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M.Sc. – II (Semester – IV) Examination, 2014
MICROBIOLOGY (Paper – XV)
Waste Management Technology

Day and Date : Thursday, 20-11-2014
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions:** 1) Part – I, Question 1 is **compulsory**.
2) Attempt **any four** questions from Part – II.
3) Figures to the right **full** marks.
4) Answers to the Part – I and Part – II are to be written in the **same** answer book.

PART – I

1. Rewrite the following sentences by selecting correct answer from given alternatives :

20

- i) In water tracing technique _____ tracer is used as a tracer.
a) Fluorescent dyes b) Textile dyes
c) Simple dyes d) Azo dyes
- ii) In an aerobic sludge digestion _____ gas is produced in large amount.
a) H₂S b) CO₂ c) CH₄ d) H₂
- iii) _____ a strong chemical oxidizing agent is used in determination of COD.
a) Ferrous ammonium sulfate b) K₂Cr₂O₇
c) Na₂S₂O₃ d) Starch
- iv) In industrial waste treatment _____ method is used for liquid-solid separation.
a) Sedimentation b) Trickling filter
c) U. V. Treatment d) Flocculation
- v) In _____ type of lake the balance between activity of producer organism and consumer organism is equal.
a) Eutrophic b) Mesotrophic
c) oligotrophic d) All of these



- vi) Black liquor is highly rich in _____
- a) Hemicellulose b) Cellulose
c) Lignin d) Pectin
- vii) Decreased level of oxygen in water enhances the toxicity of _____
- a) H_2S b) CO_2 c) H_2 d) CO
- viii) For efficient working of activated sludge process, the BOD : N : P ratio must be _____
- a) 100 : 5 : 1 b) 100 : 0.5 : 1
c) 100 : 5 : 0.1 d) 100 : 50 : 10
- ix) Oil and grease present in waste water are generally removed by _____ method.
- a) Activated sludge b) Trickling filter
c) Physical d) Centrifugation
- x) _____ element acts as key elements in eutrophication process.
- a) N and P b) N and K c) P and S d) N and S
- xi) The incubation time used to perform BOD test is _____ days.
- a) 20 b) 15 c) 10 d) 5
- xii) The efficiency of treatment process may be measured by the rate at which the organic chemicals are removed by _____
- a) Chemicals b) Physical agents
c) Microbes d) Polyelectrolytes
- xiii) Acceleration of biodegradation of specific compounds by inoculating bacterial cells is _____
- a) Bioaugmentation b) Biomethanation
c) Biofiltration d) Biomagnification
- xiv) Generally _____ method is used for immobilization of microbial cells to be used in waste water treatment.
- a) Capsulation b) Incapsulation
c) Entrapment d) Absorption
- xv) The zone of river before entry of waste is called _____
- a) Oligosaprobic b) Polysaprobic
c) Mesosaprobic d) None of these
- xvi) Ventriflume method is used for _____ measurement.
- a) Flow rate b) Clarification c) BOD d) TOC



- xvii) Turbidity of water or waste water is measured in _____
a) CFU b) CDU c) NTC d) NTU
- xviii) _____ gas is responsible for global warming.
a) SO₂ b) NO₂ c) CO₂ d) H₂S
- xix) The ozone gas is found on the upper surface of _____
a) Stratosphere b) Troposphere
c) Inosphere d) Echosphere
- xx) HRT is _____ time.
a) Hydraulic rotation b) Hydraulic revolution
c) Hydraulic revision d) Hydraulic retention

PART – II

2. Write about microorganisms in waste treatment with reference to source enrichment, acclimatization, isolations and mass scale production. **20**
3. Write an essay on ‘water tracing’. **20**
4. Discuss the critical operating parameters in industrial waste treatment. **20**
5. Write short answers (**any two**) : **20**
a) Characterization and treatment of paper and pulp industry waste water.
b) Eutrophication
c) Characteristics of distillery and cyanide wastes.
6. Write short notes on (**any four**) : **20**
a) BOD and COD
b) Types of industrial wastes
c) EIA
d) Treatment of textile industry waste water
e) El Nino and acid rain
f) Global warming.
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M.Sc. (Part – II) (Semester – IV) Examination, 2014
MICROBIOLOGY (Paper – XVI)
Agricultural Microbiology

Day and Date : Saturday, 22-11-2014
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 100

- Instructions:** 1) *Part – I, Q. 1 is compulsory.*
2) Attempt **any 4** questions from *Part – II.*
3) Figures to the **right** indicate **full** marks.
4) Answer to the *Part – I* and *Part – II* are to be written in **same answer booklet only.**

PART – I

1. A) Rewrite the sentences after choosing the correct answer from the given alternatives : **10**
- 1) _____ is the most common nonspore former bacterial bioinsecticide.
a) *Proteus vulgaris* b) *Pseudomonas aeruginosa*
c) *Enterobacter aerogens* d) *Serratia entomophili*
- 2) The oxidation of ammonia to nitrate is called _____
a) Denitrification b) Nitrate reduction
c) Nitrification d) Ammonification
- 3) *Bradyrhizobium japonicum* strains are most useful biofertilizers for _____
a) Soyabean b) Pea c) Bean d) Sesbania
- 4) Jensen's medium is used for the isolation of _____
a) *Azolla* b) *Cyanobacteria*
c) *Azotobacter* d) Phosphate solubilizing bacteria



- 5) Plants, algae and cyanobacteria are _____ as electron donors in photosynthetic reduction of CO₂ to carbohydrates.
- a) H₂S b) H₂O
c) Organic compounds d) Inorganic compounds
- 6) The most abundant organic materials in plants is _____
- a) Cellulose b) Hemicellulose
c) Lignin d) Pectin
- 7) _____ particles in soil have strong water holding capacity.
- a) Silt b) Clay c) Sand d) Loam
- 8) Red colour of the soil is due the presence of _____
- a) Hydrated iron oxide
b) Unhydrated iron oxide
c) Carbonates
d) Iron sulphides and manganese oxides
- 9) *Bacillus thuringiensis* is primarily pathogen of insect larvae of the orders _____
- a) Lepidoptera
b) Diptera
c) Coleoptera
d) Lepidoptera, Diptera and Coleoptera
- 10) The conversion of molecular nitrogen to ammonia is known as _____
- a) Nitrogen fixation b) Nitrification
c) Ammonification d) Denitrification

B) Answer the following questions :

10

- 1) Define the term 'Green manure'.
- 2) Give the types of earthworms used in vermicomposting.
- 3) Define 'rhizosphere' and 'phyllosphere'.
- 4) List the carrier media used for bacterial biofertilizers.
- 5) Define 'Mycorrhiza'.



PART – II

2. Explain types of compost and describe methods of composting with merits and demerits. 20
 3. Describe in detail the large scale production of bacterial biofertilizers using Azotobacter and Rhizobium species. 20
 4. Give the detailed account of nitrogen cycle and its significance in the soil environment. 20
 5. Attempt **any two** of the following : 20
 - a) Explain the techniques of applications of plant tissue culture.
 - b) Discuss the role of antibiotics and siderophores in the biocontrol of plant pathogenes.
 - c) Describe various types of soil microorganisms and their significance.
 6. Write short notes on **any four** of the following : 20
 - a) Biological properties of soil
 - b) Phyllosphere and microorganisms
 - c) Future prospectus of biofertilizer technology
 - d) NPV as a biofertilizer
 - e) Genetically modified crop plants
 - f) Green manure.
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M.Sc. (Part – I) (Semester – I) Examination, 2014
MICROBIOLOGY (Paper – I)
Cytology and Taxonomy of Microorganisms

Day and Date : Friday, 14-11-2014
Time : 11.00 a.m.to 2.00 p.m.

Max. Marks : 70

- N. B. :** 1) *Part – I question 1 is **compulsory**.*
2) *Attempt **any four** questions from Part – II.*
3) *Figures to the **right** indicate **full** marks.*
4) *Answer to the **two** parts should be written in the **same** answer book.*

PART – I

1. Rewrite the following sentences by selecting the correct answer from given alternatives. (14 Multiple choice questions)

14

- I) Lichens are _____
a) poikilohydric
b) capable of surviving extremely low levels of water content
c) mycobiont
d) all of the above
- II) Which of the following is not a genera of actinomycetes ?
a) Catenuloplanes b) Dactylosporangium
c) Zygomycetes d) Kineospora
- III) Rickettsiae, which include the spotted fevers, Q fever, typhus and scrub typhus are _____
a) Obligate intracellular parasites
b) Stable outside the host cell
c) Easily stained (Gram-negative) with a Gram stain
d) Maintained in nature with humans as the mammalian reservoir



- IV) In a dendogram, organisms with great similarity are grouped together and separated from dissimilar organisms; such groups are called as _____
 - a) Dendons
 - b) Phenoms
 - c) Phenons
 - d) Both b) and c)
- V) The Jaccard's coefficient is calculated by which of the following formulae ?
 - a) $(a + d)/(a + b + c + d)$
 - b) $a/(a + b + c)$
 - c) $(b + c)/(a + b + c + d)$
 - d) none of these
- VI) Ectomycorrhizas consist of _____
 - a) hyphal sheath
 - b) mantle
 - c) covering the root tip
 - d) all of these
- VII) One of the first studied strains of a species which is often more fully characterized than other strains is called as _____
 - a) Morphovar
 - b) Type strain
 - c) Type species
 - d) Both b) and c)
- VIII) Analysis of the end products of metabolism is valuable in the classification of _____
 - a) Anaerobes
 - b) Aerobes
 - c) Both a) and b)
 - d) None of these
- IX) On what does the classification of peptidoglycan depend ?
 - a) Position of cross – link
 - b) Type of peptide bridge
 - c) Amino acid at position 3
 - d) All of these
- X) _____ developed the binomial system of nomenclature.
 - a) Robert Hooke
 - b) Carolus Linnaeus
 - c) Carl Woese
 - d) Gregor Mendel
- XI) The genus *Bacillus* was coined in 1835 by _____
 - a) Christian Gottfried Ehrenberg
 - b) Carl Woese
 - c) Ferdinand Cohn
 - d) None of these
- XII) Algae are _____
 - a) typically autotrophic organisms
 - b) unicellular
 - c) multicellular
 - d) all of these



XIII) *Azotobacteris* _____

- a) aerobic
- b) free-living soil microbes
- c) aerobic and anaerobic
- d) both a) and b)

XIV) Lichens cannot reproduce _____

- a) asexually
- b) vegetative reproduction
- c) through the dispersal of diasporas
- d) sexually

PART –II

Attempt **any four** questions :

- 2. Describe in details cell division, cell cycle and differential characteristics of *Candida*. 14
 - 3. Write in details general characteristics of Rickettsias. 14
 - 4. Write in details general characteristics of Lichen. 14
 - 5. Give a detail account of general characteristics and classification of Actinomycetes. 14
 - 6. Write short answers (**any two**) : 14
 - a) Reproduction in algae
 - b) Structure of Cyanobacteria
 - c) Differential characteristics of Aurebasidium.
 - 7. Write short answers (**any two**) : 14
 - a) Fungal spores
 - b) General characteristics of mycoplasma
 - c) Chemotaxonomy.
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**M.Sc. (Part – I) (Semester – I) Examination, 2014
MICROBIOLOGY (Paper – II)
Microbiological Techniques and Scientific Writing**

Day and Date : Monday, 17-11-2014
Time : 11.00 a.m. to 2.00 p.m.

Max. Marks : 70

- N. B. :** 1) Part – I question 1 is **compulsory**.
2) Attempt **any four** questions from Part – II.
3) Figures to the **right** indicates **full** marks.
4) Answer to the **two** Parts should be written in the **same** answer book.

PART – I

1. Rewrite the following sentences by selecting the correct answer from given alternatives :

14

- i) TEM has a magnifying power of upto _____
a) 1000x b) 2000x c) 200000x d) 1000000x
- ii) The scientific paper is written in _____ format.
a) IMDAR b) IMRAD
c) RADIM d) MIRAD
- iii) Acridine dyes are used for the location of _____
a) Amino acids b) Lipoproteins
c) Hydrocarbons d) Nucleic acids
- iv) Caesium chloride is used as a gradient exclusively for the separation of _____
a) DNA and RNA b) Proteins
c) Cell organelles d) Enzymes
- v) The Svedberg unit is used to express _____ of particle.
a) Relative centrifugal field b) Sedimentation coefficient
c) Particle density d) Medium density

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- vi) Pulse field gel electrophoresis is used to separate _____
- a) Immunoglobulins
 - b) Large DNA molecules
 - c) Lipids
 - d) Small DNA molecules
- vii) In TLC, the activation of plates is carried out at _____ °C.
- a) 200
 - b) 110
 - c) 90
 - d) 50
- viii) The most commonly used detector in GLC is the _____
- a) Electron capture
 - b) Variable wavelength
 - c) Flame ionization
 - d) Nitrogen phosphorous
- ix) Ligands are used in _____
- a) HPLC
 - b) GLC
 - c) Ion exchange chromatography
 - d) Affinity chromatography
- x) An abstract of research paper should not exceed _____ words.
- a) 500
 - b) 250
 - c) 150
 - d) 50
- xi) _____ is used to separate large DNA molecules.
- a) PFGE
 - b) Agarose gel electrophoresis
 - c) PAGE
 - d) PAGE-SDS electrophoresis
- xii) Lipids are located by _____
- a) Rhodamine-B
 - b) Ninhydrin
 - c) Orange-T
 - d) Acridine dyes
- xiii) _____ is a brief summary of the information in a research document.
- a) Review
 - b) Abstract
 - c) Methodology
 - d) Conclusion
- xiv) The relative centrifugal force is determined by the formula _____
- a) $(1.118 \times 10^{-5})^2 (\text{rpm})^2 (r)$
 - b) $(1.118 \times 10^{-5}) (\text{rpm}) (r)^2$
 - c) $(1.118 \times 10^{-5})^2 (\text{rpm}) (r)$
 - d) $(1.118 \times 10^{-5}) (\text{rpm})^2 (r)^2$



PART – II

Attempt **any four** questions :

2. Discuss in detail the account of Good Manufacturing Practices (CGMP) and Goo Laboratory Practices. **14**
 3. Describe principle and method of agarose gel electrophoresis of nucleic acids. **14**
 4. Explain in detail principles and methods of enrichment and isolation of bacteria and fungi. **14**
 5. Explain principle, materials and applications of molecular exclusion chromatography. **14**
 6. Write short notes on (**any two**) : **14**
 - a) Mechanism of ion exchange chromatography
 - b) Basic concept of scientific writing
 - c) Documentation – its importance and significance.
 7. Write short answers (**any two**) : **14**
 - a) Explain guidelines of writing a research paper.
 - b) Discuss how to write a project report.
 - c) Explain principal and application of nanofiltration.
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**M.Sc. – I (Semester – I) Examination, 2014
MICROBIOLOGY (Paper – III)
Recent Trends in Virology**

Day and Date : Wednesday, 19-11-2014
Time : 11.00 a.m. to 2.00 p.m.

Max. Marks : 70

- N.B. :** 1) *Part – I is compulsory.*
2) *Attempt **any four** questions from Part–II.*
3) *Part – I and Part – II should be written in **same**.*
4) *Draw well labelled diagram **whenever** necessary.*

PART – I

1. A) Rewrite the sentences by choosing correct alternative from the following : **7**
- 1) Reverse transcriptase-PCR is used in diagnosis of all except
 - a) Rota virus
 - b) Coxsackie B virus
 - c) Influenza virus
 - d) Adenovirus
 - 2) Rabies virus is _____ shaped virus.
 - a) Sphere
 - b) Rectangle
 - c) Spiral
 - d) Bullet
 - 3) Which of the following is false about SARS ?
 - a) It is caused by coronavirus
 - b) It spreads by droplets or aerosols of respiratory secretion
 - c) It caused an epidemic in India
 - d) Reverse transcriptase-PCR is used in diagnosis.
 - 4) Influenza virus multiply in _____
 - a) Cytoplasm
 - b) Nucleus
 - c) Mitochondria
 - d) Ribosome
 - 5) In prions proteins are coded by _____ gene.
 - a) Pre
 - b) Prp
 - c) PRR
 - d) Pro



- 6) The example of dsRNA plant virus is _____
- a) Nepovirus
 - b) Wound tumorvirus
 - c) Bromovirus
 - d) Comovirus
- 7) In λ phage _____ operon is makes the decision about lysis or lysogeny.
- a) Left
 - b) Right
 - c) Immunity
 - d) Lac

B) Define the following :

- a) Eclipse period
- b) Prions
- c) Benign warts
- d) Viral vaccine
- e) Phage immunity
- f) Capsomer
- g) Envelope.

7

PART – II

Attempt **any four** questions :

- 2. Write an essay on role of RNA and DNA viruses in oncogenesis. **14**
- 3. What are interferons ? Describe their mode of action and clinical use. **14**
- 4. Describe the structure, pathogenicity and laboratory diagnosis of human immunodeficiency virus. **14**
- 5. Write in brief : **14**
 - a) Cultivation of animal viruses.
 - b) Describe in detail post transcriptional changes in DNA and RNA animal viruses.
- 6. Write short answers on **any two** of the following : **14**
 - a) Draw a labeled diagram of influenza virus and add a note on its antigenic variations.
 - b) Lysogeny.
 - c) Laboratory diagnosis of adenovirus.
- 7. Write short notes on **(any two)** : **14**
 - a) Horizontal and vertical transmission in animal viruses
 - b) Viral taxonomy
 - c) Laboratory diagnosis of hepatitis B virus.



- 9) _____ is known as cyanocobalamin.
 a) Vit. B₁ b) Vit. B₁₂ c) Vit. B₆ d) Vit. B₂
- 10) _____ is fat soluble vitamin.
 a) Vit. A b) Vit. B₁ c) Vit. C d) Vit. B₁₂
- 11) Rickets is caused due to deficiency of _____
 a) Vit. B b) Vit. A c) Vit. D d) Vit. C
- 12) Secondary structure of protein do not contain _____
 a) turns b) α -helix
 c) β sheet d) disulphide bridges
- 13) The amino acid containing additional COOH group in the side chain are _____
 a) Basic b) Neutral c) Acidic d) All of above
- 14) Emulsification is property of _____
 a) Proteins b) Fats
 c) Carbohydrates d) Amino acids

PART – II

2. What is kinetics write in detail on Briggs and Halden modification. **14**
3. Write an essay on basic concept of active site. **14**
4. Write on types of lipids and their structural aspects. **14**
5. Write an essay on classification and structural features of amino acids. **14**
6. Write short answers **any two** out of three : **14**
 a) Explain acid base catalysis in detail.
 b) Lock and key hypothesis and induced fit hypothesis.
 c) Specification if enzymes.
7. Write short answers **any two** out of three : **14**
 a) Ramchandran plot
 b) Isoenzymes and their role
 c) Fat soluble vitamins.
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M.Sc. (Semester – III) Examination, 2014
MICROBIOLOGY
Paper – IX : Molecular Biology and Genetic Engineering

Day and Date : Friday, 14-11-2014
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions:** 1) Part – I, Question 1 is compulsory.
2) Attempt **any four (4)** questions from Part– II.
3) Figures to the **right** indicate **full** marks.
4) Answers to Part – I and Part – II are to be written in **same** answer book.

PART – I

1. A) Rewrite the sentences after choosing correct answer from the given alternatives : 7
- 1) In pBR 322, promoters P₁ and P₃ are for the _____ gene.
a) Ampicillin resistance b) Penicillin resistance
c) Tetracycline resistance d) Beta-lactamase
 - 2) By using _____ Cohen demonstrated that a gene from a frog could be transferred into bacterial cells and then expressed by the bacterial cells.
a) pBR 322 b) pSC 101 c) pUC 18 d) Ti
 - 3) COS sequences are _____ base pairs long.
a) \sim 100 b) \sim 150 c) \sim 200 d) \sim 225
 - 4) _____ occurs when the fitness of particular alleles are unequal, hence it always exerts a load.
a) Selectional load b) Mutational load
c) Genetic load d) None
 - 5) _____ can be used to build genomic libraries.
a) Cosmids b) Phagemids c) Phasmid d) None



- 6) The concept of genetic load was first independently formulated, named by _____
 a) JBS Haldane b) H. J. Muller c) Both a) and c) d) None
- 7) In 1973, _____ reported the sequence of 24 base pairs using a method known as Wandering-spot analysis.
 a) Allan Maxam and Walter Gilbert b) Fredrick Sanger
 c) JBS Haldane d) H. J. Muller
- B) Answer the questions or define the following : 7
- a) Phagemid
 b) Ti Plasmid
 c) PUC 19
 d) Vectors
 e) Genetic load
 f) M13 Bacteriophage
 g) Genetic Engineering.

PART – II

Attempt **any four** questions from the following :

2. Explain in detail general strategy of gene cloning. 14
3. Take a detail account of bacterial mutations. 14
4. Explain in detail molecular biology of oncogenesis. 14
5. Write short answer on **any two** of the following : 14
- a) Discuss the process of transduction in prokaryotes.
 b) Briefly describe methods used for DNA sequencing.
 c) Explain in brief application restriction endonucleases in R DNA technology.
6. Write short notes on **any two** of the following : 14
- a) PCR amplification
 b) 'Randomized Mutant Libraries'
 c) Legal aspects in genetic engineering.
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M.Sc. – II (Semester – III) Examination, 2014
MICROBIOLOGY
Health Care and Diagnostic Microbiology (Paper – X)

Day and Date : Monday, 17-11-2014
Time : 3.00 p.m. to 6.00 p.m.

Max.Marks : 70

- Instructions:** 1) Part – I, Question 1 is **compulsory**.
2) Attempt **any four (4)** questions from Part – II.
3) Figures to **right** indicate **full marks**.
4) Answers to Part – I and Part – II are to be written in **same answer booklet only**.

PART – I

1. Rewrite the sentences after choosing correct answer from the given alternatives :14

- i) Extracellular bacterial proteins are responsible for _____
a) Invasion
b) Colonization
c) Adhesion
d) None of these
- ii) _____ is the inhibitors of protein synthesis.
a) Polymixin
b) Erythromycin
c) Acridines
d) Vancomycin
- iii) Beta lactams ring is present in _____ antibiotic.
a) Vancomycin
b) Chloramphenicol
c) Penicillin
d) Tetracycline
- iv) In ELISA test mostly _____ is used.
a) Horse raddish perodixase
b) Alkaline phosphatase
c) Lipase
d) Urease
- v) _____ toxin is plasmid encoded.
a) Tetanus
b) Diphtheria
c) Endotoxin
d) Cholera

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- vi) Streptococci produces _____ as invasion substance that degrade hyaluronic acid of connective tissue.
- a) Coligenase
 - b) Kinases
 - c) Leucocidin
 - d) Hyluronidase
- vii) Entry of pathogen in the body is called _____
- a) Colonization
 - b) Disease
 - c) Toxogenesis
 - d) Infection
- viii) Degree of pathogenicity is called _____
- a) Virulence
 - b) Invasiveness
 - c) Toxigenesis
 - d) None of these
- ix) Toxoids are produced by _____
- a) Endotoxins
 - b) Exotoxins
 - c) Lipopolysaccharide
 - d) All of these
- x) Which of the following antibiotic is NOT used as food preservative ?
- a) Pimaricin
 - b) Tyrocin
 - c) Nisin
 - d) Beta-lactam antibiotic
- xi) Which of the following synthesis/function is affected by Streptomycin and tetracycline antibiotic ?
- a) Protein synthesis
 - b) DNA function
 - c) Cell wall synthesis
 - d) Cell membrane function
- xii) Rickettsiae causes _____ disease.
- a) Leprosy
 - b) Plaque
 - c) Brucellosis
 - d) Rocky mountain spotted fever
- xiii) Which of the following antibiotic/drug may show plasmid mediated resistance ?
- a) Nalidixic acid
 - b) Rifamycin
 - c) Ampicillin
 - d) Methicillin
- xiv) The ability of organisms to invade tissues of body are called _____
- a) Toxigenesis
 - b) Colonization
 - c) Invasiveness
 - d) None of these



PART – II

Attempt **any four (4)** questions :

2. Write in detail on “Mechanism of action of Trimethoprim and sulphonamide drugs”. **14**
 3. Write in detail on “Adhesion, invasion, and colonization of host tissues by bacterial pathogens”. **14**
 4. Write essay on “Mechanisms of action of cholera and diphtheria toxin produced by bacteria”. **14**
 5. Write in short on **any two** of the following : **14**
 - a) Mechanism of antibiotic resistance.
 - b) Endotoxins of gram negative bacteria.
 - c) Antibiotic sensitivity testing.
 6. Write short notes on **any two** of the following : **14**
 - a) ELISA test used for diagnosis of diseases.
 - b) Use of polymerase chain reaction PCR.
 - c) Use of antigen antibody reaction for diagnosis of diseases.
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M.Sc. – II (Semester – III) Examination, 2014
MICROBIOLOGY

Paper – XI : Bioprocess Technology and Fermentation Technology

Day and Date : Wednesday, 19-11-2014

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :** 1) Part – I, Q. 1 is **compulsory**.
2) Attempt **any four** questions from Part – II.
3) Figures to the **right** indicates **full** marks.
4) Answers to the **two** Parts should be written in the **same** answer book.*

PART – I

1. Rewrite the following sentences by selecting correct answers from given alternatives :

14

- i) Streptomyces griseus is used for production of _____
 - a) Vit B₁₂
 - b) Amylase
 - c) Lysine
 - d) Streptomycin

- ii) The capacity of industrial fermentor is _____ litre.
 - a) 1 – 5
 - b) 25 – 50
 - c) 100 – 200
 - d) 5,000 – 10,000

- iii) Dextran is used for treatment of _____
 - a) Anaemia
 - b) Jaundice
 - c) TB
 - d) Swine flue

- iv) For production of brandy temperature should be kept below _____ °C.
 - a) 0
 - b) – 10
 - c) 24
 - d) 45



- v) Water coils around the fermentor are for regulating _____
a) Humidity b) Temperature
c) pH d) Oxygen
- vi) Waste from starch industry is called _____
a) Whey b) CSL
c) SWL d) Molasses
- vii) Quality assurance of product should be given by _____
a) Consumer b) Dealer
c) Manufacturer d) Transporter
- viii) Pyrogenicity testing is carried on _____
a) Rabbit b) Cat
c) Mice d) Guinea pig
- ix) Indicator pate technique is used for primary screening of _____
a) Vit B₁₂ b) Lysine c) Amylase d) Organic acids
- x) Generally _____ % inoculum is added in fermentor during fermentation.
a) 0 – 1 b) 2 – 5 c) 10 – 20 d) 30 – 40
- xi) Biomass from fermented mash is separated by _____
a) Drying b) Crystallization
c) Filtration d) Precipitation
- xii) Lyophilization is used for culture _____
a) Maintenance b) Growth
c) Sterilization d) Improvement
- xiii) Genetic recombination is used for strain _____
a) Maintenance b) Growth
c) Sterilization d) Improvement
- xiv) _____ is biproduct during streptomycin fermentation.
a) Lysine b) Vit B₁₂
c) Amylase d) Fusel oil



PART – II

Attempt **any four** questions :

2. Describe in detail streptomycin fermentation. **14**
 3. Write an essay on “Fermentation media”. **14**
 4. Describe in detail design and operation of bioreactor. **14**
 5. Describe in brief **any two** : **14**
 - i) Quality control in fermentation industry
 - ii) Intellectual property rights
 - iii) Mushroom production.
 6. Write short notes on **any two** : **14**
 - i) Screening techniques and strain improvement.
 - ii) Automation in fermentation industry.
 - iii) Control of metabolic path ways.
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Seat No.	
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M.Sc. – II (Semester – III) Examination, 2014
MICROBIOLOGY (Paper – XII)
Food and Dairy Microbiology

Day and Date : Friday, 21-11-2014

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :** I) *Part – I, Question 1 is compulsory.*
II) *Attempt **any four** questions from Part – II.*
III) *Figures to the **right** indicate **full** marks.*
IV) *Answers to the **two** Parts should be written in the **same** answer book.*

PART – I

1. Rewrite the following sentences by selecting the correct answer from given alternatives :

14

- i) Slime production in milk is caused by _____
a) Lactic streptococci b) Leuconostoc
c) Lactobacilli d) Coxiella
- ii) The fruity aroma of milk produced by pseudomonas fragi is due to the production of _____
a) Esters b) Dimethyl sulphide
c) Indole d) Trimethyl amine
- iii) Penicillium rogneforti is member of starter used for _____ type of cheese manufacturing.
a) Swiss b) Blue c) Cheddar d) Cottage
- iv) A flatoxicosis is caused by _____
a) Aspergillus flavus b) Streptococcus pyogenes
c) Brucella abortus d) Salmonella enteritidis
- v) Streptococcus agalactiae is associated with _____
a) Scarlet fever b) Sore throat
c) Listeriosis d) Mastitis



- vi) _____ have been known to be the most common contaminants in dahi.
- a) Yeast
 - b) Penicillium
 - c) Coliforms
 - d) Lactobacilli
- vii) Faecal coliforms in dairy products are detected by _____ test.
- a) Catalase
 - b) Widal
 - c) Oxidase
 - d) Eijkman
- viii) _____ is a popular hard-pressed cheese variety which is ripened for 3 to 12 months.
- a) Cheddar
 - b) Blue
 - c) Cottage
 - d) Brick
- ix) The commonly occurring pathogen in ice-cream and related product is _____
- a) Shigella
 - b) Salmonella
 - c) Rickettsia
 - d) Protens
- x) Minimum temperature for freezing of ice-cream is _____ of.
- a) 25
 - b) 37
 - c) 21
 - d) 55
- xi) _____ is the acid alcohol fermented milk product.
- a) Kefir
 - b) Yoghurt
 - c) Srikhand
 - d) Bulgarian sour milk
- xii) The alcohol content in Kumiss ranges from _____ %.
- a) 9 to 10
 - b) 1 to 2
 - c) 7 to 9
 - d) 3 to 5
- xiii) The total solid content in the concentrated yoghurt is approximately _____ %.
- a) 42
 - b) 24
 - c) 2
 - d) 4
- xiv) Milk minus _____ is called milk plasma.
- a) Fat globules
 - b) Calcium
 - c) Water
 - d) Lactose



PART – II

Attempt **any four** questions :

2. Write an essay on spoilage of foods. **14**
 3. What is food preservation ? Explain canning of foods. **14**
 4. Describe production and defects in cheese. **14**
 5. Describe in brief (**any two**) : **14**
 - a) Food as a substrate for microorganisms.
 - b) Food preservation by chemical preservatives.
 - c) Food adulteration and contamination of foods with harmful microorganisms.
 6. Write short notes on (**any two**) : **14**
 - a) BIS quality system certification
 - b) Yoghurt
 - c) Prevention and control of milk born diseases.
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**M.Sc. (Semester – IV) Examination, 2014
MICROBIOLOGY (Paper – XIII)
Immunology and Immuno-Technology**

Day and Date : Saturday, 15-11-2014
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions:** 1) Part – I question 1 is **compulsory**.
2) Attempt **any four (4)** questions from Part – II.
3) Figures to **right** indicate **full** marks.
4) Answers to Part – I and Part – II are to be written in **same answer booklet only**.

PART – I

1. Write the sentence after choosing correct answer from the given alternatives : **20**
- i) In an autoimmune disease pernicious anaemia, antibodies are produced against _____
a) Folic acid
b) Vitamin-B12
c) Intrinsic factor
d) All of these
- ii) Immunity mediated by T-lymphocytes is known as _____ immunity.
a) Cell mediated
b) Humoral
c) Natural passive
d) Artificially passive
- iii) Treatment of autoimmunity includes _____
a) Immunosuppressive drug
b) Anti-inflammatory drugs
c) All of these
d) None of these
- iv) _____ antibody has maximum molecular weight and called Macroglobulin.
a) IgM
b) IgE
c) IgD
d) IgG



- v) Complement is present in large amount in _____ animal.
- a) Mice
 - b) Monkey
 - c) Guinea pig
 - d) Human being
- vi) IgG antibody is produced by _____ cells.
- a) Mast
 - b) T
 - c) B
 - d) Microphage
- vii) Atopy is an example of _____ hypersensitive reaction.
- a) Type-I
 - b) Type-II
 - c) Type-III
 - d) Type-IV
- viii) Activated B lymphocytes after antigenic stimuli get differentiated into _____
- a) NK cells
 - b) CD₄ cells
 - c) T cells
 - d) Memory cells
- ix) The MHC is a collection of genes located on Chromosome No. _____ in human.
- a) 15
 - b) 17
 - c) 6
 - d) None of these
- x) The process of opsonisation is done by _____
- a) Heat stable opsonins
 - b) Heat labile opsonins
 - c) Both a) and b)
 - d) None of these
- xi) _____ may not be treated with insulin.
- a) Autoimmune diabetes
 - b) Graves disease
 - c) Normal diabetes
 - d) None of these
- xii) Humoral immunity protects the body from _____ pathogenic agents.
- a) Intracellular
 - b) Extracellular
 - c) Both a) and b)
 - d) None of these



- xiii) Cancer cells are different from normal cells by _____
- a) They carry on reproducing and do not die if they move to another part of body
 - b) They do not obey signals from neighbouring cells
 - c) They do not stick together and do not become specialized but stay immature
 - d) All of these
- xiv) Cytokines produced by virally infected cells are called _____
- a) Interferons
 - b) Chemokines
 - c) Interleukins
 - d) IL-12
- xv) _____ is a secondary lymphoid organ.
- a) MALT
 - b) Lymph node
 - c) Spleen
 - d) All of these
- xvi) The ability of an antigen to induce an immune response is referred to as _____
- a) Immunogenicity
 - b) Immunogen
 - c) Antigenic determinants
 - d) Immunologic specificity
- xvii) _____ mast cells and basophils responsible for production.
- a) Amino acid
 - b) Ketones
 - c) Allergen
 - d) Histamine
- xviii) T-suppressor cells carry _____ molecules as its specific marker.
- a) CD₄
 - b) CD₈
 - c) CD₉
 - d) CD₁₃
- xix) Autoantibodies against acetyl-choline receptors are produced in _____
- a) Rheumatoid arthritis
 - b) Myasthenia gravis
 - c) Goodpasture's syndrome
 - d) Pernicious anaemia
- xx) Bacteria, neoplastic cells and virus infected cells are destroyed by _____
- a) T-lymphocyte
 - b) B-lymphocyte
 - c) Phagocytes
 - d) NK cells



PART – II

2. Write in detail on “Theories of origin of autoimmunity”. **20**
3. Write in detail on “Human Lymphocyte Antigens (HLA) typing and its significance”. **20**
4. Write essay on “Functions of Cytokines in : **20**
- a) Growth and differentiation
 - b) Immune response
 - c) Wound healing
 - d) Chemotaxis and
 - e) Inflammation process.
5. Write in short on **any two** of the following : **20**
- a) Prostate Specific Antigen (PSA)
 - b) T cell deficiency disorders
 - c) Cells of immune response.
6. Write short notes on **any four (4)** of the following : **20**
- a) T-cell receptors
 - b) Basis of antibody diversity
 - c) Characteristics of cancer cells
 - d) H₂ and HLA complex
 - e) Innate immunity
 - f) Role of tumour markers.
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M.Sc. – II (Semester – IV) Examination, 2014
MICROBIOLOGY (Paper – XIV)
Bioinformatics and Biometry

Day and Date : Tuesday, 18-11-2014

Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :** 1) *Part – I, Question 1 is compulsory.*
2) *Attempt **any four** questions from Part – II.*
3) *Figures to **right** indicate **full** marks.*
4) *Answers to Part – I and Part – II are to be written in **same** answer booklet only.*

PART – I

1. Rewrite the sentences after choosing correct answer from the given alternatives : **20**

- i) All are sequence alignment tools except _____
a) RASMOL b) BLAST
c) FASTA d) Clustal W
- ii) The alignment method suitable for finding out conserved patterns in DNA or protein sequences is _____
a) Multiple sequence alignment b) Pair wise alignment
c) Global alignment d) Local alignment
- iii) The procedure of aligning two sequences by searching for patterns that is in the same order in the sequences.
a) Sequence alignment b) Pair wise alignment
c) Multiple sequence alignment d) All of these
- iv) All the following are protein sequence databases EXCEPT _____
a) PIR b) PSD
c) SWISS PROT d) EMBL
- v) Submission to GenBank are made using _____
a) Bankit and Sequin b) Bankit and Bankin
c) Sequin and Bankin d) Entrez



- vi) Which of the following is an E.coli model organism database ?
- a) EcoGene
 - b) EcoBase
 - c) EcoSeq
 - d) ColGene
- vii) Literature databases include _____
- a) MEDLINE and PubMed
 - b) MEDLINE and PDB
 - c) PubMed and PDB
 - d) MEDLINE and PDS
- viii) DNA microarrays allow detection of Gene mutations using
- a) Polymerase Chain Reaction
 - b) Cloning
 - c) Southern Blotting
 - d) Hybridization
- ix) Which of these would not be a valid reason that use of microarray technology to differentiate between closely related bacterial species and subspecies is important ?
- a) Certain strains of bacteria are more pathogenic than other related strains
 - b) Some strains of bacteria are more active in bioremediation than other related strains
 - c) Infection by different strains of bacteria may require different therapeutic approaches
 - d) In many cases, critical information about characteristics of a bacterium causing an infection needs to be immediately available
- x) The DNA microarrays technology that indicates which genes are transcribed is called _____
- a) DNA variation screening
 - b) Gene expression profiling
 - c) Microarray comparative genomic hybridization
 - d) Antisense
- xi) Which of the following value is not a possible value of probability ?
- a) 0.1
 - b) 25/100
 - c) 1
 - d) 100/25
- xii) Which measure of central tendency is least affected by extreme values ?
- a) Mean
 - b) Mode
 - c) H.M.
 - d) Median



PART – II

Answer **any four** of Part – II :

2. Write an essay on “Use of Bioinformatics in major research areas”. 20
 3. Write an essay on : DNA microarray. 20
 4. Give an account of : Open access bibliographic resources and literature databases special reference to PUBMED. 20
 5. Write short answer of **any two** from the following : 20
 - a) Metagenomics
 - b) Application of genomics
 - c) Application of biostatistics.
 6. Write short notes on (**any four**) : 20
 - a) Hypothesis testing
 - b) Mean and Mode
 - c) Analysis of variance
 - d) EMBL
 - e) Phylogeny
 - f) Applications of protein microarrays.
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