SMART SKILLS

2017-18

Class XI

BIOTECHNOLOGY

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Assignment 1 **Introduction, Protein and Carbohydrates**

1. What is bioinformatics?

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2. What are biosensors?

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3. How is nanobiotechnology different from nanotechnology?

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5. What is cloning?

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6. Give the applications of plant cell culture and animal cell culture.

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7. Briefly describe protein engineering.

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8. How is biotechnology useful in paper-pulp and textile engineering?

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9. Fill up the blanks in the given table.

S.No.	Reagent	Colour of the product	Result
1.	Alkaline Copper salt solution	Yellow-red ppt	----------
2.	----------	Blue	Arginine
3.	Strong acid +-------	----------	Pentose in DNA or RNA
4.	DPA +acid	----------	Deoxyribose in DNA

10. Complete the reaction:
Ninhydrin +---------- --oxidative deamination----→ NH_3=CO_2

ASSIGNMENT: 2 Nucleic Acids

1. What is a nucleotide?

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2. Name the scientists who gave the structure of DNA.

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3. How is nucleotide different from nucleoside?

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5. Name the sugars present in:
   1. DNA----------
   2. RNA----------
6. Draw the structure of the above sugars.

7. Draw the structure of dNTP and rNTP

ASSIGNMENT: 3
BIOCHEMICAL TECHNIQUES

1. Complete the table below on the basis of centrifuge types:

S.No.	Centrifuge Type	Speed	RCF	Applications
1.	Low Speed	----------	----------	
2.	----------	12,0000 rpm	----------	----------
3.	----------	----------	----------	----------
4.	----------	---------- ---------	60,0000g	----------
5.	ultracentrifuge	---------- -	----------	----------

2. Complete the table below on the basis of centrifugation techniques:

S.No.	Centrifugation Technique	Principle	Applications
1.	Differential Sedimentation	Differential Speed	
2.	Density Gradient Centrifugation a.Rate Zonal/Velocity Sedimentation b.Isopycnic	a. components of the mixture move as distinct bands	----------
3.	Density Barrier Single Step Density Barrier	Separation on the basis of buoyant density	----------

3. Define Ion Exchange Chromatography.

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4. Complete the following with respect to the Ion Exchange Chromatography :

1. Sample ions have differential degree of interaction with matrix which depends on: Difference in their ----------,---------- and distribution of ---------- on their surface.

2. This interaction can be controlled by changing ----------and pH.

3. Positively Charged Exchanger are called as ---------- Exchanger because here Negatively charged---------- are exchanged with ----------(anions)sample ions.

4. Negatively Charged Exchanger are called as ---------- Exchanger because here Positively charged---------- are exchanged with ----------(cations)sample ions.
5. Matrix is made up of: ----------or ----------, cellulose and polymers of ---------- and----------.
6. IEC is a powerful technique for separating two proteins differing in only one---------- ---------- ----------.

5. I. a. What is Electrophoresis?

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b. DNA is ---------- charged but in case of proteins the net charge depends on:----------

----------at a given pH.

c. For separation of DNA, ---------- gel is used due to the large molecular size of: ----------

d. For proteins -------- gel is used because it provides a stable medium, eliminates convection in the electrophoresis tank and does not react with sample or retard its movement.

e. Polyacrylamide gel is made of:

1. Monomers: ----------

2. Initiators: ----------

3.Propagators: ----------

4. Terminator: ----------

II.a. For Polymerisation of acrylamide, Ammonium persulfate forms ----------which activates----------.Once the linear chain is formed the gelation and cross-linking is brought about by ----------.

b. SDS is used to enable the seaparation of the proteins only on the basis of their -------Chemically

SDS is a ----------. It affects the protein by ----------it and causing ----------proteins to separate into ----------.

c. In SDS-PAGE as well as in Agarose gel electrophoresis after the separation the heavy molecules are at ----------part of the gel while the lighter molecules are at ---------- part of the gel.

6. Complete the following on the basis of IEF:
   a. Separation of molecules according totheir……,which is the pH value at which ----------
   b. ------gradient is formed by compounds called as---------- which are complex mixture of synthetic----------.
7. Spectroscopy:
   a. Electro magnetic radiations include:Y rays, ----------,----------,----------,---------
   b. Light source of the colorimeter ----------
   c. Light source of spectrophotometer…….....
   d. Application of the spectrophotometer/colorimeter
      ……...
8. Draw the diagram of the components of a colorimeter.

9. Draw the diagram of the components of a spectrophotometer.

10. State Beer and Lambarts Law.

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11. In the form of a flow chart describe the procedure of Mass Spectrometry.

12. State the principle of Mass Spectrometry

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13. Write the applications of Mass Spectrometry

ASSIGNMENT: 4 Cellular Techniques

1. Define Resolving Power.

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2. Complete the table below on the basis of staining techniques:

S.No.	Name of the stain	Applications
1.	H&E stain	----------
2.	Giemsa stain	----------
3.	Gram's stain	----------
4.	Malachite Green	----------

3. Complete the following table on the basis of Microscopy technique:

S.No.	Type of the Microscopy	Type of lens	Principle	Applications
1.	Phase Contrast			
2.	Dark Field			
3.	Fluorescence			
4.	TEM			
5.	SEM			

4. Complete the following with respect to the Cell Sorting :

7. Extracellular matrix and intercellular junctions are disrupted by treating the tissue with ---------- and ----------.The former acts on proteins while the latter ----------on which cell-cell adhesion depends. This process is known as ----------
8. Separation of different cell types is done by ----------.
9. Here the cells are identified by measuring----------or ---------- as they flow through a laser beam.
10. FACS is ----------.
11. Here cells are labeled with ----------coupled with ----------.

5. a. List various methods of Cell Fractionation:

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b. Starting from lungs as the sample source make a flow chart to obtain small polyribosomes.

6.	Give the disadvantage of the Direct microscopic count. --- --- --- ---
7.	What is a Coulter Counter? What is its limitation? How it can be overcome? --- --- --- ---
8.	What is MPN? --- --- --- ---
9.	What is viable count? How is it obtained? --- --- --- ---

ASSIGNMENT: 5 Genome Function

1. State Central Dogma.

   _____

   _____

2. Differentiate between:
   1. Gene and Genome
   2. Monocistronic and polycistronic
   3. Pseudo and mosaic genes
   4. Exon and intron
   5. Translation and Transcription
   6. DNA polymerase 3′ to 5′ exonuclease activity and 5′ to 3′ exonuclease activity

3. Write the genome size of:
   1. *Mycoplasma*
   2. *Methanococcus*
   3. *E. coli*
4. Write the total number of genes in *E.coli* and Humans.
5. Describe in detail the structure of nucleosome.

6. Draw a self-explanatory diagram of Messelson and Sthal's experiment.

7. 1. What are Okazaki fragments?

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2. Write the structure and function of RNA polymerase.

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3 How is the transcription site labeled?

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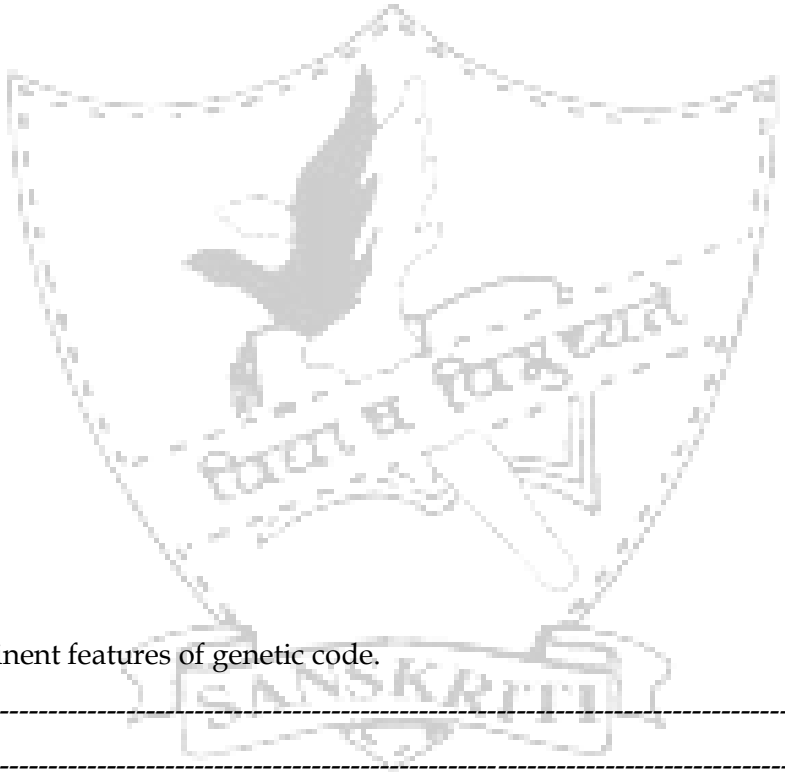
8. Draw a well labeled diagram of t RNA.



9. Write the prominent features of genetic code.

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10. In a point wise manner write the process of transcription.

11. In a point wise manner write the process of translation.

12 Draw a flowchart of lac operon.

ASSIGNMENT: 6 Genetic Techniques

1.	What is Karyotypimg? _____ _____
2.	What type of samples can be used for karyotyping? Which sampling technique is better and why? _____ _____ _____ _____
3.	4. Expand FISH. 5. Draw a flow chart to show the various steps of FISH.
4.	What are auxotrophs? How will you raise an auxotrophic mutant?Write the procedure in pointwise manner. _____ _____ _____ _____ _____ _____ _____ _____

	_____ _____ _____ _____
5.	What is conjugation. What is the disadvantage of conjugation. _____ _____ _____ _____