NORTH MAHARASHTRA UNIVERSITY

JALGAON

QUESTION - BANK

S.Y.B.Sc. MICROBIOLOGY
(FIRST SEMESTER)

W.e.f. 2008-2009

Question Bank
MB 211-- General and Environmental Microbiology

Q1 Multiple Choice Questions.

1) The compound microscope consists of two lenses known as----------
   a) Objective & Eyepiece. b) Objective & Condenser.
   c) Eyepiece & Occular. c) None.

2) In---------Microscopy the object appears dark & the microscopic field is brightly illuminated.
   a) Dark field. b) Bright field.
   c) Both. c) None.

3) ----------of the following is/are the fluorochrome.
   a) Rose Bengal. b) Acridine orange.
   c) Both. c) None.

4) In Phase contrast microscopy the special optical system makes it possible to distinguish cells which are differ slightly in their--------
   a) Size. b) Diameter.
   c) Refractive index. c) Length.

5) The first phase contrast microscope was developed by----------in 1933.
   a) Hans Janssen. b) Zacharias.
   b) Fredrick Zernike c) Lippershey.

6) In TEM, the microscopic column is maintained under---------
   a) Pressure. b) Vacuum.
   c) Temperature. c) Magnetism.

7) In SEM, the secondary electrons are converted into----------
   a) Tertiary electrons. b) Electric current.
   C) Electric charge. c) None.

8) Symbiotic association may be roughly divided into two categories------
   a) Ectosymbiosis & Endosymbiosis. b) Electric current.
   c) Both. d) None.

9) Lichen is the symbiotic association of----------
   a) Fungi & Bacteria. b) Fungi & Algae.
   c) Algae & Bacteria. d) Protozoa & Virus.

10) Bioluminescence is the property of producing----------

a) Rays. b) Light.
c) Current. c) Darkness.

11) ----------is the type of endosymbiosis.

a) Cooperation. b) Commensalisms.
c) Mutualism. c) Predation.

12) ----------bacteria can fix the nitrogen.

a) *Pseudomonas.* b) *Staphylococcus.*
c) *Rhizobium.* c) *Lactobacillus.*

13) The term commensal was introduced by ---------- in 1876

a) Pierre Joseph Van Beneden. b) Lippershey.
b) Robert Hook c) Hans Janssen.

14) The fungal mycelium penetrates the root cells by means of projections called---------

a) Arbuscules. b) Absorbing organ.
c) Hausteria. c) None.

15) The ruminants are a group of ---------- mammals.

a) Carnivorous. b) Herbivorous.
c) Omnivorous. c) None.

16) In Lichen, the fungle partener is called as----------

a) Phacobiont. b) Photosymbiont.
c) Mycobiont. c) All of above.

17) Bioluminescence property is common to several species of---------

a) *Vibrio & Shigella.* c) *Photobacterium & Vibrio*.
d) *Photobacterium & Shigella* d) Only *Vibrio.*

18) ----------is the obligatory interaction.

a) Mutualism. c) Commensalism
b) Cooperation. d) Ammensalism.

19) The digestive tract of ruminant contains---------- successive stomach.

a) Two c) Three
d) Four d) Six

20) -------- device is used for the enumeration of bacteria in air.

a) Lemon Sampler. b) Andersons air sampler.
c) Capillary impinger. e) All of the above.

21) --------- species of *Clostridium* is specially acts as index organism.

a) *tetani.* c) *botulinum.*
d) *perfringens* e) None.

22) ----------are used frequently as indices of fecal pollution in water & food.

a) *Only E.coli.* c) *E.coli & Cl.perfringens.*
d) *E.coli & Strept.facalis*. d) *Cl.perfringens & Strept.faecalis.*

23) ---------test/ tests are used in the routine analysis of coliform.

a) Presumptive test. c) Confirmed test.
d) Completed test. e) All of the above

24) ----------medium is used in the presumptive test.

a) Lauryl sulphate tryptone broth. c) Mac Conkeys broth.
d) Sodium azide glucose broth. d) Yeast extract mannitol broth.

25) For enumeration of coliform organism---------- method is used.

a) IMViC reaction. c) MPN.
d) Standard plate count. d) None of the above.

26) In laboratory many sea bacteria grow at 30^0C & 15000Ib/inch these are known as—---------.

a) Barophilic. c) Obligatory barophilic.
d) Psychrophilic. d) Mesophilic.

27) The organism whose natural habitat is terrestrial & which are able to grow in media without sea water yet able to tolerate varying degrees of salinity are known as----------.

a) Indigenous organism. b) Transient organism.
c) Halotolerant organism. c) None..

28) The size, weight, moisture content &---------- of air born particles are of importance in consideration of methods for disinfecting air.

a) Shape b) Opacity to UV light.
c) Both c) None.

29) The coliform group includes all the ----------Bacilli.

a) Aerobic & facultative anaerobic. b) Gram negative.
c) Non-spore forming c) All of the above.

30) ----------test is designate to enumerate total viable pollution.

a) Presumptive test b) Completed test.
c) Standard plate count. c) Confirmed test.

31) ---------- inhibit virtually all bacteria except fecal *Streptococci.*

a) Ethyl violet & Azide. b) Glucose.

c) Lauryl sulphate d) Tryptose.

32) E.coli & ----------are normally referred to as fecal & non- fecal contaminants of water respectively.

a) *Cl.perfringens*. b) *Enterobacter aerogenes*.

c) *Bacillus spp.* d) *Vibrio cholerae.*

Q2. Questions for 4 marks

1) Give the principle & ray diagram of SEM.

2) What is fluorescence? Give its principle & application.

3) Draw the ray diagram of compound microscope & explain its principle & working.

4) Explain ruminant symbiosis.

5) What is the difference between mutualism & co-operation? Explain both briefly.

6) Explain Comment on droplet nuclei.

7) Explain the Lemon sampler.

8) Explain the filtration method used for enumeration of bacteria in air.

9) What is mycorhiza? Explain in brief.

10) Enlist any two examples of Mutualism.

11) Enlist any two examples of co-operation.

12) Enlist any two examples of Commensalisms.

13) Enlist any two examples of Predation.

14) Enlist any two examples of Amensalism.

15) What is rumen?

16) Which is direct transmission of symbiont?

17) What is indirect transmission of symbiont?

18) Which type of bacteria present present in rumen?

19) Give one use of luminescence to symbiotic bioluminescent fish.

20) What is role of cellulolytic bacteria in Ruminants?

21) Which gas is produced in rumen because of bacterial activity?

22) What is literal meaning of commensalisms?

23) Which compound/ food are available in large quantity for ruminants?

24) Define electron microscope, enlist its types & draw ray diagram of TEM.

25) Give the application of electron microscopy.

26) Explain principle & working of phase contrast microscope.

27) Explain ruminant symbiosis.

28) Define symbiosis. Explain the legume-0Rhixobim interaction.

29) Enlist the type of interaction & explain any two.

30) Explain the membrane filter method.

31) Explain the concept of aerosol & droplet nuclei.

32) Write down the advantages of membrane filter method.

Question for 3 marks

1) Define Microscope & give its types.
2) Draw the ray diagram of phase contrast microscope.
3) Explain the image formation of TEM.
4) What is bioluminescence? Explain bacterial bioluminescence.
5) The symbiosis is established by direct transmission, explain.
6) What is mycorrhiza? Explain in brief.
7) Comment on indicators of water pollution.
8) Write down the significance of index organism.
9) Explain Andersons air sampler.
10) What is Stock's Shift?
11) Define Light microscope & enlist its types.
12) Define the terms: a) Mutualism b)Commensalisms
13) Define Transient organism.

Question for 6 marks

1) Define microscope & explain SEM w.r.t its principle, working & ray diagram.
2) Explain the fluorescence microscopy in detail.
3) Enlist & explain the functions of symbiosis.
4) What is symbiosis? How it is established in next generation?
5) Define endo- ecto-symbiosis & established in next generation.
6) Explain the mechanisms of establishment of symbiosis.
7) Enlist & explain the functions of symbiosis.
8) What is symbiosis? How it is established in next generation?
9) Define endo-ecto symbiosis & explain ectosymbiosis with an example.
10) Explain the mechanisms of establishment of symbiosis.

Mb 212: Microbial Genetics and Basic Immunology
Unit 1: Genomics

Objectives-

1) Gene is a---------- unit, which transfer the genetic character over several generations.

A) Smallest B) Hereditary C) Chromosomal D) Silent

2) The smallest unit capable of undergoing recombination is known as--------.

A) Intron B) Cistron C) recon D) Muton

3) From DNA to protein information pass through a---------.

A) m-RNA B) hn-RNA C) M-RNA D) t-RNA.

4) There are three stop codon as--------,---------,----------.

A) UAA, UGA, UAG B) UAC, UCA, UCC C) AUC, UAA, UGA D) UGA, UCA, UGG.

5) There are 64 codon in genetic code for ---------- Amino acids

A) 21 B) 24 C) 20 D) 19

6) When one codon codes for two aminoacid it is called ---------- .

A)Umbiguous B) Anambiguous C) Ambiguous D) Amino acids

7)The initiation codon is also called as ---------- codon.

A) Internal B) Start C) Stop D) Anticodons

8)---------- is an Initiation codon.

A) CCC B) GUC C) AUG D) CUG

9) Three of 64 codon are called as ---------- codon because they do not specify t-RNA.

A) Sense B) Nonsense C) Anticodon D) None

10) Plasmid is a small circuler ---------- & Double stranded DNA molecule present in bacterial cell.

A) Self replicating B) Replicating C) Non Replicating D) None

11) The end of a single Chromosome is called as----------.

A) Capsomer B) Telomer C) Proteomer D) All of these

12) ---------- is a smallest unit of chromosome which undergo mutational changes

A) Recon B) Intron C) Gene D) Muton

13) Shifting the ---------- i.e overlapping the code, the same gene can encode two different protein.

A) Shifting frame B) Reading frame C) Inversion D) Intrchange

14) The dictionary of coded language of genetic information is called ----------.

A) Cryptogram B) Crytogram C) Wikkepedia D) All

2 Maks Question

1) Enlist the properties of genetic code
2) Short note on Cryptogram of DNA
3) Short note on Universal code
4) Short note on wobble hypothesis
5) Genetic code in Mitochondria
6) Explain the code is non-overlaping
7) Write how the code is non ambiguous

8) Explain code has polarity
9) Explain the code is triplets
10) What is Plasmid
11) Enlist the types of Plasmid
12) Give Characteristics of F-Plasmid
13) Give Characteristics of R-Plasmid
14) Give Characteristics of Degerative Plasmid
15) What is a Chromosome
16) Special Characteristics of Eukaryotic Chromosome
17) Explain how Chromosome takes parts in to hereditary character.
18) Define Intron, Cistron, recon, Muton
19) Define col Plasmid.

3 Marks Question

1) Explain the concept of a gene
2) What is genome
3) Explain gene is a transmissible molecules
4) What is genetic code
5) Explain the code are degenerative
6) Characteristic of Wobble hypothesis
7) Describe F Plasmid
8) Describe R Plasmid
9) Describe col Plasmid
10) Explain degerative Plasmid
11) Short note on chromosome
12) Give Chemical composition of chromosome
13) Properties of genetic code
14) Explain characteristic of Plasmid
15) Write Note on Intron, Cistron, Muton

6 marks question

1) Comment on Types of Plasmid
2) Properties of Plasmid
3) Explain the all types of Plasmid & describe
4) What are different approaches made for codon assignment
5) What are different Properties of genetic code
6) In what way the Wobble hypothesis explain about the degeneracy of genetic code
7) Difference between Universal code and mitochondria code
8) Discuss in brief the genetic code of overlapping genes.

Unit 2: Mutation
Objective

1. …….. refers to all the heritable changes in the genome, excluding those resulting from incorporation of genetic material from other organisms.
   A) Recombination B) Mutation C) Transformation D) Genetic exchange

2. …… includes alterations in structure of the DNA molecule within a gene.
   A) Intragenic mutation B) Intergenic mutation C) Induced mutations D) Super vital mutation

3. In …….. Mutation, there is change in the normal base sequence of DNA molecule.
   A) Point B) Induced C) Base D) Spontaneous

4. The unit of gene mutation is ……
   A) Cistron B) recon C) muton D) photon

5. …….. mutations in which chromosomal changes in structure involves long region of DNA.
   A) Genetic mapping B) Alkylating agent C) Base analogue D)Induced mutation

6. In large deletions or additions of base sequence corresponding to an entire polypeptide chain is lost or add are useful in…….. .
   A)genetic mapping B)alkylating agent C)Base analogue D)induced mutation

7. …….. phenotype mutations result in the death of cells or organisms.
   A) Sub vital B) Lethal C) Super vital D) Induced
8. …….. phenotype mutations reduce the chances of survival of organisms .
   A) Sub vital B) Lethal C) Super vital D) Induced
9. ……. phenotype mutations result in the improvement of biological fitness under certain conditions.
   A)sub vital B)lethal C)super vital D)induced
10. Mutations that occurs under natural conditions are called…….
    A) Point B) Induced C) Base D) Spontaneous

2 and 3 Marks Questions

1. Define mutation and enlist types of it.
2. Write down Principle of Fluctuation test
3. Define Spontaneous mutation.
4. Define induced mutation.
5. Intercalating agents?
6. Define Alkylating agent?
7. Define Deamining agents?

8. Define Point mutation.
9. Define Nonsense Mutation.
10. Define Silence mutation.
11. Define Transition.
12. Define Tranversion.
13. Define Tautomerism.
14. What are base analogues?
15. How U.V. rays produces induced mutationin DNA?
16. What is mutagen?
17. Short note on Nonsense mutation?
18. What is silent mutation?
19. Define base pair substitution?
20. Explain frame shift mutation?
21. How does mutation act?
22. Classify the effect of mutation on phenotype?
23. Explain transition and transversion?
24. Enlist chemical mutagens?
25. Tautamerism in spontaneous mutation?
26. What is point mutation?

4 Marks Questions

1. Differentiate between Spontaneous and Induced mutation.
2. Explain induced mutation with any one example.
3. How intercalating agents react with DNA?
4. Explain types of point mutations?
5. What is chromosome mutation?
6. What is difference between deletion and insertion?
7. Differentiate between substitution and inversion?
8. Short note on Replica plate technique?
9. Application and principle of Fluctuation Test?
10. Mode of action of UV rays on DNA?

6 Marks question

1. Explain Fluctuation test with principle, procedure, and application?
2. Explain Replica plate with application?
3. Define mutation? Explain all types of mutation?
4. Explain the mode of action of any two chemical mutagens involved in induced mutations?
5. Explain the role of radiation in induced mutation?
6. Comment on Spontaneous Mutation over random and Nonadptive in nature.
7. comment on frameshift mutation change in frame in codons
8. Justify Frameshift mutation are never leaky.
9. Explain Intragenic and Intergenic mutation.

Unit 3: Infection and immunity

Objective

1. Antibody production is by _____
   1).T cells 2).B cell 3).K cell 4).NK cell

2 The specific humoral factor or antibody was first described by…….
   1).Pfeiffer 2).Behring & Kitasato 3).Jenner 4).Twort & d'Herelle

3. Antibodies are _____
   1).Alpha-1-globulin 2). Alpha-2-globulin 3). Beta globulin 4). none of above

4. Immunoglobulin constitute what % of total proten---------
   1) .5-10 2.) 10-20 3.) 20-25 4). 30-35

5 Heat liable antibodies is ----------
   1.) Ig E 2). IgG 3). IgD 4.) IgM

6. Maternal antibodies are ----------
1). artificial passive 2).Nature passive 3.) Artificial active 4). Nature active

7. Sedimentation coefficient of IgM is----------
. 1) 7S 2) 11S 3) 19 S 4) 8S

8. Antibodies are secreted from ----------
   1) Plasma cell 2) Macrophages 3) T- lymphocytes 4) Eosinophils

9. Secondary immune response is mediated by ----------
   1) IgA 2) IgG 3) IgM 4) Ig E

10. Antibody formation depends on ----------
   1) Age of the person 2) Amount of antigen
   3) Well being of the person 4) All of the above

11. The ratio of heavy chain to light chain is
   1) 2:1 2) 3:1 3) 1:2 4) 2:2

12. Immunoglobulin consist of----------
   1. 2 light, 2 heavy chain 2) 1heavy, 2 light chains
   3) Light, 1 heavy chain 4) 3 light, 1 heavy chain

13. Active immunity is induced by ----------
   1. Infection 2. Placental transfer of antibodies
   3. Injection of antibodies 4)all of the above

14. Allergic reaction are related with……..
   1. IgE 2) IgD 3) IgG 4) IgM

15. Antibodies combine with antigens----------
1) At variable regions 2) At constant region
3) Only if macrophages are present 4) both (1) & (3) are correct

16. Antibodies are synthesized by ----------
1) B lymphocytes 2) phagocytes 3) helper T lymphocytes 4) killer T lymphocytes

17. The type of antibodies present in colastrum,saliva & tears is---------
1.) IgE 2) IgD 3) IgG 4) IgM

18. The secretary immunoglobulin is ----------
1) IgE 2) IgD 3) IgG 4) IgM

19. The father of immunization was
1) Louis Pasteur 2) Edward Genner 3) Salk 4) Sabin

20. Active immunity is not acquired by--------
1) Infection 2) Vaccination 3) Immunoglobulin transfer 4) Sub clinical infection

21. The Fab portion of ----------
1) Binds to an Fc receptor 2) Contains the J chain 3) Contains the idiotype of the Ig
4) Mediate biological effectors function of Ab molecules

22. The Fc region of Antibody---------
1) Contains both heavy & light chain 2) Is required for Ag binding
3) Is not a required for placental transmition
4) Generally confers biological activity on the various molecules

2 or 3 marks

1. Short note on Exotoxin
2. Write a note on Endotoxin
3. What is Antibody? Enlist the types of antibodies.
4. Short note on invasiveness'.
5. Give the biological properties of IgM.
6. Explain source of infection.
7. Enlist the methods of transmission of infection.
8. What is infection? Note on Iatrogenic & laboratory Infection.
9. Comparison of active & passive immunity.
10. Write a note on local immunity.
11. Write a note on normal flora of mouth
12. Give the diagrammatically representation of IgM
13. Write a note on IgE.

!4. Give the diagrammatically representation of IgA.
15. Write a note on normal flora of respiratory tract.
16. Write a note on IgE.

For 4 marks

1. Difference between Exotoxin & Endotoxin.
2. Write a note naturally acquired immunity.
3. Explain basic structure of immunoglobulin.
4. Write a note on IgG & IgA.
5. Give the function of IgG &IgM
6. Comment on normal flora of respiratory tract
7. Explain types of immunity.
8. Give the properties of antigen
9. Explain the characteristic of epitope.
10. What are the functional properties of IgD &IgE
11. Describe briefly on innate & natural immunity
12 Write a note artificially acquired immunity.
13 comment on inhalation &ingestion

For 6 Marks

1. Explain distribution &occurrence of normal flora
2. What is infection? Explain types of infection.
3. Explain mode of transmission.
4. What is immunity? Explain types of immunity.
5. What is immunoglobulin? Write a note on IgM &IgA.
6. Explain primary & secondary immune response
7. Explain in detail basic structure of immunoglobulin.
8. What is virulence? Explain its determinants.
9. Write in detail Innate & acquired immunity
10. Explain some properties of immunoglobulin classes
11. What is antigen? Give the properties of antigen.

S.Y.BSc. Question Bank

Subject: Microbiology

Paper: MB 221

Microbial Biochemistry and Physiology

Unit 1:Biomolecules

Q1 Fill in the blanks (2 marks each)

1) Carbohydrate have basic chemical formula are ---------- include simple sugars

   a) Cn (H2O) n b) C12H2O2 c) C (H2O) d) Cn

2) Simple sugars are called as----------

   a) Monosaccharide b) disaccharide c) Trisaccharides

   b) d) Tetrasaccharide

3) ……can be hydrolyzed to produce smaller units of sugars.

   a)Polysaccharide b)monosaccharide c)Trisaccharides d)Tetrasaccharide

4) In aqueous solution the 5 to 6 membered monosaccharide can form ---------- structure.

   a) Ring b) elliptical c) Triangle d) oval

5) ----------Bond forms between the aldehyde group of one-monosaccaharide units &one of alcohol groups of other monosaccharide unit.

   a) Glycosidic bond b) peptide c) hydrogen d) electrostatic bond

6) ----------Are water insoluble molecules that are soluble in no polar solvent such as chloroform.

   a) Protein b) carbohydrate c) lipids d) amino acids.

7) ----------Lipids, which are composed of fatty acids, bonded to an alcohol.

   a) Complex b) carbohydrate c) lipids d) amino acids.

8) ----------are as structural monomers for proteins.

   a) amino acids b) sugar c) lipids d) nucleotide

9) ……type of an amino acids can act either as acids or as a base.

a) Zwitterionic b) non-polar c) aromatic d) uncharged.

Q2) Write short notes on- (2marks)

1) What are carbohydrates? Define with one example.

2) Give the structure of glucose molecule & explain its different configuration?

3) Illustrate the linear structure of starch molecule.

4) What are lipids? What is their role in biological membrane?

5) What are phospholipids? explain their function?

6) Explain the peptide bond in protein?

7) What are phospholipids? Explain their function.

8) What are globulins?

9) Mention the structure of sulphur containing amino acids?

10) Explain the energy yielding reactions involving ATP & NADP.

Q3) Write short notes on- (3marks)

1) Enlist essential amino acids.

2) How to classify carbohydrates ?

3) Define general structure of an amino acids on the basis of R-GROUP?

4) Give classification of amino acids on the basis of R-group?

5) Define secondary structure of protein?

6) Explain tertiary structure of protein?

7) Classify carbohydrate on the basis of structure ?

8) How to classify monosaccharide on the basis of structure?

9) Define oligosaccharides with two example?

10) What is Heteropolysaccharides? Write two examples?

Q3) Explain in detail. (6marks)

1) Describe the primary, secondary, tertiary & quaternary structure of proteins?

2) Describe the structure of different Kinds of lipids & mention their roles in biological systems?

3) Explain four structural level of classification of protein?

4) Define metabolism? Explain what is bacterial physiology?

5) Describe classification of carbohydrate ? Define with example?

6) Define carbohydrate? Mention their roles in biological system?

7) Give the significance of proteins & amino acids in biological systems?

8) Describe classification of lipids? Define with example.

9) What are fatty acids? classify fatty acids on the basis of presence or absence of double bond?

10) Define amino acids? Classify them according to their biological or physiological importance?

Unit 2: Microbial Enzymes

Q1Fill in the blanks (2 marks each)

1. The whole active enzyme is known as ----------
   a) Apoenzyme b) Coenzyme c) Holoenzyme d) Zymogen
2. The cleft at which substrate specifically binds to enzyme is known as --------- site.
   a) Interaction b) Passive c) Active d) Adhesion
3. All enzymes are ……. in nature, except Ribozyme.
   a) Carbohyrate b) Protein c) DNA d) RNA
4. The enzymes increases the rate of reaction by ---------- activation energy
   a) Increasing b) Decreasing c) Equaling d) None of above
5. A coenzyme or metal ions that covalently bound to the enzyme are protein are known as ----------
   a) Enzyme b) Prosthetic group c) Holoenzyme d) Zymogen
6. ---------- enzymes have additional catalytic site along with active site.
   a) Exoenzyme b) Zymogen c) Constitutive enzyme d) Allosteric
7. E-S Hypothesis which states that catalytic site of enzyme was fixed or rigid is known as ----------
   a) E-S Mechanism b) Lock- key Mechanism c) Induced Fit Mechanism d) None of Above
8. The Enzymes that catalyses oxidation-Reduction type of reactions are included in class ----------
   a) Oxidoreductases b) Lipases c) Transferases d) lyases

9. Hydrolyase class of enzymes catalyse reactions by ---------- cleavage

   a) reductive b) hydrolytic c) ionic d) indirect

10. The Rate of enzyme catalysed reaction is influenced by ---------- --------

    a) pH b) [E] c) [S] d) All the Above

Q2) Write short notes (2 marks each)

1. Enlist six Classes of enzymes.
2. Define prosthetic group with example?
3. Define energy of activation
4. Enlist Factors affecting enzyme activity.
5. Structural properties of Enzyme
6. Active site of Enzyme
7. Define Extracellular and Intracellular enzymes.
8. Define Constitutive enzyme and Inducible enzyme.
9. Define and give examples of enzyme activators
10. Define enzyme inhibitors and give example.
11. Define Exocellular and Endocellular enzymes.

Q3) Explain (3 marks each)

1. Lock and key Model of E-S interaction
2. Induced Fit Theory of E-S interaction
3. Explain optical specificity of enzymes along with one example?

4. Explain Geometrical specificity of enzymes along with one example?
5. Explain absolute substrate specificity of enzymes along with one example?
6. Explain Concept of Energy of Activation in detail
7. Explain any lyases and ligases class of enzymes
8. Write note on Transferase class of enzymes
9. Explain Effect of PH on enzyme activity
10. Explain Effect of Temperature on enzyme activity
11. Explain Effect of Enzyme concentration on enzyme activity
12. Explain Effect of Substrate concentration on enzyme activity

Q4) Explain in detail (6 marks each)

1. Enlist Factors affecting enzyme activity and explain any two factors in detail.
2. Write criteria/ rules of Nomenclature and Classification of enzymes?
3. Explain enzyme specificity and types of specificities?
4. Explain Effect of pH and Temperature on enzyme activity with graphical representations.
5. Explain in detail Effect of [E] and [s] on enzyme activity.
6. Explain in short six classes of enzymes with one example of each
7. Explain role of enzyme activators and inhibitors in enzyme cayalysed reactions?

Unit 3: Bacterial Physiology

Q1 Fill in the blanks (2 marks each)

1. All the chemical reactions occurs in the living system are collectively called as ----------
   a) Anabolism b) Catabolism c) Metabolism d) all the above
2. A metabolic pathway contains series of ---------- reaction to produce specific product.
   a) Enzyme b) Chemical c) biological d) None of the above
3. Metabolism broadly divided into ---------- and ---------- .
   a) Anabolism & Catabolism b) Metabolism & Catabolism
   c) Anabolism & Metabolism d) all the above
4. Catabolism is reaction in which --------
   a) Complex substance converted to simple
   b) Simple substance converted to Complex
   c) Energy is gained
   c) all the above
5. Anabolism is reaction in which --------
   a) Complex substance converted to simple
   b) Simple substance converted to Complex
   c) Energy is gained
   c) all the above
6. In catabolism, energy is trapped in form of ----------
   a) ATP b) ADP c) NADP d) NADPH
7. Polysaccharide converted to monosacchride is example of ----------
   a) Anabolism b) Catabolism c) Metabolism d) all the above

8. Anabolic and catabolic pathways are ----------

   a) Reversible b) Irreversible c) complex d) None of the above

9. ---------- % of ATP are synthesized in TCA cycle.

   a) 60 to 70% b) 70 to 80% c) 90 to 100% d) 50%

10. ---------- ATP molecules produced in TCA cycle.

    a) 20 b) 31 c) 18 d) 40

11. In TCA cycle, condensation of acetyl co A & oxaloacetate catalysed by enzyme ----------

    a) Citrate synthase b) Malate dehydrogenase c) Aconitase

    d) Isocitrate dehydrogenase

12. Glyoxylate pathway occurs in ----------

    a) Golgi complex b) Glyoxisomes c) peroxisomes d) Nucleus

13. Glyoxylate cycle is regarded as anabolic variant of ---------- cycle.

    a) TCA b) Glycolysis c) EMP d) All the above

14. Glycolysis is ---------- pathway, which yield energy during synthesis.

    a) Anabolic b) Catabolic c) Catholic d) None of the above

15. Oxidative phosphorelation is an ---------- metabolism in aerobic microorganisms.

    a) Energy yielding b) Energy releasing c) both a & b

    d) None of the above

Q2) Define (2 Marks)

1. Metabolism
2. Catabolism

3. Anabolism
4. Glycolysis
5. TCA cycle
6. Glyoxylate bypass
7. Amphibolism
8. Anapluretic reaction
9. Substrate level phosphorelation
10. ATP

Q3) Explain in detail (6 marks each)

1. Give the steps involved in TCA Cycle.
2. Give the steps involved in Glyoxylate pathway.
3. Give the steps involved in Glycolysis.
4. Explain in detail Concept of metabolism
5. Give significance of substrate level phosphorelation
6. Explain in detail Concept of Amphibolism
7. Discuss in detail Anapluretic reactions
8. Digramatically represent Metabolism
9. Discuss in detail enzymatic regulation of TCA Cycle
11. Discuss in detail enzymatic regulation of Glycolysis
12. Discuss in detail enzymatic regulation of Oxidative phosphorylation
13. Explain in detail mechanism of ATP synthesis.

Mb 222: Industrial Microbiology
Unit 1: Basic of industrial microbiology
Objectives

1. Inoculum media usually differ in composition from ----------
a) Production media b)synthetic media c)Crude media d)Selective media
2. ----------usually are balanced for rapid cell growth & not for product formation
   a) Inoculum media b)synthetic media c)Crude media d)Selective media
3. There are two types of stock cultures, working stocks & ----------stocks
a)Primary b)Secondary c)Tertiary d)Quaternary
4. Microbial growth under industrial fermentation conditions usually utilizes ----------metabolism of the organism.
A) Luxury b) Rapid c) Slow d) co-metabolism
5. Simple & complex media are further subdivided into categories synthetic & ----------
   a) Selective media b) Production media c) Crude media d) Inoculum media
6. Screening technique for ----------producers is the Crowded-Plate Technique
a)vitamin b)antibiotic c)both a&b d)growth factor
7. ---------- Screening allows the detection & isolation of micro-organisms that possess potentially interesting industrial application
a) Primary b) Secondary c) Tertiary d) all of these
8. A ----------medium in which all of the constituents are specifically defined & known compounds
   a) synthetic b)crude c)complex d)simple
9. The purity of the ----------source may also affect the choice of substrate
a) Carbon b) nitrogen c) sulphur d) phosphorus

Short Notes

1. Working Stocks
2. Molasses
3. Secondary Screening
4. Media sterilization
5. Primary Screening
6. Antifoam agents
7. Growth factors

Explain

1. Screening for fermentation media
2. Inoculum development
3. Corn steep-liquor
4. Primary Screening
5. Inoculum media

Unit 2: Bioreactor and fermentation process
Fill in the blanks

----------is the process in which fermentation process is carried in batches.
(a) Batch fermentation (b) SSF
(c)Submergé fermentation (d) continuos fermentation

Fermentation is carried out in a glass coated vessel called as----------
(A) Fermenter (b) chemostate
c) Turbidostat (d) Baffles

Industrially important microorganism are grown in large vessel containing nutrient media .this vessel called as----------
a) Baffles b) Sparger c) Fermenter d) Impeller

Size of fermenter depends on ----------
a) Total volume b) total media c) total capacity d) nutrient media

Type construction medium used to construct fermenter depends on ----------
a) Type of fermentation b) type of media c) type of organism d) type of nutrients

----------used for vigorous stirring and agitation of media.
a) Spindle b) Sparger c) Motor d) Impeller

Fermentation carried out in presence of oxygen is called as ----------
a) Surface b) SSF c) aerobic d) anaerobic

Foam production is more in medium contataing ----------
a) Protein & peptides b) amino acid c) lipid & fats d) carbohydrate

Foam is control in fermentation is by ----------
a) Biological agent b) chemical agent
c) Physical agent d) all of above

----------is used as antifoam agent.
a) Media b) oils c) nutrient d) none of above

Growth medium used for cultivation of microorganism is called as----------.
a) Fermentation media b) nutrient media c) growth media d) none of above

Glucose is used as----------source in fermentation.
a) Carbon b) hydrogen c) sulphur d) nitrogen

Depending on composition fermentation media categorized as---------- &----------.
a)complete & simple Media b)composition &compost media
c)simple & complex media d) complex media

Microbial population maintained in _____ phase for long time using continious culture system.

a) lag b) Log c) Exponential d) death

A chemostat is also known as _____
a) Bactogen b) Bacteriogen c) Bacterial filter d) Bacteriogen vessel

Cell density in _____ is controlled by increasing and decreasing flow of culture medium.
a) Chemostat b) Turbidostat c) Continuous culture d) Synchronous culture

A _____ is composed of population of cell that at the same stage of their cell cycle
a) Chemostat b) Turbidostat c) Continuous d) Synchronous culture

---------- is a combination of monobasic and dibasic salt which resist sudden change in pH.
a) Buffer 2) acid c) alkali d) none of these

What is an enrichment culture?
(a) Something that provides growth for all microorganisms
(b) Something that inhibits growth for all microorganisms
(c) An infectious culture
(d) Something that provides growth for a certain microorganism but not for others

What microorganisms require oxygen?
(a) Obligate aerobes (b) Facultative anaerobes
(c) Obligate anaerobes (d) Free radicals

Question for 2, 3 marks

1. What is fermenter?
2. Enlist the part of typical fermenter.
3. Draw the diagram of fermenter.
4. Enlist the types of fermentation.
5. Write the application of batch fermentation.
6. Enlist the product of batch fermentation.
7. Write in brief about continuous fermentation
8. Write in brief about batch fermentation.
9. Write in brief about chemstate.
10. Write in brief about Turbidostat.
11. Write in brief about Synchronous culture
12. Enlist the different types of antifoam agent.
13. Enlist example of antifoam agent used in fermentation.
14. Define buffer and give the significance.
15. Give the various examples of buffer.

Question for 4 marks

1. Describe Fermenter & its parts.
2. Describe batch fermentation
3. Describe methods of continuous fermentation.
4. Diagrammatically represent chemo stat.
5. Diagrammatically represent Turbidostat
6. Describe synchronous culture and its applications
7. Give the applications of continuous culture.
8. Describe the part used in fermenter for aeration and agitation.
9. Why antifoam agents are required in fermentation process?
10. Describe Helmstetter-cumming technique.
11. Describe selection technique for physical separation.
12. Write advantages & uses of continuous culture.

Unit 3: Downstream processing

Fill in the blanks

1. …….. process in that it allows enrichment and concentration in one step, by reducing the volume of material for further processing.
   A) Filtration B**)** Precipitation C) Diffusion D) All the Above

2. Chilled…… and ……. can be used in the precipitation of proteins mainly due to changes in the dielectric property of solution.
   A) Ethanol, Ethane B) Acetone,Ketone C) Glycol, Glycerol D) Ethanol, Acetone

3. …… Process used at all scales of operation to separate suspended particles from a liquid or gas, using a porous medium which retains the particles but allows the liquid and gas to pass.
   A) Filtration B) Precipitation C) Diffusion D) Adhesion

4. …… type of filter is suitable for "polishing" large volumes of liquid with low solid content or small batch filtrations of valuable solids.
   A) Frame filter B) Pressure leaf filter C) Diffusion filter D) Cross flow filter

5. Cross flow filtration is also called as …….. .
   A) Tangential filtration B) Rotary filters C) continuous filter D) Stacked filter

- **2 Marks Questions**
  1. Define cell disruption method?
  2. Enlist chromatographic methods?
  3. Differentiate between drying & crystallization?
  4. Enlist Solveny recovery methods?
  5. Note on Physical methods of cell disruption?

6. write Chemical method of cell disruption?
7. Define filtration and give its type?
8. Define centrifugation?

- **3 /4 Marks Question**
  1. Write note on solvent recovery?
  2. Explain downstream processing?
  3. Explain drying in recovery process?
  4. What is flocculation test?
  5. Methods used for purification of products?

- **6 Marks**
  1. Explain cell removal by precipitation, filtration and centrifugation?
  2. Describe various chromatography used in product purification?