

**INTERNATIONAL INDIAN SCHOOL – DAMMAM**  
**PRELIMS – 2013-2014**  
**CLASS: XII - BIOTECHNOLOGY**

**Time Allowed: 3 Hrs**

**General Instructions:**

- All questions are compulsory.
- There is no overall choice. However internal choice has been provided in one question of three marks and two questions of five marks. You have to attempt only one of the choices in such questions. Question paper contains four sections – A, B, C and D
- Question numbers 1 to 5 are very short answer questions, carrying 1 mark each.
- Question numbers 6 to 15 are short answer questions, carrying 2 marks each.
- Question numbers 16 to 25 are also short answer questions, but carrying 3 marks each.
- Question numbers 26 to 28 are long answer questions, carrying 5 marks each.
- Use of calculators is not permitted. However, you may use log tables if necessary

**Section – A (1 Mark)**

1. Name two factors that can reduce the ionic bond strength between amino acid residues in proteins.
2. Why is it necessary to insert gaps when aligning two or more genetic sequences?
3. Growth media for microbial growth is not always adjusted to pH7 why?
4. What is the main feature of suspension cultures?
5. Explain aqueous two phase partition.

**Section – B (2 Marks)**

6. Relationship between number of genes and number of proteins is not linear. Give reason.
7. How would you ensure that production of a recombinant molecule does not occur until required?
8. In the presence of DMSO and high concentrations of serum, it is possible to store animal cells for long periods at very low temperatures why?
9. You wish to introduce the human insulin gene into a bacterial host in the hope of producing large amount of human insulin. Should you use genomic DNA or cDNA? Explain.
10. List any 2 database retrieval tools available from NCBI. Does similarity between two sequences always indicate their homology? Explain.
11. How is *Pischia pastoris* is better expression host compared to *Saccharomyces cerevisiae*?
12. Differentiate between roller bottle and spinner culture.
13. Explain any two analysis made using bioinformatics tool.
14. Indicate use of the following in microbial cell cultures  
[a] aeration [b] agar [c] antifoams [d] corn steep liquor.

15. What is the principle of MALDI-TOF? What is its main use in protein studies?

**Section – C (3 Marks)**

16. In a parental dispute case, an RFLP analysis was performed on DNA obtained from the child, mother and paternal uncle (as the disputed father had died). Would the results be conclusive? Give reason.

17. [a] Give any two applications of proteolytic enzymes

[b] What are cytokines and name any two factors included in them

[c] Give any two analytical applications of enzymes and antibodies.

18. Mention any 3 techniques used to count microbes in a culture.

19. What is BLAST? Describe the principles that underlie BLAST search.

**OR**

Why do in vitro cultures of plant cells require several nutrients unlike intact plants?

Name any two such nutrients.

20. Why is golden rice nutritionally superior to normal rice? And how does the rice seem to have golden color?

21. What are monoclonal antibodies? Suggest one application of it.

22. List the general conditions followed to stabilize protein during down stream process.

23. [a] Why is *Agrobacterium tumefaciens* regarded as nature's genetic engineer?

[b] Name an ornamental and a crop plant each where micro propagation has been commercially successful.

24. Write two important features of cultured animal cells. Differentiate between primary and secondary cell cultures.

**Section – D (5 Marks)**

25. [a] Discuss the procedure of Southern hybridization technique. [b] Draw diagrams to illustrate it.

[c] What do you call variations of Southern hybridization developed for RNA and proteins?

26. Explain how charge relay system operates in chymotrypsin.

**OR**

The functional properties of a protein are dependent on its 3-D structure

[a] what are the three main non-covalent interactions that contribute to the folding of a protein into specific shapes?

[b] Differentiate between hydrogen bonds and van der Waals forces.

[c] What are prions? Name a disease caused by them.

27. Make a tabular list of any five restriction enzymes mentioning their source as well as recognition sites.

**OR**

[a] Enlist the various steps involved in a recombinant DNA experiment.

[b] What is the advantage of having a polylinker in a cloning vector?

[c] Name a cloning vector that can be used to clone large DNA fragments (> 1 MB).