Maulana Azad College

SEMESTER 4
MCB-A-CC-4-8-TH
CC8 MICROBIAL GENETICS

Unit wise model questions

Unit 1

Answer the following questions in one to two words (1 mark each)

1. What type of association is mediated by Histone and DNA?
2. What is the difference between mutation rate and mutation frequency?
3. What is the overall rate at which new mutations arise spontaneously at any given site on the chromosome per round of replication?
4. What do alkylating agents do?
5. By which process miss-incorporated base can change into a permanent mutation?
6. Give example of ionising radiation.
7. In mutational event what happens if Adenine is replaced by Guanine?
8. What kind of mutation causes sickle-cell anemia?
9. Which mutation has the most significant effect on protein synthesi?
10. What % of SINES occur in the human genome?
11. What is the size of Yeast genome?
12. How many chromosomes *Saccharomyces* have?
13. What is the genome size of *Tetrahymenna thermophila*
14. Why Histones are positively charged proteins?
15. What is a mutation?
16. How many times DNA wrap around the Histone octamer?
17. Write the name of the disease that is caused by the tandem DNA repeats in the human chromosome.
18. What is the difference between genotype and phenotype?
19. In which region of the chromosome satellite DNA is present.

Answer the following short questions (2 marks each)

1. What is the result of mutation occurring in a suppressor gene?
2. What is reversion mutation?
3. What are the 4 types of mutations?
4. What are the different types of exons?
5. What is Nucleosome?
6. What is C-value paradox?
7. What features pseudo genes have?
8. What is yeast transposable element?
9. Why Nuclear Dimorphisim is observed in the genome of Tetrahymenna?

Head of the Department

Digitally signed by Head of the Department
DN: OU=Deartment of Microbiology, O=MAC, CN=Head of the Department, E=macmicrobiology18@gmail.com
Reason: I am approving this document
Location: your signing location here
Date: 2020-04-28 17:44:36
Foxit Reader Version: 9.7.0

10. Define mutation rate and mutation frequency?
11. How many types of histone molecules are found in nature?
12. How many contacts are observed between the DNA and the histone core protein? Explain
13. What is the difference between a missense mutation and a nonsense mutation?
14. Why are mutations so important to living organisms?
15. State the difference between Chromosome and Chromatin
16. What is the solenoid structure of chromatin?
17. State the different types of chromatin
18. What are LINES and SINES?

Answer the following broad questions (more than 2 marks)

1. How does a mutation in an upstream gene alter the expression of a downstream gene? What cellular processes are disrupted? What is base analogue? The sequence of a nucleotide in an mRNA is 5'- AUGACCCAUUGGUCUCGUUAG-3' Assuming that ribosome could translate this mRNA, how many amino acid would you expect the resulting polypeptide change to be? (2+1+1+1)
2. What is repetitive DNA? Draw the classification of various types of repetitive DNA. (1+3+1)
3. How many types of Lines are present in the human genome? Among them which one is active? Write the mechanism of LINES repeat jumps with diagram? (1+1+3)
4. Write short note on gene families along with its category. Name the multi-gene family present in yeast genome (3+1)

Unit 2

Answer the following questions in one to two words (1 mark each)

1. Define curing of plasmid.
2. Why does not F^+X F^+mating takes place?
3. How are F' factors formed?
4. How plasmid clones can be screened?
5. Which gene in the pUC18 vector confers antibiotic resistance to the transformed cells?
6. Which is the first engineered plasmid vector?
7. What are relaxed plasmids?
8. Which charecteristics do F-plasmid confer to the host bacterium?
9. What do you mean by acridine curing?

Answer the following short questions (2 marks each)

1. Distinguish between stringent and relaxed plasmid.
2. What regulates the copy number of a plasmid in the cell?

3. What is fertility inhibition?
4. Describe F-factor and R-factor.
5. Of what use are F-prime factors in genetic analysis?
6. Define the term conjugative mobilizable and self-transmissible plasmid.
7. What mode of replication are used by plasmids for their reproduction and their transfer?Give a brief account of these two modes.
8. If a particular cell type rifampicin was used to inhibit DNA transfer what you conclude about the transfer mechanism?
9. Distinguish F^+ and HFR transfer with respect to the amount of genetic material transferred and the intactness of the transferred unit.
10. Which of the following terms such as conjugative, mobilizable and self-transmissible can be used to describe andColE1 plasmid?
11. What features of F not present in ColE1 enables F but not ColE1 to integrate into the host chromosome?
12. Most self- transmissible plasmid express a pilus only immediately after entering a cell and only intermittently thereafter, explain why?
13. Define plasmid incompatibility.
14. What are the causes of plasmid incompatibility?
15. How do Par protein function in Plasmid partitioning?
16. If a plasmid is mobilizable but not conjugative what function does it lack?
17. How do you determine the origin of plasmid replication experimentally?
18. Name 2 vital condition for artificial transformation.
19. What basic characteristics can make a plasmid mobilize?
20. Define segregative instability of plasmid.
21. Plasmid replication is dependent on host cell. Justify.
22. How does Hfr x F mating differ from a F' x F^- mating?

Answer the following broad questions (3 marks each)

1. Describe the process of natural transformation with a specific example.
2. If two plasmids cannot be maintained in a single cell, what properties may be common in these plasmids?
3. Describe briefly the different processes of replication control in plasmid.

Unit 3

Answer the following questions in one to two words (1 mark each)

1. What is F^+ strain?
2. What is F^-strain?
3. Define Hfr strain?
4. Define F' strain?
5. Define bacterial transformation
6. What are competence factors?

7. What is transformasome?
8. Define generalized transduction.
9. Define specialized transduction.
10. Define abortive transduction
11. What is low frequency transducing lysate?
12. What is high frequency transducing lysate?

Answer the following short questions (2 marks each)

1. Write the function of F pillus.
2. What is sexduction?
3. Write the role of relaxase in bacterial conjugation
4. Write the characteristics of Hfr strains
5. Compare between Hfr and F+
6. Write the role of competence factors in transformation process.
7. Write the significance of transformation in bacteria.
8. Differ between natural and artificial competence.
9. Describe the role of pseudopilus in transformation process.
10. Write the basic differences between generalized transduction and specialized transduction
11. What do you mean by co-transduction frequency?
12. Describe how co-transduction frequency could be used to map genetic markers.
13. Describe the biological significance of transduction
14. Explain how is co-transduction frequency calculated?

Answer the following broad questions (3 marks each)

1. Describe Davis U tube experiment
2. Describe the general structure of F plasmid
3. Describe the Mpf and Dtr components of tra genes
4. Describe the characteristics of F+x F- ,F' x F- and Hfr x F- crosses
5. What do you mean by Interrupted mating experiment?
6. In E.coli four Hfr strains donate the following genetic markers in following order: Strain 1: MZXWC, Strain 2: LANCW, Strain 3: ALBRU, Strain 4: ZMURB. What is the order of these markers in circular chromosome of the original F+?
7. Schematically describe transformation process in gram-positive bacteria
8. Schematically describe transformation process in gram-negative bacteria
9. Describe the Liderberg-Zinder experiment for bacterial transduction
10. Schematically describe the process of specialized transduction
11. Schematically describe the process of generalized transduction

Unit 4

Answer the following questions in one to two words (1 mark each)

1. What will be the phenotype of a mutant CI phage?
2. Differentiate between the r+ and rII phage plaques on the basis of their morphology in E. coli strain B.
3. Why is E coli strain B known as permissible host with respect to T4 R locus?
4. What are Hfl strains?
5. Why does lambda dgal always need a helper virus for infection?
6. What is a dilysogen?
7. How does a lambda phage associate with E. coli before pushing its genome inside?

Answer the following short questions (2 marks each)

1. Explain the role/s of the transcript made from P_{RE} during lambda lysogenic cycle?
2. Is there any single most important event which brings about switch of lambda from lysogenic to lytic mode on exposure to UV radiation?
3. Explain in brief the molecular basis of super infection immunity.
4. State the function of any one antiterminator involved in lytic progression lambda.
5. At high repressor concentration, both OL and OR are sequestered preventing transcription from either side. Explain with a diagram.
6. How is CII protein stabilized inside the host inspite of being susceptible to proteolytic cleavage?
7. Explain why T4 rII mutants are known as conditional mutants.
   What do you mean by a cistron? Explain with example

Answer the following broad questions (more than 2 marks)

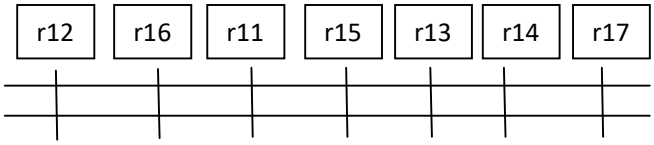
1. Co-operative binding of cII to O_R is critical for maintenance of lambda in the lysogenic state. Explain. 3
2. Explain the role of cro in inhibition of repressor synthesis. 3
3. Categorically state the immediate early gene products and their functions in lambda life cycle. 3
4. Lambda repressor and cro have autoregulatory mechanisms. Explain 4
5. Construct a map from the following two factor phage cross data (show map distance)

Cross	Percentage recombination
r1 x r2	0.10
r1 x r3	0.05
r1 x r4	0.19
r2 x r3	0.15
r2 x r4	0.10
r3 x r4	0.23

6. E. coli strains K12 and B can be used to discriminate between T4 r+ and rII mutants. Design experiments to distinguish between recombination and complementation analyses using these tools. 3
7. Given the following map with point mutants and data in the following table, draw a topological representation of deletion mutants r21, r22, r23, r24, r25 (Be sure to show the endpoint of deletions, + indicates r+ recombinants are obtained, 0 indicates not obtained). 5

Deletion mutants	Point mutants						
	r11	r12	r13	r14	r15	r16	r17
r21	0	+	0	+	0	+	+
r22	+	+	0	0	+	+	0
r23	0	0	0	+	0	0	+
r24	+	+	0	0	+	+	+
r25	+	+	0	0	0	+	+

Map:



Unit 5

Answer the following questions in one to two words (1 mark each)

1. What are cryptic transposons?
2. What do you mean by a co-integrate?
3. How can a co-integrate resolve in the absence of a functional transposase?
4. What is a superbug?
5. Name a transposon like element which uses reverse transcriptase,
6. Which transposable element is present in F factor?

7. What is a transposome?
8. What is a suicide vector?

Answer the following short questions (2 marks each)

1. What are Ac and Ds elements?
2. Explain the significance of G loop in a Mu phage.
3. Explain the phenomenon of hybrid dysgenesis in Drosophila.
4. How can you look for the presence of a transposon like element in a given sequence without doing any genetic experiment?
5. Mention one evolutionary consequence of transposition in the human genome
6. State true or false with explanation:
7. Recombination can lead to deletion but transposition does not.
8. What are integrons? Explain their significance in antibiotic resistance.
9. What is a "sleeping beauty" element?
10. How are transposition and recombination fundamentally different?
11. Explain with a diagram, how direct repeat is generated at the site of insertion of a transposition.

Answer the following broad questions (more than 2 marks)

1. Design an experiment to prove that a certain antibiotic resistance gene reside in a transposable element. 4
2. What do you mean by inside end and outside end transpositions? Explain the consequences involved in each case. (2+2)
3. How can you differentiate (through experiment) between a transposable element which transposes by a replicative mechanism from another one which moves by non replicative mechanism. 3
4. Citing the example of any typical transposon, explain how is transposition regulated in bacteria? 4
5. Explain clearly the advantages and disadvantages associated with *in vitro* transposon mediated mutagenesis. 4
6. Explain with sketches the genetic consequences mediated by transposons. 4

MCB-A-CC-4-9-TH
CC9: ENVIRONMENTAL MICROBIOLOGY

Unit wise model questions

Unit 1

Answer the following questions in one to two words (1 mark each)

1. Write the name of first identified Hyperthermophile
2. Write the name of the world toughest bacteria
3. Write the name of oil-eating bacteria
4. Which bacteria grow at 37°C?
5. Which bacteria grow at high osmotic pressure?
6. Define the term barophile

Answer the following short questions (2 marks each)

1. What is Extrimophiles?
2. Define Halophiles with an example
3. Which factors affecting the rate of decomposition?
4. Write the feature of Oligotrophs
5. Define Psychrotolerants. Give an example
6. Define radioresistor with an example
7. Define xerophile with an example
8. Define barotolarent with an example
9. What are the different extreme environmental conditions?
10. State about the occurrence of Oligotrophs.

Answer the following broad questions (more than 2 marks)

1. What are the characteristic adaptations of oligotrophs? Give an example of it. Write the biotechnological application of halophiles. (2+1+2)
2. Explain the adaptive mechanism of psychrophiles. Why psychrophiles are known as bioremidiators? . (2+2)
3. Classify the thermophiles with respect to temperature and give an example of each. Explain the adaptive mechanism of thermophiles with diagram (1.5+1.5+2)
4. Write the biotechnological application of acidophiles and alkaliphiles (2+2)
5. Why microorganism decomposes plant organic materials? Explain the different decomposition process. (2+3)

Unit 2

Answer the following questions in one to two words (1 mark each)

1. What is neutralism?
2. What is bio-fertilizer?
3. What is ammensalism?
4. What is meant by the term fixed Nitrogen?
5. What is the biological significance of root nodule formation legunes?
6. What is competitive exclusion?
7. What are rhizobia?

Answer the following short questions (2 marks each)

1. State differences between mutualism and commensalism? Give example.
2. Give example of ammensalism and synergism.
3. Compare bio-fertilizers and chemical fertilizers.
4. Define predation and parasitism. How are these similar and different?
5. Discuss mutualism relationship between two microbial population.
6. How do Rhizobia colonize the legume root?
7. Why is nitrification a good example of commensalistic process?
8. How does bio-fertilizers enhances soil fertility?
9. How do Azotobactor and *Rhizobium* sp. protect their nitrogenase from oxygen?
10. How do molybdenum and vanadium and leg haemoglobin influence nitrogenase activity?
11. Describe the differences between symbiotic and asymbiotic nitrogen fixation.
12. Briefly describe the process of nitrification and de-nitrification.
13. Discuss the differences among symbionts and opportunist and pathogens.
14. What factors determines the attraction of Rhizobium to the root surface of legume plants?
15. With suitable examples define commensalism.
16. Write notes on nod gene?
17. Differentiate between competition and predation with respect to microbial interaction.
18. What are the two kinds of nitrogen fixing bacteria? Elucidate with example.

Answer the following broad questions (3 marks each)

1. Briefly state the mechanism of biological nitrogen fixation.
2. Write short notes on Rhizobium.

Unit 3

Answer the following questions in one to two words (1 mark each)

1. What is meant by cross inoculation group?

2. What is nod cluster?
3. Differentiate between nitrification and ammonification
4. Distinguish between nitrate assimilation and denitrification.
5. What is infection thread?

Answer the following short questions (2 marks each)

1. Name the signal molecules secreted by legumes to interact with Rhizobia.
2. What is leg-hemoglobin? What is its function?
3. Differentiate between symbiotic and non-symbiotic nitrogen fixation?
4. What role played by IAA and lectins in biological nitrogen fixation?
5. What are nif genes and nif clusters?

Answer the following broad questions (more than 2 marks)

1. Write the chemical nature of dinitrogenase complex. 4
2. Give an account on the symbiotic and non-symbiotic nitrogen fixers with their specific hosts. 4
3. Write the role of TCA cycle acids in amino acid biosynthesis. 3
4. Write the reactions catalysed by GS and GOGAT and mention their regulatory roles. 4+2
5. Write the role of different types of cofactors involved in dinitrogen fixation in Rhizobia. 4

Unit 4

Answer the following questions in one to two words (1 mark each)

1. What is waste?
2. Define biomedical waste.
3. Define MSW.
4. What is e-Waste?
5. What do you mean by Waste management?
6. What is hazardous waste?
7. What is composting?
8. What is C/N ratio?
9. Define BOD
10. Define COD
11. Define NOD
12. What are coliform bacteria?
13. What do you mean by eutrophication?

Answer the following short questions (2 marks each)

1. Write the different categories of solid waste.

2. Describe the risks and problems associated with solid wastes.
3. What is the "4R"s of waste management?
4. What do you mean by sludge and activated sludge?
5. Write the characteristics of an indicator organism
6. What do you mean by secondary waste water treatment?
7. What do you mean by tertiary waste water treatment?
8. Write the importance of secondary sewage treatment.
9. Write the importance of tertiary sewage treatment.
10. Describe how solid sludge is disposed after sewage treatment.

Answer the following broad questions (3 marks each)

1. Briefly describe activated sludge process of waste water treatment
2. Briefly describe trickling filter process of waste water treatment
3. Briefly describe the various processes of tertiary waste water treatment.
4. Write short note on organic composting.
5. Write short note on sanitary landfilling.

Unit 5

Answer the following questions in one or two words (1 mark each)

1. What do you mean by bioremediation?
2. Define the following terms
   Biostimulation, Bioaugmentation, Biosparging, Bioventing, Biopiles
3. What do you mean by Xenobiotic compound?
4. What is bioleaching?
5. What do you mean by in-situ and ex-situ remediation?
6. What is Super Bug?
7. Wtat are PAHs?

Answer the following short questions (2 marks each)

1. Describe the role of microbe in degradation of DDT
2. What are the limitations of Bioremediation?
3. Write the advantages of Bioremediation

Answer the following broad questions (3 marks each)

1. Describe the different techniques used in bioremediation process
2. Write Mechanisms of Heavy Metal Remediation by Microorganisms
3. Describe the role of microbes in remediation of inorganic contaminants
4. Describe the role of microbes in remediation of organic contaminants

Unit 6

Answer the following questions in one or two words (1 mark each)

1. Why is MPN called so?
2. During confirmatory test of coliform detection, methylene blue is used in the media. Explain the reason.
3. What are coliforms?
4. What are indicator organisms?
5. Name an indicator organism other than *E. coli*
6. Define water treatment.
7. State the APHA guidelines about allowable coliform count in potable and recreational water.
8. What is the function of a Durham's tube?

Answer the following short questions (2 marks each)

1. What is FC/FS ratio?
2. State one example each of water borne disease caused by a) bacteria b) virus c) protozoa d) fungi
3. What is the full form of SIM agar? For what purpose is it used?
4. How does UV light inactivate microorganisms?
5. Chlorine di-oxide is more efficient than chlorines and monochloramines in disinfecting water. Explain the reason.
6. Explain the mechanism of ozonation mediated disinfection of water.
7. Apart from MPN, what is the other direct method of determining the no. of coliforms present in a water sample?

Answer the following broad questions (more than 2 marks)

5. What are the major advantages and disadvantages of superheating and flushing in treatment of potable water? 3
6. What are the potential merits and demerits associated with treatment of water by chlorination? 3
7. Why are monochloramines often more preferred in treatment of water as compared to simple chlorination? State its limitations. (2+2)
8. Explain clearly the basis of each of the four tests of IMViC used to discriminate between typical and atypical coliforms. (2x4=8)
9. What is a TSI test? State clearly the different zones of bacterial growth used in a TSI slant?

MCB-A-CC-4-10-TH
CC10: RECOMBINANT DNA TECHNOLOGY

Unit wise model questions

Unit: 1 & 2

Answer the following questions (2 marks each)

1. Name the first biotechnology product to appear in the market. Name the scientists who developed the required plasmid for synthesis of the product.
2. Name the recombinant vaccine widely used in India. Which host cell is used to develop the vaccine?
3. Name the vector used for transposon mutagenesis. How do they function?
4. List the advantages of using eukaryotic host cell over prokaryotic host cell to clone a eukaryotic gene.
5. What are phagemids? Give one example.
6. Explain how we can avoid self-ligation of vectors during cloning.
7. Explain how T-vectors are used to develop transgenic plants.
8. Explain how lambda virus is used as vectors for cloning.
9. You have done a cloning experiment using YAC vector in yeast host cell. How do you select the recombinant yeast cells?
10. State the special features of expression vectors.
11. Which vectors are used to construct genomic libraries & why?
12. What are neoschizomers? Give example.
13. Explain why T4 DNA ligase is used in cloning experiments.
14. How could you check the protein contamination present in your isolated plasmid DNA?
15. What are reporter genes? Explain with an example.
16. What are isochizomers? Give example
17. What type of vectors should we use to get the recombinant protein after cloning? How can we purify these proteins?
18. What is star effect?
19. The size of the foreign DNA insert determines the choice of the particular vector to be used for cloning.....Explain
20. Explain with flow chart how do you clone a mammalian gene into *E.coli.*

Write short notes on (4 marks each)

1. Replica plating technique
2. Artificial chromosomes
3. DNA ligase
4. Blue white screening
5. Restriction endonuclease

Unit 3

Answer the following questions (1 mark each)

1. Which of the chemicals is added to make the recombinant plasmid permeable to DNA molecules?
2. Which enzyme is required for end to end joining of DNA?
3. In which phase of growth does the recipient cell takes up the donor DNA?
4. In which category biolistic transformation falls?
5. Give an example of biological gene transfer method?
6. In which method electric field is applied for gene transfer?
7. What is the size of the virulent plasmid of *Agrobacterium tumefaciens*?
8. Which technique is used to introduce genes into dicots?
9. Which of the following are used as selection marker for the cells transformed with *Agrobacterium?*
10. Who discovered the technique southern blotting?
11. What is the key principle of southern/northern blotting?
12. Which reagent extracts and purifies RNA from solution?
13. Which chemical is used to make RNA fragments linear in northern blotting?
14. Which membrane filter paper is used in Northern blotting?
15. Which membrane filter paper is used in Western blotting?
16. Which protein is used as blocking agent in western blotting?
17. What fusigenic material is used for plant transformation?
18. Which gel electrophoresis is used for protein separation?
19. What is the size of glass micropiette in Microinjection technique?
20. What voltage is used in electroporation techniques?

Answer the following questions (2 marks each)

1. Write the features of Liposome.
2. On what basis proteins are separated in PAGE?
3. For separating the larger protein molecules which factor should be controlled in PAGE
4. Define electrophoretic mobility with equation.
5. Write the function of buffers and ammonium per sulphate in PAGE.
6. What is the chemical composition of agarose?
7. Define DNA Microarray.
8. What are the different types of DNA microarray?
9. What is the basic principle of CaCl2 technique?
10. Why blocking is important in western blotting?
11. Write the differences between Native-PAGE and SDS-PAGE ?
12. Write the differences between Agarose gel electrophoresis and PAGE
13. How proteins are detected in western blotting?
14. Why western blotting is referred as gold-standard?
15. Write the application of microinjection technique.

16. Write the different detection method after probe hybridization in blotting?
17. Write the different artificial methods for DNA transfer with one example

Write short notes with diagram on (4 marks each)

1. Southern blotting
2. Northern blotting
3. Dot blotting
4. Elctroporation
5. Gene gun
6. Microarray

Unit 4

Answer the following questions (1 mark each)

1. What are Primers?
2. What does a reaction mixture of PCR consists?
3. Write down the characteristics of Taq polymerase?
4. Which activity is absent in Taq polymerase?
5. What was the first significant DNA sequence obtained?
6. What is the main enzyme component of Sanger Sequencing?
7. What acts as a chain terminator in Sanger sequencing?
8. What is a klenow fragment?
9. How many types of deoxynucleotide tri phosphates are used in Sanger sequencing?
10. What is the characteristic of a sequencing gel?
11. What is the molarity of urea in the sequencing gels?
12. What is the function of urea in sequencing gel?
13. What is Hot Start PCR?

Answer the following questions (2 marks each)

1. Primer and polymerases are added again during the reaction because they get consumed as the reaction proceeds. Justify whether true or false.
2. Explain how PCR technique can be used to amplify a DNA fragment?
3. Explain how PCR technique can be used to incorporate a mutation in a DNA fragment?
4. Explain how a PCR product can be sequenced.
5. What are the factors on should consider while designing a primer?
6. How can u empirically determine the annealing temperature of a PCR reaction?
7. Is it possible to get PCR amplification if only forward primers are used? Explain.
8. Both forward and reverse primers are essential for sequencing a DNA fragments. Justify whether true of false.
9. What are the properties of Real Time PCR assay?
10. What are the applications of RT-PCR?

11. How can you decide between one step RT-PCR and two steps RT-PCR?
12. State the differences between real time PCR and RT PCR.
13. Why primer annealing temperature should be chosen carefully?
14. How can PCR Product be cloned into a vector.

Unit 5

Answer the following questions (1 mark each)

1. First genomic DNA Library was cloned in what?
2. Why DNA is restricted to make a genomic library?
3. What do you understand by a genomic library?

Answer the following questions (2 marks each)

1. Write short note on cDNA library.
2. Justify whether true or false – colony hybridization is a technique that can be used to detect the presence of a specific DNA sequence in a cell.
3. How would you generate a genomic library and identify a known gene A in the library?
4. Write short note on colony hybridization.
5. State the role of RNase H in construction of a cDNA Library.
6. Which vectors are used for construction of genomic libraries? Why?

Unit 6

Answer the following questions in one to two words (1 mark each)

1. What is gene therapy?
2. Name two widely used vectors of gene therapy.
3. What is humulin?
4. Name two eukaryotic hosts suitable for production of recombinant insulim.
5. What is pre-pro insulin?
6. What are follitropin alpha and follitropin beta?
7. What do you mean by protein engineering?
8. What are GM crops?

Answer the following short questions (2 marks each)

1. Differentiate between in vivo gene therapy and ex vivo gene therapy.
2. What are lipoplexes? Explain the chief difficulty in using them.
3. What are Flavr-savr tomatoes?

4. What is t-DNA?
5. Differentiate between antigene and antisense therapy.
6. What are amplicon vectors?
7. Recombinant proteins are often made as fusion construct with a polyhistidine stretch. Explain the reason.
8. What are Adeno Associated Vectors? Why are they more safe than adenoviral vectors?
9. State the significance of cry gene in agriculture.
10. How can you cleave your

Answer the following broad questions (more than 2 marks)

1. Depending upon the nature of vaccine, how many types of recombinant vaccines are there? Discuss in brief. 5
2. Explain why DNA vaccines are superior to other vaccines in eliciting host immune response. 3
3. State the advantages of using adenoviral vectors in gene therapy. 3
4. Explain how you can use Polymerase Chain Reaction to introduce mutations in specific regions of a gene thus altering specific amino acids in the corresponding protein. 4
5. What are inclusion bodies? State an experimental strategy to recover your recombinant protein from inclusion bodies. (1+3)
6. What are the chief difficulties in cloning a pre pro insulin cDNA straightaway into an expression vector for production of recombinant insulin? How has been the problem/s solved? (2+3)

MCB-A-SEC-B-4-1
SEC-B:
1. FOOD FERMENTATION TECHNIQUE

Unit wise model questions

Answer the following multiple choice questions (1 mark each)

1. Preparation of baker's yeast cells for bread making is useful in
a. Massive increase in cell population to seed a commercial generation in the end
b. Biochemical & physiological condition of yeasts to meet the requirement of the user
c. High dough leavening quality
d. Both a. & b
e. All a., b. & c.
2. Microbial growth initiation in grain based foods is supported by
a. Water content of the grain
b. Polysaccharide content of the grain
c. Little amount of free sugar content of the grain
d. Previous batch of microbes
3. Prebiotic components of cereals include
a. Arabinoxylan & β-glucan
b. Small oligosaccharides
c. Amylopectin
d. All of the above
4. Phytate (myo-inositolhexaphosphate) is considered as a reservoir for
a. Vitamins
b. Minerals & phosphor
c. Sugar alcohols
d. Trace elements of nutrition
5. Sourdough is advantageous because
a. Inhibition of α-amylase and longer mold free period along with prevention of rope in bread
b. Extra bit of leavening is allowed
c. Sour taste creates easier fermentation condition
d. Makes bread delicious afterwards
6. Sourdough can be prepared by using
a. Addition of defined starter culture
b. Addition of mother sponge
c. Adding water into cereal powder
d. None of the above
7. Mother sponge is known as
a. Leavened dough
b. Starter culture to prepare sourdough

c. Piece of mature or ripe dough
d. Dough before the start of leavening

8. The microflora of spontaneously fermenting sourdough usually consists of
a. Saccharomyces cerevisiae + Lactobacillus casei
b. Pediococcus cerevisiae + Lactobacillus plantarum
c. Pediococcus cerevisiae + Streptococcus lactis
d. All of the above

9. Function of yeast in sourdough is
a. Acidification of dough
b. Amylolysis
c. Proper leavening
d. Generation of flavour

10. Anti-mold activity of sourdough is attributed to
a. Lactobacillus plantarum
b. Lactobacillus acidophilus
c. Lactobacillus sanfranciensis
d. Lactococcus lactis

11. Flavour development of dosa is due to the growth of
a. Lactobacillus delbruckii
b. Streptococcus lactis
c. Leuconostoc mesenteroides + Pediococcus cerevisiae
d. Debaryomyces hansenii + Trichosporon beigelli

12. Early stage fermentation of dosa is associated with
a. Heterofermentative LABs
b. Homo + Heterofermentative LABs
c. Homofermentative LABs
d. Yeasts

13. Late stage of idli fermentation is due to
a. S.lactis + P. cerevisiae
b. Yeasts + Lactococcus lactis
c. L. lactis + P. cerevisiae
d. P. cerevisiae only

14. Sauerkraut is prepared from
a. Carrot
b. Cauliflower
c. Mango
d. Cabbage

15. Principal homofermentative LAB associated to sauerkraut is
a. Lactobacillus brevis
b. Lactobacillus plantarum
c. Leuconostoc mesenteroides
d. P. cerevisiae

16. Off-flavoured kraut is caused by
a. Low [salt]

b. High temperature
c. Rapid fermentation by aerobic yeasts & molds
d. All of the above

17. Leaf mustard pickle is fermented by
a. Leuconostoc mesenteroides + Pediococcus cerevisiae
b. Lactobacillus helveticus + Lactobacillus bulgaricus
c. Lactobacillus plantarum only
d. Pediococcus cerevisiae only

18. "Chalky bread" is caused by
a. Debaryomyces hansenii
b. Candida kefir
c. Saccharomycopsis fibuligera
d. Zygosaccharomyces bailli

19. Black gram in idli/dosa is the source of
a. Lactobacillus plantarum
b. Pediococcus cerevisiae
c. Leuconostoc mesenteroides
d. All of the above

20. Pink kraut is caused by
a. Lactococcus lactis
b. Rhodotorula sp.
c. Lactobacillus plantarum
d. Penicillium sp.

Unit 1

Answer the following question in one to two words (1 mark each)

1. What is Kimchi?

Answer the following short questions (2 marks each)

1. What is the actual purpose of fermentation?
2. What do you mean by Kafir & Pulque?

Answer the following semi-descriptive questions (3 marks each)

1. What is the principal difference between primitive& modern beers?
2. How can meat-like texture be generated in fermented products?

Answer the following descriptive questions (4 & more marks each)

1. Discuss the health benefits of Cheese, yoghurt & Koumiss.
2. Describe the health beneficial effects of fermented foods.
3. Enlist the role of LABs in fermentation as a whole.

Unit 2

Answer the following question in one to two words (1 mark each)

1. What do you mean by surface ripening?

Answer the following short questions (2 marks each)

1. What is the specific role of Sterptococcus salivarius thermophilus in yoghurt fermentation?
2. How can the yoghurts be made sweet?
3. What is the actual utility of cheese preparation?
4. State the utility of salting in cheese making.
5. What is the purpose of ripening of cheese?

Answer the following semi-descriptive questions (3 marks each)

1. Classify yoghurt according to fat content.
2. State the characteristics of L. delbruckii bulgaricus & Bifidobacterium sp. in yoghurt.
3. Describe the roles of stabilisers in yoghurt preparation.
4. How the flavour can be developed in yoghurt?

Answer the following descriptive questions (4 & more marks each)

1. Mention the principal LABs associated with yoghurt fermentation.
2. Classify cheese with suitable examples.
3. Describe the two coagulation techniques of cheese mentioning the biochemistry in each case.
4. How do proteolysis & lipolysis affect ripening of cheese?

Unit 3

Answer the following questions in one to two words (1 mark each)

1. Which component makes the soy sauce delicious?
2. Enlist the type of yeasts involved in soy sauce maturation.
3. Define sourdough.
4. What factor does initiate the growth of microbes in cereals?
5. What do you mean by mother sponge?
6. What is chalky bread?

Answer the following short questions (2 marks each)

1. How can soy sauce & paste be differentiated?
2. Cite four flavour imparting components of soy sauce.
3. How the baking is carried out in case of bread preparation?
4. Indicate the difference between idli & dosa?
5. Describe the nutritive value of dosa.

Answer the following semi-descriptive questions (3 marks each)

1. Classify soy sauce depending on preparation principles & physical properties
2. Enlist the properties of starter mold in soy sauce fermentation.
3. What is finished koji? How does it look like?
4. Discuss the purpose of using yeast in soy sauce maturation.
5. Comment on the anti-mold activity of sourdough.
6. How the flavour can be generated in sourdough?
7. What is the advantage of using Zygosaccharomyces bailii in dough formation?
8. Comment on the utility of black gram in idli or dosa preparation?
9. How may the ingredient composition specify the microbial fermenting process in idli making?

Answer the following descriptive questions (4 & more marks each)

1. Give examples of four common molds in cheese ripening.
2. Discuss the purpose of using both starchy & proteinacious starting materials in soy sauce preparation.
3. What is the role of two types of molds in soy sauce fermentation?
4. How the soy sauce can be pasteurised?
5. What do you mean by dough rising? How this can be achieved?
6. How cereals can be considered as microbial substrate?
7. Cite the advantages of usage of sourdough.
8. Describe the various LABs useful in preparing sourdough.
9. Demonstrate the role of yeasts in sourdough making?

Unit 4

Answer the following questions in one to two words (1 mark each)

1. Which is the starting material of sauerkraut fermentation?

Answer the following short questions (2 marks each)

1. What do you mean by fu-choy & mei-kan-choy?
2. Describe the biochemical changes brought about in sauerkraut fermentation.
3. What are the natural antibacterials found in cabbages?
4. What is the purpose of sauerkraut fermentation?

Answer the following semi-descriptive questions (3 marks each)

1. Why fully ripened cucumbers are unsuitable for pickling?
2. How the cabbage is pre-treated in sauerkraut fermentation?
3. Indicate the role of salt in sauerkraut fermentation.
4. What are the principal heterofermentative LABs involved in sauerkraut fermentation?
5. Demonstrate the role of homofermentatives in storage of cabbage.
6. Define the terms: Pink kraut, Soft kraut, Off-flavoured kraut.

Answer the following descriptive questions (4 & more marks each)

1. Comment on the microbes associated with natural fermentation of cucumber pickle?
2. Describe the microbiological aspects of leaf mustard pickle fermentation briefly.

Unit 5

Answer the following questions in one to two words (1 mark each)

1. What is the main LAB involved in meat fermentation?
2. How was the term 'sausage' coined?
3. Define: Frankfurter; Bologona.
4. What are biogenic amines?
5. Give one example of amylolytic LAB.
6. What are puti shidal & phasa shidal?
7. Give the examples of fishes used to prepare lonailish.

Answer the following short questions (2 marks each)

1. Define the role of ascorbate in meat pre-processing?
2. Cite the difference between semi dry & air dried sausage.
3. What role do casings play in sausage preparation?
4. Why the fish fermentation is not considered as conventional type of fermentation?
5. State the role of garlic in fish fermentation process.
6. What is the utility of 'matka' in NE Indian fish fermentation?
7. What are the bacterial types to carry out lonailish fermentation?
8. What do you mean by hentak & tungtap?

Answer the following semi-descriptive questions (3 marks each)

1. What are various types of sausages?
2. Enlist the various purposes of smoking of the meat.
3. What do you mean by sucuk? Where was it started?
4. Discuss the various beneficial effects of fermented meat.
5. How the LABs are selected for starter culture in meat fermentation?

6. What are the specific roles of molds in meat fermentation?
7. Cite the major differences between two types of fermented fishes.
8. Indicate the difference between fish sauce & paste.
9. State the microbial role in shidal preparation briefly.

Answer the following descriptive questions (4 & more marks each)

1. Cite some examples of aroma generating compounds formed in meat fermentation.
2. Briefly mention the role of yeasts in meat fermentation.
3. Colour of cured meat is indicative of meat quality- justify.
4. Cite some examples of aroma generating compounds formed in meat fermentation.
5. What are the two main types of fermented fish?
6. What are the autochthonous bacteria of fish?
7. Describe the fish fermentation with carbohydrate specially mentioning the role of carbohydrates

Unit 6

Answer the following questions in one to two words (1 mark each)

1. Define probiotic & symbiotic foods.
2. Define koumiss.

Answer the following short questions (2 marks each)

1. What is bio-yoghurt?
2. What is the utility of mare's milk in koumiss fermentation?

Answer the following semi-descriptive questions (3 marks each)

1. Cite the unique features of kefir.
2. Discuss the similarities & dissimilarities of koumiss & kefir.
3. Mention the microflora used in koumiss preparation briefly.

Answer the following descriptive questions (4 & more marks each)

1. Describe the preparation of acidophilus milk.
2. What kind of drawback is associated with L. acidophilus in acidophilus milk preparation? How can that be solved?
3. State the microbes involved in kefir fermentation with their respective roles.

Head of the Department