(84 & A-66) Seat No.:_____ No. of printed page: 2

SARDAR PATEL UNIVERSITY

M.Sc. Integrated Biotechnology, Fifth semester Examination (NC)

PS05CIGB01- Enzymology

Monday, 27th March, 2017

2:00 p.m. to 5:00 p.m.

Total marks: 70

Note:

1) Figures to the rights indicate marks
2) Draw neat and labeled diagram wherever necessary.

Q.I **Multiple choice questions:** **(08)**

1 Enzymes bound with their cofactors termed as_____.

a) Apoenzyme c) Holoenzyme

b) Coenzyme d) None of the above

2 According to which hypothesis, substrate is considered as 'Solid'?

a) Lock and key c) Transition state stabilization

b) Induced fit d) None of the above

3 What is used for formation of gradient in Isoelectric focusing?

a) Ampholytes c) Polar molecules

b) Chemical agents d) All of the baove

4 _____ is used to prepare protoplast of *E. Coli.*

a) EDTA c) Glucanase

b) Hydrolytic enzymes d) Chitinase

5 _____ is the Y- intercept of L. B. plot of single substrate enzyme catalyzed reaction.

a) Km/Vmax c) 1/Vmax

b) -1/Km d) Vmax/Km

6 Which type of inhibitors bind with an enzyme irrespective of the binding of substrate with an enzyme?

a) Non competitive c) Competitive

b) Un competitive d) Partial

7 Isozyme identification study is governed mainly by which of the following techniques?

a) Agarose gel electrophoresis c) Native PAGE

b) Chromatography d) Both b) and c)

8 Creatine phosphokinase has _____ ioszumes.

a) 4 c) 3

b) 2 d) 5

(P.T.O.)

Q.II **Answer the following (Any seven)** **(14)**

1. Define : Cofactor, Holoenzyme, Apoenzyme and Co-enzyme
2. What is activation energy? How enzymes help in to increase in rate of reaction?
3. Differentiate between enzyme catalyzed and uncatalyzed reactions.
4. Give basic principle and significance of SDS PAGE.
5. Briefly discuss the procedure of extraction of enzymes from plant tissue.
6. Derive Han's equation with its plot.
7. What do you mean by competitive and Non competitive inhibitors? Give reaction showing dead end complex formation in case of each.
8. Write functions of Alkaline phosphatase isozymes with their significance in brief.
9. Discuss advantages and disadvantages of immobilization of enzymes.

Q.III **(a)** Describe Induced fit and transition state stabilization hypothesis in detail. **(06)**

(b) Describe FMN and FAD with their roles in enzyme catalysis. **(06)**

OR

(b) Explain mettalloenzymes and metal activated enzymes with examples. **(06)**

Q.IV **(a)** Elaborate on immunoadsorption and Covalent chromatography. **(06)**

(b) Explain procedure of extraction of enzymes from different sources. **(06)**

OR

(b) Write a note on Affinity chromatography. **(06)**

Q.V **(a)** Derive Michaelis- Menten equation for single substrate enzyme catalyzed reaction according to the Briggs- Haldane modification. **(06)**

(b) Derive Lineweaver- Burk equation and its plot for competitive enzyme inhibition. **(06)**

OR

(b) Write a note on Substrate and Allosteric enzyme inhibition. **(06)**

Q.VI **(a)** What do you mean by Isozymes? Explain LDH isozymes in detail. **(06)**

(b) Give industrial applications of enzymes. **(06)**

OR

(b) Describe covalent binding and entrapment methods of immobilization of enzymes in detail. **(06)**

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(76 A & A-83) Seat No.:_____ No. of Printed Pages: 02

SARDAR PATEL UNIVERSITY
M.Sc. Integrated Biotechnology
5th Semester Examination [ATKT] (NC)
Tuesday, 28th March, 2017
02:00p.m. to 05:00p.m.
PS05CIGB02: Recombinant DNA technology

Total Marks: 70

Note:(i) Figures to right indicate marks.
(ii) All questions are compulsory.

Q.1		**Choose the most appropriate alternative for the following: (All are compulsory)**	[8]
	1.	Restriction enzyme HindIII (A/AGCTT) give _____ ends. (a) Blunt (b) Sticky (c) sticky and Blunt both (d) Any	
	2.	Annealing temperature is _____ than the melting temperature. (a) 5° higher (b) 5° lover (c) equal (d) based on template	
	3.	_____ is a melting temperature for primers FP: acctaatgctgatgcgagcta and RP: gccttatagtgaataccgcga. (a) 68°C (b) 52°C (c) 48 °C (d) 72 °C	
	4.	_____ is suitable thermostable DNA polymerase for TA cloning. (a) Taq Pol (b) Pfu (c) Primers (d) PCR	
	5.	PCR is involved in _____ technique. (a) RAPD (b) RFLP (c) Restriction mapping (d) Ligation	
	6.	Gene therapy involved insertion of rectified _____ into the organism. (a) Drug compound (b) DNA sequence (c) Viral particles (d) Antibodies	
	7.	DNA isolated from soil is experiment of _____. (a) restriction digestion (b) metagenomics (c) fungus isolation (d) soil characterization	
	8.	Gene inserted for glyphosate resistance is example of _____. (a) Metabolic engineering (b) ligation (c) PCR (d) restriction digestion	
Q.2		**Attempt <u>any seven</u> of the following:**	[14]
	1.	Give example and application of restriction enzymes.	
	2.	List out components of PCR mixture.	
	3.	What is nested PCR.	
	4.	Give different types of thermostable DNA polymerases.	
	5.	What is SSR?	
	6.	Give application of overlap extension PCR.	
	7.	What is multiplex PCR.	

	8.	List out examples of GMO.	
	9.	Give application of rDNA in molecular diagnosis.	
Q.3	A.	Explain procedure and principle of Plant DNA isolation.	[6]
	B.	Give concept of restriction and modification.	[6]
		OR	
	B.	Give difference and application of genomic and cDNA libraries.	[6]
Q.4	A.	Explain procedure of TaqMan probe in Q-PCR.	[6]
	B.	Enlist factors affecting PCR, advantages, limitations and application of PCR.	[6]
		OR	
	B.	ARMS (amplification refractive mutation system) PCR	[6]
Q.5	A.	Give detail note on automated sequencer.	[6]
	B.	Explain the procedure of DGGE.	[6]
		OR	
	B.	Explain sequence reading method with example in Maxam-Gilbert method.	[6]
Q.6	A.	Explain different types of Gene therapy.	[6]
	B.	Give example in Molecular pharming.	[6]
		OR	
	B.	Different methods applied in Molecular Diagnostics.	[6]

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(80 & A-70) Seat No.:_____ No. of Printed Pages : 2

Sardar Patel University
External Theory Examination
Integrated M.Sc. Biotechnology
IGBT-V Semster
Biotechnology: Principle and Practices (PS05CIGB03)
Thursday, 30th March 2017
2:00 pm to 5:00 pm

Total Marks: 70

Note:
1) Attempt all the questions (including multiple choice questions) which are to be written in the provided answer book only.
2) Draw neat and labeled diagram wherever necessary.

Q.I **Multiple choice questions:** **(08)**

1 Which organic solvent commonly used to dissolve cell membrane?
(a) Lipase/Methanol Mixture
(b) Methanol/Hcl Mixture
(c) Chloroform/Lipase Mixture
(d) Chloroform/ Methanol Mixture

2 _____most commonly used as an osmoticum to prevent sub cellular organelles.
(a) Glucose
(b) Sucrose
(c) Fructose
(d) Galactose

3 DNA chip technology is based on which principle?
(a) Polymerization
(b) Oxidation
(c) Hybridization
(d) None of these

4 Oligonucleotide Microarrays are prepared by using_____
(a) Photodeprotection
(b) Autoradiography
(c) Light mask
(d) None of these

5 All stages of cell fractionation must be performed at_____.
(a) 20°C
(b) 4 °C
(c) 35°C
(d) 10°C

6 Which group of bacteria is responsible for Biogas production?
(a) Methanogens
(b) Streptococcus
(c) Archebacteria
(d) Bacillus

7 *Bacillus thuringenesis* produce toxins which can kill_____.
(a) Human
(b) Animals
(c) Insect
(b) Human and animals

8 Which of the following has maximum transplantation success rate?
(a) Autograft
(b) Allograft
(c) Xenograft
(d) Syngenic graft

(P.T.O.)

Q.II		**Answer the following (Any seven)**	**(14)**
	1.	Enlist different methods of cell disruption.	
	2.	Write the scopes of Biotechnology.	
	3.	Write the role of bioinformatics in biotechnology.	
	4.	Give the different requirements of plant tissue culture laboratory.	
	5.	Write the applications of DNA chip.	
	6.	What is Xenotransplantation?	
	7.	Define Following : a) Biodegradation b) Composting c) Land filling d) Bioremediation	
	8.	Give the applications of Transgenic mice.	
	9.	Give the benefits of Human Genome Project?	
Q.III	**(a)**	Give a detailed account on cell fractionation techniques.	**(06)**
	(b)	Why *Arabidopsis thaliana* considered as an ideal model organism?	**(06)**
		OR	
	(b)	Explain the general protocol for the isolation of DNA from Plant.	**(06)**
Q.IV	**(a)**	Enlist the essential requirements and their role in animal tissue culture laboratory.	**(06)**
	(b)	Describe DNA chip technology.	**(06)**
		OR	
	(b)	Explain about chemical synthesis of nucleic acid.	**(06)**
Q.V	**(a)**	Write a note on "Monoclonal antibody as a diagnostic tool".	**(06)**
	(b)	What is gene therapy? Explain the methodology of virus based gene therapy.	**(06)**
		OR	
	(b)	What is immobilization of enzyme? Explain immobilization by entrapment method.	**(06)**
Q.VI	**(a)**	Write a detailed note on Transgenic sheep.	**(06)**
	(b)	With the help of example explain: How insect resistance plants can be created?	**(06)**
		OR	
	(b)	Write a note on Biofuel production.	**(06)**

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(95&A-66) SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

External theory examination

M.Sc. CIGBT) **Semester V (N5)**

PS05CIGB04 – Bioinformatics and Structural Biology

31st March, 2017, Friday

Time: 02:00 p.m. to 05:00 p.m.

Q 1 **Multiple Choice Questions.** **[08]**

1. _____ is the protein sequence database.
   a) PDB b) Swiss Prot
   c) GenBank d) SCOP
2. Which one of these is a hereditary disease database?
   a) OMIM b) CATH
   c) DDBJ d) PubMed
3. The heuristic method of sequence comparison is
   a) BLAST b) FASTA
   c) Both a) and b) d) None of these
4. _____ is the local alignment algorithm.
   a) Needleman – Wunsch b) Smith - Waterman
   c) Nussinov d) None of these
5. _____ is an example of protein secondary structure.
   a) Alpha helix b) Beta sheets
   c) Beta strands d) All of these
6. Which one of these is the method of determining protein structure?
   a) X ray crystallography b) NMR
   c) Both a) and b) d) All of these
7. _____ is the method of RNA structure prediction.
   a) Energy Minimization b) Nussinov
   c) Base pair maximization d) All of these
8. Protein structure in PDB is stored in _____ format.
   e) .pdb f) .gif
   g) .jpg h) All of these

Q 2 **Short Questions (Attempt any seven).** **[14]**

1. What is bioinformatics?
2. What do you mean by sequence retrieval system?
3. Differentiate between primary and secondary databases.
4. Give full form of PIR, EMBL, SCOP and PDB.
5. Define alignment. Write its types.
6. What is the use of goniometer?
7. What do you mean by ab initio method of protein structure prediction?
8. How many classes are there of protein in SCOP?
9. What is PDB?

P.T.O.

Q 3

A.	Write a short note on NCBI.	**[06]**
B.	Discuss the nucleotide sequence databases.	**[06]**
	OR	
B.	Write down the applications of bioinformatics.	**[06]**

Q 4

A.	Explain BLAST and its types.	**[06]**
B.	Describe multiple sequence alignment in detail.	**[06]**
	OR	
B.	Give a brief note on phylogenetic analysis.	**[06]**

Q 5

A.	Discuss the levels of protein structure in brief.	**[06]**
B.	Write a short note on RNA secondary structure.	**[06]**
	OR	
B.	Explain the steps of x - ray crystallography in detail.	**[06]**

Q 6

A.	Write a detailed note on protein classification databases.	**[06]**
B.	Give an account on RNA structure prediction methods.	**[06]**
	OR	
B.	Discuss homology modeling in detail.	**[06]**

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(2)

(87&A-53) SEAT No._____ No. of Printed Pages: 02

Sardar Patel University

M. Sc. Integrated Biotechnology Examination, Fifth Semester
Saturday, 1st April, 2017
02:00 p.m. to 05:00 p.m.
PS05CIGB05: Bioinstrumentation

Total Marks: 70

Notes: - 1) Figures to the right indicate marks.
2) Draw neat and labeled diagram, wherever necessary.

Q.1 Choose the Correct Answers of the Following. **[08]**

1. If concentration of H^+ is greater than 1×10^{-7} then solution is____.
   (a) acidic (b) basic (c) neutral (d) aqueous
2. Fine insoluble solid particles can be removed through_____.
   (a) crystallization (b) centrifuging (c) decanting (d) separating funnel
3. Which of the following is best suited to get the surface view of an object?
   (a) Compound microscope (b) TEM (c) SEM (d) TEM & SEM
4. When the power of ocular lens is 10X and objective lens is 20X, the magnification is_____.
   (a) 20 times (b) 30 times (c) 50 times (d) 200 times
5. In reverse phase chromatography, the stationary phase is made____.
   (a) non-polar (b) polar (c) either non-polar or polar (d) none of these
6. Thin layer chromatography is_____.
   (a) partition chromatography (b) adsorption chromatography
   (c) electrical mobility of ionic species (d) none of these
7. The role of 2-mercaptoethanol in sample preparation for SDS-PAGE is__.
   (a) to enhance solubility of protein (b) to maintain protein in native state
   (c) to reduce disulphide bonds (d) to provide negative charge to proteins
8. The electrophoresis technique that used isoelectric focusing is____.
   (a) PFGE (b) SDS-PAGE (c) Native PAGE (d) 2D-PAGE

Q.2 Answer the following in short. (Attempt Any Seven) **[14]**

1. What is pH? Enlist the different methods used to determine pH.
2. Explain ionization constant.
3. Enlist the different factors affecting pH measurement.
4. Give the comparison of bright field and dark field microscopy.
5. What are electromagnetic lenses?
6. Narrate the application of TLC.
7. What is the principle of HPLC.
8. Give the importance of gradient gel electrophoresis.
9. What are advantages of 2D-gel electrophoresis?

Q.3 (A)	Discuss the application of centrifugation. Enlist the safety aspects in centrifugation.	[06]
(B)	Describe the different types of rotor used in centrifugation technique.	[06]
	OR	
(B)	Discuss the construction and working of pH meter with suitable diagram.	[06]
Q.4 (A)	Write a comparative note on SEM and TEM.	[06]
(B)	Discuss possible multiple parameter analysis with flowcytometer.	[06]
	OR	
(B)	Explaining the function, discuss the principle and working of fluorescence microscopy.	[06]
Q.5 (A)	Explain working of FPLC. Give its application.	[06]
(B)	What is Column chromatography? Write a note on Ion exchange chromatography.	[06]
	OR	
(B)	Explain the any detector used in gas chromatography.	[06]
Q.6 (A)	Explain the principle of IEF and discuss its applications in detail.	[06]
(B)	Discuss the role of agarose for separation of DNA and RNA.	[06]
	OR	
(B)	Discuss various factors influencing electrophoretic separation of molecules in poly-acrylamide gel.	[06]

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SEAT No._____ No. of Printed Pages: 02

[1328A76]

SARDAR PATEL UNIVERSITY

M. Sc Integrated Biotechnology (IGBT) - Vth (05) Semester

Subject Code & Subject: PS05CIGB06 - PLANT PHYSIOLOGY

Date: 03-04-2017, Monday Time: 02: 00 P. M TO 05: 0 P.M Total Marks: 70

Note: (1) All questions are compulsory. (2)Figure to right indicates marks.

Q-1. Answer the following objective questions. 1x8= 08

1. In ice, water molecules form, a.....

(A)Tetrahedral structure (B)Triangular structure (C)Quadrangular structure (D)None of them

2. Ascent of sap in higher plant takes place through.....

(A)Phloem (B)Xylem (C) Parenchyma (D) None of them

3. .....in green plants constitute the photosynthesis apparatus.

(A)Chloroplast (B) Mitochondria (C) Golgi bodies (D) None of them

4. Excited singlet state and is also unstable with a half life of.....

(A)10^{-12} (B) 10^{-09} (C) 10^{-10} (D) 10^{-03}

5. Primary physiology effect of auxin in plant is stimulating the elongation of cells in.....

(A)Shoot (B) Root (C)Shoot and Root (D)None of them

6. Rice seedlings infected by the fungus is.....

(A)*Gibberella indica* (B) *Gibberella fujikuroi* (C) *Gibberella gibrella* (D) *Gibberella fujikara*

7. Thigmonastic movement is found in the leaves of .....

(A) Drosera (B) Oxalis sp. (C) Mimosa pudica (D) None of them

8. Which of the following is not vital movement.....

(A)Movement of locomotion (B)Hygroscopic movement (C)Movement of curvature (D)All of them

Q-2. Answer the following (Any Seven). 02X07=14

1. Write the advantages of Plasmolysis.
2. Define the imbibitions and osmosis.
3. Write the significance of photosynthesis to mankind.
4. Enlist the different types of photosynthesis pigment.
5. Write the differences between photoperiodism and vernalization.
6. Write the practical application of Ethylene.
7. Write the difference between Tropic movement and Nastic movement.
8. Explain the why and how plants usually bend towards the source of light.
9. What is stress physiology?

P.T.O

Q-3 (A). Define Transpiration. Enlist the factors affecting the rate of transpiration. Discuss any three factors. (06)

(B). Write a short note on osmosis. (06)

OR

(B). What are the different theories of ascent of sap? Discuss any two theories. (06)

Q-4 (A). Write a short note on Photosynthesis apparatus. (06)

(B). Give a critical account of the various factors influencing photosynthesis. (06)

OR

(B). Give an account of Calvin cycle. (06)

Q-5 (A). Discuss the physiological effects and practical application of Auxin. (06)

(B). Write a short note on photoperiodisum. (06)

OR

(B). Write a short note on Kinetic of Growth. (06)

Q-6 (A). Discuss the different types of movements of locomotion in plants. (06)

(B). Write short note on (A) Photonastic movement (B) Tropic movement (06)

OR

(B). Give a brief account of water and salt stress in plants. (06)

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