Sample Question Paper
Class: XII
Biotechnology (Theory) (2017-18)
Sub Code: 045

Time: 3 Hours Max. Marks:70

General Instructions:
- All questions are compulsory
- Question paper consists of 4 sections A,B,C and D
- Question numbers 1 to 6 are very short answer questions each carrying one mark
- Question numbers 7 to 14 are short answer questions each carrying two marks
- Question numbers 15 to 25 are also short answer questions each carrying three marks
- Question numbers 26 to 28 are long answer questions each carrying five marks
- There is no overall choice. However an 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.
- Use of calculators is not permitted .However, you may use log tables, if necessary.

	SECTION A	
1.	Specify the role of "cos" sites in bacteriophage lambda.	1
2.	Expand and define PER.	1
3.	What would be the effect of an aqueous environment on the bond strength of ionic bonds between amino acid residues in a protein?	1
4.	How is lipofection used to deliver genes into cells?	1
5.	Name the scientists who were first to introduce trypsin for the sub culturing of adherent cells.	1
6.	Write any one distinguishing feature of pBR 322 and pUC19 vectors.	1
	SECTION B	
7.	What is meant by tissue engineering?	2
8.	How does the metagenomics approach help to identify novel genes present in the environment? Explain the process.	2
9.	Explain various plant regeneration pathways.	2

10.	A researcher wants to introduce a desired gene into a specific host cell .Write any two methods that can be used for the same.	2
11.	Differentiate between somaclonal variations and gametoclonal variations. Who proposed the term "Somaclones" for plant variants?	2
12.	*C.elegans* a eukaryotic organism with a genome of 97 Mb and about 20,000 genes. Why does organizational features of this genome are unusual when compared to the genomes of other eukaryotes, such as yeast and *Drosophila*?	2
13.	Highlight graphically the differences between culturing microbes in the school laboratory and a bioreactor which allow cells to grow in a continuous culture system.	2
14.	How can you maximize protein stability during purification? Write any two parameters for the same.	2
	SECTION C	
15.	Discuss the various types of shapes & structures that a protein takes to make a functional protein .Write various forces responsible for these structures.	3
16.	Outline the process of creation of chimeric mouse by embryonic stem cell culture.	3
17.	What is a DNA probe? Explain the principle of Sanger's method of DNA sequencing.	3
18	Expand BLAST. Differentiate between Homologues and Paralogs.	3
19.	You have succeeded in purifying a protein from yeast .Name a technique you would use and the principle behind it for determining the molecular mass of this protein .	3
20.	Explain the methods which can be used for the scaling up of animal culture.	3
21.	State any three advantages of using *Pichia pastoris* as a eukaryotic expression host.	3
22.	How would you detect a specific microbial contamination from a given water sample using PCR. Give a brief explanation of the process.	3

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<tr><td>23.</td><td>Following are few transgenic crops approved by U.S.F.D.A .Identify ‘a’ , ‘b’ and ‘c’ and complete the table.
<table>
<tr><th>Crop</th><th>Gene(s) introduced</th><th>New/Improved Character</th><th>Developer</th></tr>
<tr><td>Canola</td><td>a</td><td>High laurate oil</td><td>Calgene</td></tr>
<tr><td>Corn</td><td>EPSP synthase</td><td>b</td><td>Monsanto</td></tr>
<tr><td>Cotton</td><td>Acetolactate synthase</td><td>Weed Control</td><td>c</td></tr>
</table></td><td>3</td></tr>
<tr><td>24.</td><td>Rohan cultured streptococcus bacteria in his lab to check whether it is gram positive or negative and then he threw the culture directly in dustbin. Is this method of disposal ethically and ecologically safe?</td><td>3</td></tr>
<tr><td>25.</td><td>What are edible vaccines? How are they better than conventional vaccines? Give any two points.
OR
What are somatic hybrids? How are they produced?</td><td>3</td></tr>
<tr><td></td><td>SECTION D</td><td></td></tr>
<tr><td>26.</td><td>What are type II restriction endonucleases ? Give an example of a type II restriction endonucleases that generates flush ends and the sequence recognized by it. Explain how are they named. Name any other enzyme and its utility in cloning experiment.</td><td>5</td></tr>
<tr><td>27.</td><td>Name the technique developed by O’ farrel. Schematically depict key steps in the separation of proteins using the technique. Highlight the basis of separation at each step.
OR
Classify protein based products. Give one example under each category along with its application. How are these useful to the biotechnology industry?</td><td>5</td></tr>
<tr><td>28.</td><td>Explain how cDNA microarray technique can be used to study cellular response to the environment? Support your answer with a flowchart for the same.
OR
a)Which information can be retrieved from the following databases?
i)EMBL
ii)PDB
iii)PALI
b)Give two reasons for completely sequencing a genome.</td><td>5</td></tr>
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