c) Covalent modification of enzymes

- a) Feed back inhibition
- b) General principles of applications of enzymes in diagnosis
- c) Enzyme replacement therapy
- d) Structural aspects of aspartate carbamoyltransferase
- e) Basic concepts of allosterism
- f) Enzymes as analytical tools

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M.Sc. (Part - II) (Semester - III) Examination, November 2018

MICROBIOLOGY (Paper - XI) (CBCS-R)

Microbial Technology

Sub. Code : 64205

SR - 274

Total No. of Pages : 3

Day and Date : Friday, 30 - 11 - 2018

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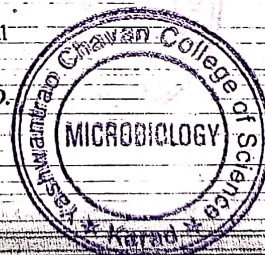
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[16]

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Total No. of Pages : 3

M.Sc. (Part - II) (Semester - III) (CBCS) Examination
November - 2018
MICROBIOLOGY (Paper - X)
Enzymology & Enzyme Technology
Sub. Code : 64204

Day and Date : Wednesday, 28 - 11 - 2018

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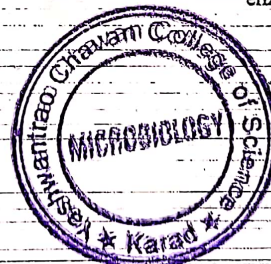
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P.T.O.



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[16]

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- d) Structural aspects of aspartate carbamoyltransferase
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[16]

