

[704A-26]

() SARDAR PATEL UNIVERSITY

M. Sc. Integrated Biotechnology External Examination, Sixth Semester

Date: 03/11/2017, (Friday)

Time: 2:00 pm to 5:00 pm

PS06CIGB02: Genetic Engineering

Total Marks: 70

Q-1 Multiple choice questions (All are compulsory).

[08]

- (1) Transformation method of plants and animals in which plants and animals are given shocks is known as
a) microinjection b) genome breeding c) electroporation d) genome engineering
- (2) Any DNA molecule that has the ability to replicate in an appropriate host cell, to which the desired gene are integrated for cloning, is called as
a) Plasmid b) linker c) vector d) adapter
- (3) The most popular and widely used engineered plasmid vector is
a) pBR 322 b) pUC vectors c) pSC101 d) pUC 19
- (4) Which of the following is an RNA dependent DNA synthetase
a) DNA polymerase I b) DNA polymerase II c) Reverse transcriptase d) all of these
- (5) If you want a radiolabel a DNA strand using P32, which of the following is the most suited enzyme for that purpose?
a) DNA polymerase b) Reverse transcriptase
c) Polynucleotide Kinase d) Terminal transferase
- (6) For cross linking of nucleic acids to nylon membranes the short and medium wave UV light employed is
a) 254-312 nm b) 180-250 nm c) 320-410 nm d) None
- (7) Ti plasmids that is used as a plant vector is obtained from
a) *Agrobacterium tumefaciens* b) *Agrobacterium rhizogenes*
c) *Agrobacterium radiobacter* d) *Thermus aquaticus*
- (8) Golden rice is a genetically modified crop plant where the incorporated genes are meant for biosynthesis of -----
a) vitamin A b) vitamin C c) vitamin B d) Beta-carotene

Q-2 Answer the following questions in short. (Any Seven)

[14]

- (1) Write properties of plasmid.
- (2) Write a note on microinjection.
- (3) Write the importance of vector in cloning.
- (4) Write a note on Alkaline phosphatase and Terminal transferase enzymes.
- (5) What are the importance of salmon sperm DNA in hybridization procedure?
- (6) Write a short note on Southern blotting.
- (7) What do you mean by nested deletion?
- (8) Write a note on promoter.
- (9) Write the different steps of safety in genetic engineering.

- Q-3 (A) Discuss the importance and structure of pBR322 vector. [06]
(B) Explain the principle and importance of electroporation method of transformation. [06]
- OR
- (B) Explain the different properties of Vectors and hosts for suitable transformation. [06]
- Q-4 (A) Discuss a method of full length cDNA cloning in detail. [06]
(B) Explain Clarke and Carbon method with example for producing representatives Genomic libraries in Cloning vector. [06]
- OR
- (B) Explain at least two different methods for selection of recombinant vector consisting of Gene of interest (GOI). [06]
- Q-5 (A) Describe various direct and indirect methods used for screening of recombinant clones [06]
(B) Explain the techniques involved in Northern blotting. [06]
- OR
- (B) Discuss the method of subtractive hybridization in detail? [06]
- Q-6 (A) Briefly explain site directed mutagenesis [06]
(B) Write a short note on the risk associated with genetic modified crops and food [06]
- OR
- (B) With suitable examples explain purification of recombinant protein [06]

.....X.....

SARDAR PATEL UNIVERSITY
M.Sc. Examination - November 2017
M. Sc. Integrated Biotechnology (IGBT) - 6th Semester
Tuesday, 07th November 2017
Session: Evening Time: 02:00 pm to 5:00 pm
Subject / Course code: - PS06CIGB03
Subject / Course Title: - Industrial Microbiology

Maximum Marks: 70

Note: (1) All the Questions are compulsory. (2) Figures on the right indicate marks.

Q.1. Choose the correct option

1x8= 8

- (i) Which one of the following is the example of In-Line sensor?
 [A] Ion specific sensor. [B] Mass spectrophotometer
 [C] Antifoam probe [D] tachometers
- (ii) The volumetric mass transfer coefficient, $K_L a$ has the unit ____
 [A] $\text{cm}^2 \text{h}^{-1}$ [B] h^{-1}
 [C] cm^3/cm^2 [D] cm^2/dm^3
- (iii) Which one of the following method is not used for sterilization of media?
 [A] Radiation [B] Filtration
 [C] Agitation [D] Heat
- (iv) In *Corynebacterium glutamicum* increased cell permeability to the Glutamic acid can be achieved in the following ways
 [A] ensuring biotin deficiency in the medium
 [B] treatment with fatty acid derivatives
 [C] addition of penicillin during growth of glutamic acid bacteria
 [D] All of the above
- (v) _____ feedback control is inhibition the first enzyme of pathway by each end products by a certain percentage independently of other end products.
 [A] Co-operative [B] Cumulative
 [C] Concerted [D] sequential
- (vi) The AISI has standards for a broad range of stainless steels that can be used in many applications. What is the full form of AISI.
 [A] American Institute for Steel and Iron
 [B] American Indian Standard Iron
 [C] American Iron and Steel Institute
 [D] American Institute of Standard Iron
- (vii) The most widely used chemical for protoplast fusion, as fusogen, is _____.
 [A] Mannitol [B] Sorbitol
 [C] Mannol [D] Poly ethylene glycol
- (viii) Isolation & detection of microorganisms, which are able to produce antibiotic, is largely done by _____ technique.
 [A] auxanography [B] enrichment
 [C] crowded plate [D] sandwich

Q.2. Attempt any seven of the following

2x7= 14

- a) Role of pH indicator dyes in primary screening.
 b) What is baffle and function of it?
 c) Define batch and continuous culture
 d) Enlist characteristics of industrially important microorganisms.

(P.T.O.)

- e) Explain the terms crude medium and synthetic medium
- f) What are absolute filters and depth filters?
- g) Enlist the applications of citric acid
- h) Define the term precursors and buffers.
- i) Define the term Primary screening and secondary screening.

Q. 3. (A) Discuss in detail the technique used for primary screening of Antibiotic producing organisms. [06]

(B) Enlist various methods of preservation of industrially important microorganisms. Explain any one method in detail. [06]

OR

Q. 3. (B) Discuss with suitable examples for the isolation of induced mutant producing improved yields of primary metabolites [06]

Q. 4. (A) Discuss in detail the crude carbon sources used in fermentation medium and factors affecting choice of carbon sources in fermentation medium. [06]

(B) Discuss in detail on Antifoam agents. [06]

OR

Q. 4. (B) Explain the design of continuous sterilization process with labelled diagram. Write advantages of continuous sterilization over batch sterilization. [06]

Q. 5. (A) Explain the various functions of fermenter and describe the body construction of a fermenter with suitable diagram. [06]

(B) Enlist the different process variables, which requires measurement and control. Explain any one in detail. [06]

OR

Q. 5. (B) Give an account on components involved in aeration and agitation. [06]

Q. 6. (A) Discuss in brief on Surface, submerged and solid state fermentation. [06]

(B) Write a note on Solvent extraction method for product recovery with suitable example. [06]

OR

Q. 6. (B) Discuss in brief the fermentative production of amylase. [06]

— X —
②

SC

(181)

SEAT No. _____

No. of Printed Pages: 02

SARDAR PATEL UNIVERSITY
M. Sc. Integrated Biotechnology (IGBT) 6th Semester
 Thursday 9th November 2017
 2:00 pm to 5:00 pm
PS06CIGB04 – Biosensors and Biocrystallography

Maximum Marks: 70

Note: 1) All the Questions are compulsory.
2) Figures on the right indicate marks.

Q.1 Multiple choice questions: (08)

- [1] _____ term describes the maximum expected error associated with a measurement or a sensor.
 - a) resolution
 - b) sensitivity
 - c) accuracy
 - d) precision
- [2] Resistance and capacitance are _____ measured.
 - a) Chemical
 - b) Thermal
 - c) Electrical
 - d) Mechanical
- [3] _____ is father of biosensor.
 - a) Edison
 - b) Clark
 - c) Verneuil
 - d) Albert
- [4] _____ is not a mediator in second generation biosensor.
 - a) Acrydine Orange
 - b) TCNQ
 - c) Ferrocene
 - d) None of above
- [5] Purity of enzyme at various stage of purification is best measured by _____ of an enzyme.
 - a) Percent recovery
 - b) Total activity
 - c) Specific activity
 - d) none of these
- [6] The 3 D structure of protein crystal can be determined by _____.
 - a) XRD
 - b) NMR
 - c) Spectroscopy
 - d) a and b both
- [7] There are __ types of crystal systems.
 - a) 7
 - b) 14
 - c) 21
 - d) 28
- [8] The wavelength of X-ray is _____.
 - a) 0.01 to 10mm
 - b) 10 to 100 nm
 - c) 0.01 to 10nm
 - d) 0.01 to 100nm

Q.2 Answer the following (Any Seven) (14)

1. Write the parameters required for dynamic characteristic.
2. State operating principle of Electrodes.
3. Give the components of biosensor.
4. Write the application of biochip.
5. Enlist the methods of bioreceptor immobilization.
6. Differentiate between a conventional crystal and macromolecular crystal.

7. Define : Space lattice and Single crystal
8. Derive Bragg's law.
9. Enlist the properties of X-rays.
- Q.3 (A) Discuss in detail about the mechanical and thermal characteristics of sensors. (06)
(B) Explain electric characterization methods of sensors. (06)
OR
(B) Define sensor. Write its principle and importance. (06)
- Q.4 (A) Describe the types of biosensors based on the use of different sensor device. (06)
(B) Define Immobilization. Explain and three methods for immobilization of enzyme. (06)
OR
(B) Write a note on second generation biosensors. (06)
- Q.5 (A) What is crystallization? Explain any two technique of protein crystal growth. (06)
(B) Enlist physical properties of organic compound and Write a note on Isomerism in detail (06)
OR
(B) Enlist and explain the physical properties of organic compounds. (06)
- Q.6 (A) Write a note on modern Coolidge tube for production of X-rays. (06)
(B) Discuss in detail the powder and rotating crystal methods for diffraction of X-rays. (06)
OR
(B) Give detailed note on structure determination of protein crystals by x-ray crystallography. (06)

— x —

(2)

(169)

SEAT No. _____

No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
 M.Sc (Integrated Biotechnology), VIth Semester Examination (ATKT)
 Saturday, 11th November, 2017
 2:00 pm to 5:00 pm
 IGBT
 PS06CIGB05 – Bioanalytical techniques

TOTAL MARKS: 70

Q.1 Tick mark / select the correct answer for the following. (Only correct option against given question number needs to be written in provided answer book) (08 Marks)

1. One of the following is used to disperse the radiation according to wavelength
 - a. Source
 - b. Monochromator
 - c. Sample holder
 - d. Nebulizer

2. One of the following is most commonly used source for visible radiation.
 - a. Tungsten filament lamp
 - b. Hydrogen lamp
 - c. Deuterium lamp
 - d. Nernst glower

3. Flame photometry is also known as
 - a. Atomic emission spectroscopy
 - b. Flame emission spectroscopy
 - c. Both (a) and (b)
 - d. None of these

4. The very near IR region ranges from _____ to _____
 - a. 1.2 ; 2.5
 - b. 2.5 ; 25
 - c. 25 ; 300
 - d. 25; 400

5. Fluorescence spectroscopy deals withphenomenon.

a. Emission	c. Transmission
b. Absorbance	d. None of these

6. In mass spectroscopy, the mass spectrum is a plot of theof the ions at each m/z ratio.

a. Resonance frequency	c. Relative abundance
b. Emission	d. None of these

7. In radiometric titration, titration curve is always.....

a. Curved	c. Linear
b. Sigmoid	d. None of them

8. Ionization radiation is producing by atom.

a. Unstable atom	c. Both (a) and (b)
b. Stable atom	d. None of them

(1)

(P.T.O.)

- Q.2 Answer any seven from the following: 14
- a) Define hypochromic and hypsochromic effect
 - b) State Beer's law
 - c) Explain how photovoltaic cell works
 - d) How turbidity and temperature affects Beer's law?
 - e) Draw schematic diagram of double beam spectroscopy
 - f) Enlist the various components of mass spectrometers.
 - g) What is nuclear resonance
 - h) Write a short note on solid scintillation counting.
 - i) Write the principle of radio ligand assay technique.
- Q.3 (A) Explain wavelength selectors and light sources used in UV visible spectrometer 6
- (B) Discuss factors affecting Beer's law in detail 6
- OR
- (B) Describe detectors used in UV Spectroscopy 6
- Q.4 (A) Discuss radiation sources and monochromators used in IR spectroscopy 6
- (B) Write detailed note on AAS 6
- OR
- (B) Discuss the role of components of absorption spectroscopy 6
- Q.5 (A) Give a detail account on Fluorescence spectroscopy 6
- (B) Discuss the various applications of mass spectroscopy in details 6
- OR
- (B) Write the principle and important applications of NMR spectroscopy in details 6
- Q.6 (A) Explain in detail about autoradiography technique 6
- (B) Discuss in detail about radio ligand assay 6
- OR
- (B) Write a detail note on any one of the method used for radiation detection 6

← X →
②

(94)

SEAT No. _____

Number of Printed Pages = 2

SC

SARDAR PATEL UNIVERSITY

M. Sc. (Integrated) Biotechnology – Sixth Semester Examination

Tuesday, 14th November, 2017

02:00 pm to 5:00 p.m.

PS06CIGB06: ANIMAL PHYSIOLOGY

- Note: 1) Figures to the right indicate marks
2) Draw diagram wherever necessary

TOTAL MARKS: 70

Q.1 Tick mark / select the correct answer for the following. (Only correct option against given question number needs to be written in provided answer book) (08 Marks)

- 1) Salivary amylase secreted into the oral cavity starts the digestion of
 - a) proteins
 - b) starch
 - c) lipids
 - d) amino acids
- 2) Which of the following secrete hydrochloric acid?
 - a) Mucous
 - b) Parietal
 - c) Chief
 - d) Serosa
- 3) _____ blood group is known as universal donor:
 - a) AB
 - b) A
 - c) B
 - d) O
- 4) Haemoglobin is found in the _____.
 - a) thrombocytes
 - b) leucocytes
 - c) erythrocytes
 - d) pinocytes
- 5) Resting membrane potential of neuron is _____.
 - a) -55mV
 - b) -70mV
 - c) -90mV
 - d) +30mV
- 6) The functional unit of kidney is called:
 - a) Ureters
 - b) Nephron
 - c) Bowman's capsule
 - d) Urinary bladder
- 7) One of the following cell type secretes insulin:
 - a) Alpha
 - b) Beta
 - c) Delta
 - d) Gamma
- 8) Which gland regulates the "Biological Clock" of human body?
 - a) adrenal gland
 - b) parathyroid glands
 - c) pineal gland
 - d) thyroid gland

(1)

(P.T.O)

- Q.2 Answer **any seven** from the following: 14
- a) Enlist the organs of the digestive system.
 - b) Write the phases of swallowing.
 - c) What is the role of vitamin K in clotting?
 - d) Write the various types of circulatory systems.
 - e) Sketch and label the structure of neuron.
 - f) State two points of difference between action potential and graded potential.
 - g) Draw a schematic representation of the internal structure of a kidney.
 - h) List any three endocrine glands with their secretions
 - i) Define glomerular filtration rate (GFR)?
- Q.3 (A) Explain the structure and functions of salivary glands. 6
- (B) Discuss the structure and functions of liver in metabolism and homeostasis. 6
- OR
- (B) Describe the role of stomach in digestive system. 6
- Q.4 (A) Describe the structure and composition of blood. 6
- (B) Explain the extrinsic and intrinsic pathways of blood clotting. 6
- OR
- (B) Write a short note on chambers of heart. 6
- Q.5 (A) Classify neurons on the basis of structure and function. 6
- (B) Describe the propagation of action potential across a chemical synapse 6
- OR
- (B) Enlist the different parts of brain and with detailed function. 6
- Q.6 (A) Write an explanatory note on structure and types of nephron. 6
- (B) Describe the location, structure and endocrine functions of pancreas. 6
- OR
- (B) Discuss the structure and function of filtration membrane. 6

— ✕ —
 (2)

[75]

Sardar Patel University

M. Sc. (INTEGRATED) BIOTECHNOLOGY- VI SEMESTER
FINAL THEORY EXAMINATION (ATKT), NOVEMBER 2017

PS06CIGGB01: Fundamentals of Immunology1ST Nov. 2017

TIME: 2:00 to 5.00 pm

Max. Marks: 70

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

Q.I	Answer the following Multiple Choice Questions. All are compulsory	[08]
1.	The antigens present in blood are presented to B cells in a. Lymph nodes b. spleen c. thymus d. MALT	
2.	The following is not an example of granulocyte a. Neutrophil b. basophil c. eosinophil d. monocyte	
3.	In IgG glycosylation occurs atdomain a. C _H 1 b. C _H 2 c. C _H 3 d. C _H 4	
4.	The antibody class present in external secretion is a. IgG b. IgA c. IgD d. IgE	
5.	MHC complex in mice is called as a. HLA b. HLB c. H-2 d. H-3	
6.	Thymic selection is exerted at following stage a. Single positive b. single negative c. double positive d. double negative	
7.	In Radio immunoassay, the labeling is done with a. I ¹²⁵ b. P ³² c. S ³⁵ d. H ¹	
8.	Vaccine shows a. Memory b. specificity c. memory and specificity both d. neither memory nor specificity	
Q.II	Answer the following questions. (Attempt Any Seven)	[14]
1.	What are PAMPS?	
2.	Differentiate between innate and adaptive immunity.	
3.	Explain haptens.	
4.	Mention the differences in antigen recognition by B cell and T cell.	
5.	Draw a labeled diagram of antibody molecule.	
6.	Enlist differences between plasma cell and memory cell	
7.	Explain immunoprecipitation curve.	
8.	What is Coomb's test?	
9.	Give example of toxin-antitoxin reaction.	

Q.III (A)	Discuss thymus as a primary lymphoid organ.	[06]
(B)	Enlist and discuss characteristics of phagocytic cells.	[06]
	OR	
(B)	Write a note on inflammation.	[06]
Q.IV (A)	Discuss the structure of different antibody classes and their functions.	[06]
(B)	Explain the steps in the formation of membrane attack complex in classical pathway.	[06]
	OR	
(B)	Describe the technique for production of monoclonal antibody.	[06]
Q.V (A)	Describe activation of B lymphocytes by thymus dependent and thymus independent antigens.	[06]
(B)	Discuss the structure of MHC class I and II molecules.	[06]
	OR	
(B)	Write a note on T cell activation	[06]
Q.VI (A)	What is attenuated vaccine? How is it produced? Mention its advantages and disadvantages.	[06]
(B)	Write a note on (i) ELISA OR (ii) Recombinant vaccine	[06]

XXXXXXXXXXXXXXXX