

CENTRAL UNIVERSITY OF HARYANA
Term End Examinations January 2023

Programme : M.Sc. Microbiology

Semester : III

Course Title : Biofuels and Bioenergy

Course Code : SIAS MB 1 3 06 DCEC 4004

Session: 2022-23

Max. Time: 3 Hours

Max.Marks : 70

Instructions: 1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks. 2. Question no. 2 to 5 have three parts and student are required to answer any two parts of each question. Each part carries seven marks.

Q 1. Discuss briefly

(4X3.5=14)

- a) Bioeconomy
- b) Environmental impacts of biofuel production
- c) Biogas
- d) Accessory enzymes
- e) AFEX pretreatment
- f) Factors affecting biomass hydrolysis
- g) Saccharification yield and efficiency

Q 2.

(2X7=14)

- a) Explain lignocellulosic biorefinery concept with suitable examples.
- b) Discuss various types of feedstocks used for bioenergy production with examples.
- c) Discuss general principles of the carbon cycle, greenhouse effect and global climate change in context of biofuels and bioenergy.

Q3.

(2X7=14)

- a) What are the major lignocellulosic biopolymers? Discuss their major structural properties.
- b) Write any two physico-chemical pretreatment methods in detail.
- c) Elaborate pseudolignin formation and its negative impacts on biomass conversion yield.

Q 4.

(2X7=14)

- a) Define LPMO. Discuss the functioning and necessity of LPMO in complete conversion of biomass.
- b) Discuss solid state fermentation or submerged fermentation technology for enzyme production.
- c) Discuss the concept of cellulolytic enzyme cocktails and their formulation for achieving higher saccharification yield.

Q 5.

(2X7=14)

- a) Discuss Indian National Policy on Biofuels 2018.
- b) Give a detailed account of biohydrogen production or microbial fuel cell (any one).
- c) What is LCA? Discuss LCA in the context of biofuels.

CENTRAL UNIVERSITY OF HARYANA

Term End Examinations January 2023

Programme: M.Sc. Microbiology
Semester: III
Course Title: Plant Pathology
Course Code: SIAL MB 1 3 05 DCEC 4004

Session: 2022-23
Max. Time: 3 Hours
Max. Marks: 70

Instructions:

1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks.

2. Question no. 2 to 5 have three parts and students are required to answer any two parts of each question. Each part carries seven marks.

Q 1. (4X3.5=14)

- Role of preexisting physical barriers in protecting plant's against pathogens
- Differentiate between sign and symptom
- Disease cycle of yellow rust of wheat
- Role of growth hormones in disease development
- Differentiate between PTI and ETI
- Physical methods of controlling diseases
- Role of oxidative bursts in plant defense

Q 2. (2X7=14)

- Discuss in detail about Irish Potato Famine and Great Bengal Famine including the disease cycle.
- What are the effects of pathogen attacks on host physiology?
- Write down about different animate and inanimate causes of diseases along with 2 examples of diseases for each?

Q3. (2X7=14)

- Classify diseases based on scale & severity and the number of generations with examples
- Discuss necrosis symptoms in detail.
- Discuss different events in the disease cycle with examples?

Q 4. (2X7=14)

- Define toxin. Classify toxins based on their role in pathogenesis. Give 2 examples for each type of toxin along with producing pathogen.
- Hydrolytic enzymes are the major weapon of rot-causing pathogens. Justify the statement.
- Discuss the role of PR proteins and phytoalexins in protecting plants from diseases.

Q 5. (2X7=14)

- Define biocontrol. Discuss biocontrol mechanisms of disease control by Trichoderma and its mass production.
- What are the six principles of plant disease management? Explain with examples
- Define plant disease resistance. What are different types of resistance based on the number of genes involved. Briefly describe ISR and SAR also.

CENTRAL UNIVERSITY OF HARYANA

Term End Examinations, January 2023

Programme : M.Sc. Microbiology

Semester : III

Course Title : Industrial Microbiology

Course Code : SIAS MB 1 3 03 C4004

Session: 2022-23

Max. Time: 3 Hours

Max.Marks : 70

Instructions:

1. There are total five questions in this paper. All questions are compulsory and carry 14 Marks each.
2. Question no. 1 has seven sub parts and students need to answer any four.
3. Question no. 2 to 5 have three sub parts and students need to answer any two sub parts of each question.
4. Draw diagrams wherever necessary and provide suitable examples.

Question No1.

(4X3.5=14)

- a. Differentiate between screening and enrichment of cultures.
- b. Write a note on solid state reactors.
- c. Give four examples each of primary and secondary metabolites and microbes involved.
- d. Write short note on 'SCP'.
- e. Explain scale-up and scale down process in fermentation.
- f. Write short note on 'airlift fermentor'
- g. Write a note on media sterilization in continuous fermentations.

Question No2.

(2X7=14)

- a. Discuss methods of long term preservation and maintenance of microbial cultures giving details about principles or procedures involved.
- b. Discuss role of industrial microbiologist.
- c. Differentiate between solid state and submerged fermentations.

Question No3.

(2X7=14)

- a. Discuss fermentation kinetics of fed batch and continuous fermentations giving mathematical expressions.
- b. Write a note on inoculum development for fermentation.

c. What are the various constituents of fermentation media? Write a note on various carbon and nitrogen sources used at industrial level.

Question No4.

(2X7=14)

- a. Describe in detail the steps involved in downstream processing.
- b. Explain various types of bioreactors with suitable diagrams, applications, advantages and disadvantages.
- c. Write a detail note on various components of a fermenter.

Question No5.

(2X7=14)

- a. Name the microorganism commonly used in the brewing process? What are different types of beer? Discuss beer fermentation.
- b. Give an elaborated account of fermentative production of antibiotics using suitable examples.
- c. Discuss various methods of microbial strain improvement using rDNA technology and metabolic engineering.

CENTRAL UNIVERSITY OF HARYANA

Term End Examinations January 2023

Programme: M.Sc.

Session: 2022-23

Semester: III

Max. Time: 3 Hours

Course Title: Biostatistics and Bioinformatics

Max. Marks: 70

Course Code: SIAS MB 1 3 01 C 3003

Instructions:

1. Question no. 1 has seven parts and students need to answer any four. Each part carries three and half Marks.
2. Question no. 2 to 5 have three parts and student need to answer any two parts of each question. Each part carries seven marks.

Q 1.

(4X3.5=14)

- a) Questionnaire
- b) Significance of replications in an experiment
- c) Dependent and independent variables
- d) ORF
- e) NCBI
- f) Languages used in bioinformatics
- g) NGS

Q 2.

(2X7=14)

- a) Explain the different measures of central tendency and dispersion with merit and demerits of each
- b) What do you understand by Data? What are the different methods of data collection in biological sciences?
- c) What do you understand by the term probability? Give at least two biological examples. Also explain the theory of addition and multiplication to determine the probability

Q3.

(2X7=14)

- a) What do you understand by one-way ANOVA and two-way ANOVA? Explain both with the hypothesis
- b) Which are the different statistical tests used to interpret the biological data. Explain
- c) Explain in brief (any two): Tests of Significance, Probability distribution.

Q 4.

(2X7=14)

- a) Explain the different types of databases with examples? Give examples of databases for nucleic acids and proteins
- b) Explain different applications of bioinformatics in Microbiology

c) Write brief notes on: Major milestones in Bioinformatics, Bioinformatics in drug designing.

Q 5. (2X7=14)

- a) Compare: Local alignment vs Global alignment, BLOSSUM vs PAM
- b) What are the different tools to determine the phylogeny? Describe the algorithms used, advantages and disadvantages of all
- c) Differentiate between: (i) Similarity, Identity and homology (ii) Orthologues and paralogues

CENTRAL UNIVERSITY OF HARYANA

Term End Examinations January 2023

Programme : M.Sc. Microbiology

Semester : Third

Course Title : Applied Microbiology

Course Code : SIAS MB 1 3 03 GEC 4004

Session: 2022-23

Max. Time: 3 Hours

Max.Marks : 70

Instructions: 1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks.
2. Question no. 2 to 5 have three parts and student are required to answer any two parts of each question. Each part carries seven marks.

Q 1. Discuss briefly

(4X3.5=14)

- a) Food fermentations
- b) Dairy starter cultures
- c) Physical methods of sterilization
- d) Pure culture techniques
- e) Nosocomial infection
- f) ELISA
- g) BNF and its role in N cycle

Q 2.

(2X7=14)

- a) Describe the growth phases of a bacterial culture. Explain each phase of growth
- b) Describe the structure of a bacterial cell with well labelled diagram
- c) Discuss the contribution of Louis Pasteur and Robert Koch in the field of Microbiology

Q3.

(2X7=14)

- a) What is the resident, transient and carrier state in normal flora? Name the species of natural flora present on skin, nasopharynx, small intestine and vagina.
- b) What is an antibiotic? Describe the meaning of bacteriostatic and bacteriocidal. Write the mechanism of action for penicillin, tetracyclin, chloramphenicol, erythromycin.
- c) Give two examples of common live vaccine and give two examples of killed vaccine. What is active immunity and what is passive immunity? Write a short note on Radio immuno assay.

Q 4.

(2X7=14)

- a) Define biogas. Discuss about 4 different stages during biogas production including the microorganisms involved.
- b) Discuss different types of microbial interaction with examples.
- c) Elaborate the role of microorganisms in biodegradation of cellulose, starch and lignin.

Q 5.

(2X7=14)

- a) Discuss microbial production (fermentation) of one each of dairy and non-dairy fermented foods.
- b) Discuss industrial production of any one primary metabolite.
- c) Define probiotics, prebiotics and synbiotics. Discuss health benefits of probiotics in detail.