

## **HOLIDAY ASSIGNMENT**

### **BIOTECHNOLOGY**

#### **ClassXII**

#### **Chapter 1: Recombinant DNA technology**

- Q.1. Write importance of rop in E. Coli vector ?
- Q.2. What is rDNA ? List its features. How do enzymes restriction endonucleases and DNA ligase help in its formation ?
- Q.3. What is the Natural source of Agarose. Mention one role of agarose in biotechnology.
- Q.4. Why is Agrobacterium tumefaciens a good cloning vector ? Explain.
- Q.5. What is the role of Ethidium Bromide during agarose gel electrophoresis of DNA fragments ?
- Q.6. (a) Write palindromic Nucleotide reference for DNA segments 5' GAATTC 3'  
(b) Name the restriction endonuclease that recognise this sequence.  
(c) How are sticky ends produced ? Mention its role ?
- Q.7. If a researcher began with a sample that contained three copies of dsDNA , how many copies would he be able to generate after 27 cycles of PCR ?
- Q.8. Write two distinguishing features of pBR322 and BAC vectors.
- Q.9. Which vectors can be used to clone a fragment of DNA with the following lengths ?  
(i) 4 kb      (ii) 35 kb      (iii) 20 kb      (iv) 250 kb
- Q.10. If a reseracher began with a sample that contained four copies of dsDNA, how many copies would he be able to generate after 28 cycles of PCR.

#### **Chapter 2: Protein structure and Engineering**

- Q.1. Name two human diseases caused by the absence of proteins ?
- Q.2. How are H<sub>2</sub> bonds formed in protein ?
- Q.3. Indicate two ways by which sickle cell anemia can be diagnosed. What is the molecular defect in these patients ?
- Q.4. Protein based products are useful in everyday life. Give one application each of any two such products.
- Q.5. What are probiotics ? Give an example.
- Q6. Who deveploped first the protein sequencing method ?

- Q.7. Indicate four general precautions to be observed for maximal stability of proteins during purification.
- Q.8. Relationship between number of genes and number of proteins is non-linear. Explain the above statement.
- Q.9. Which amino acids are present in whey ?
- Q.10. What is the carbon part of BCAA used as ?
- Q.11. Explain why analysis of mRNA does not provides a direct reflection of protein content in the cell.
- Q.12. What are the various non covalent interactions involved in quaternary protein structure?

### **Chapter 3: Genomics Proteomics and Bioinformatics**

- Q.1. Give important database used in routine Bioinformatics ?
- Q.2. Suggest one possible way for going about analyzing a given sequence using Bioinformatics?
- Q.3. What is the number of predicted genes in humans ?
- Q.4. How much human genome is similar to each other ?
- Q.5. Expand BLAST ? What kind of analysis can be undertaken with this search tool ?
- Q.6. Write 10 letter sequence each typical of DNA and protein.
- Q.7. What is FISH technique used for? How are flurescent colours introduced into chromosomes.
- Q.8. Do you think in siico based prediction techniques are accurate in genomics ? Support your answer with reasoning.
- Q.9. What are the main branches of genomics one can study ?
- Q.10. The microarray techniques can be used to compare gene products between normal and cancer cells. Explain the principles involved in this technique with diagram ?

### **Chapter 4: Microbial cell culture and its applications**

- Q.1. In large scale microbial culture media, olive oil or sunflower oil is an additive. What purpose does this serve ?
- Q.2. Growth media for microbial growth is not always adjusted to pH=7. Why ?
- Q.3. Why are mutagens used for microbial strains ? Name any one mutagen.

- Q.4. Why is aeration important for microbial growth? How a proper aeration be achieved in microbial cultures grown under laboratory conditions.
- Q.5. What is lyophilization ?
- Q.6. Why is the Nutrient medium autoclaved before using it for culturing microbes?
- Q.7. Mention any three techniques used to count microbes in a culture. Which technique can measure live cells ?
- Q.8. How is large quantity of air, required in industrial fermentor sterilized ?
- Q.9. What problems must be tackled while expressing a eukaryotic gene in a prokaryotic host ?
- Q.10. In a microbial culture underlying balanced growth, how is the specific growth 'u' calculated. Suggest an equation showing its relationship with cell concentration (gm/L) and time (hour).

#### **Chapter 5: Plant cell culture and its applications**

- Q.1. Give three examples of vectorless gene transfer methods in plants?
- Q.2. In micropropagation, apical meristem are used for raising virus free plants, why ?
- Q.3. Why is 'golden rice' nutritionally superior to normal rice ?
- Q.4. Name any two components of a plant tissue culture medium and indicate its use.
- Q.5. Explain the term 'organogenesis' as applied to plant tissue culture.
- Q.6. What is the principle of barnase – baster gene system ? How have plant breeders exploited this sytem ?
- Q.7. How are inter-genetic somatic hybrids made ? Give any one benefit of these.
- Q.8. Write briefly the benefits of Biodegradable plastics that are produced from GM plants ?
- Q.9. Describe protoplast culture and its applications.
- Q.10. How can you obtain virus free potato plants from virus-infected plants ? Are these plants virus-resistant ? Why or why not ?

#### **Chapter 6: Animal cell culture and its applications**

- Q.1. What is the main Buffer system used in animal culture ?
- Q.2. Give two features by which continous and finite cell lines can be distinguished ?
- Q.3. Animal cell cultures are grown in CO<sub>2</sub> incubators rather than regular BOD's. Why ?
- Q.4. Briefly list the features of finite cell lines and continous cell lines.

- Q.5. If you wish to scale up cells derived from human tissue, what kind of culture set-up would you use and why ?
- Q.6. What is the mode of action of t-PA. Name one medical application of t-PA .
- Q.7. How are cancerous cells determined in biopsy ?
- Q.8. What are stem cells ? Describe the applications of Embryonic stem cell technology?
- Q.9. What is the importance of pH while culturing animal cells ? How is the pH maintained in culture media ?
- Q.10. How are animal cells preserved ? Give two examples of cryopreservatives ?

### **CBSE PROJECT HOLIDAY HOMEWORK**

#### **PROJECT WORK WAS GIVEN TO STUDENTS ON DIFFERENT TOPICS**

- 1 STEM CELL TECHNOLOGY
- 2 DNA FINGERPRINTING
- 3 GENETICALLY MODIFIED ORGANISMS
- 4 ROTAVIRUS VACCINE
5. BIOREMEDIATION
6. NANOTECHNOLOGY
7. PRODUCTION OF VACCINES
8. RECOMBINANT DNA TECHNOLOGY.
9. MICROARRAY TECHNOLOGY
10. RED BIOTECHNOLOGY & ITS APPLICATIONS