SIC

SEAT No._____

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No. of printed pages: 02

Sardar Patel University
M.Sc. (Integrated) Biotechnology
External Theory Examination
PS09CIGEB1 – Green Biotechnology
1st November, 2017 (Wednesday)
Time: 10:00 a.m. to 01:00 p.m.

Total Marks: 70

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

1. _____aquatic fern is an excellent biofertilizer.
   a) Desmodium b) Azolla
   c) Marsilea d) Pteridium
2. _____ is example of biofertilizer.
   a) Rhizobium b) Azospirillum
   c) Azotobacter d) All of these
3. Enzyme involved in gene splicing of bioplastic.
   a) kinase b) dehydrogenase
   c) lipase d) ligase
4. Liberation of P from organic phosphate compound is mainly due to the action of enzyme of _____ type.
   a) Catalase b) Esterase
   c) Peroxidase d) Ligase
5. Direct accumulation of contaminants into plant shoots with subsequent removal of plant shoots is _____.
   a) phytoextraction b) Rhizosphere degradation
   c) both a) and b) d) Phytovolatilization
6. Biological factors affecting bioleaching
   a) Redox potential b) temperature
   c) pH d) All of these
7. Transgenic plants can be produced only when the cell are also capable of _____.
   a) Regenerating complete plantlets b) Mutation in cell division
   c) Response to plant growth regulators d) None of these
8. Antisense transgenic plants produced fruit that softened
   a) More rapidly than the normal fruit b) More slowly than the normal fruit
   c) As the normal fruits d) None of these

Q 2	**Short Questions (Attempt any seven).**	
1.	Write the role of Rhizobium in crop response.	[14]
2.	Write do you mean by biofertilizer? Write any three examples of biofertilizers.	
3.	Define Entomopathogenic fungi and Entomopathogenic virus with example.	
4.	What is IPM? Write any four applications of IPM.	
5.	What is MEOR?	
6.	What do you mean by bioleaching?	
7.	Define Rhizofiltration and phytostabilization.	
8.	Write a short note on benefits of transgenic crops in crop improvement progra	
9.	What do you mean by alien gene and its importance in transgenic crops?	

Q 3 A.	Write a detail note on mycorrhiza as a biofertilizer and its benefits in agriculture system.	[06]
Q 3 B.	Discuss in detail about mode of action of P-solubilization by microbes.	[06]
	OR	
Q 3 B.	Write various applications of biofertilizers in crop improvement programmes with suitable examples.	[06]

Q 4 A.	Write about starch based and cellulose based bioplastic in detail.	[06]
Q 4 B,	Give a note on production of *Bacillus thuringiensis.*	[06]
	OR	
Q 4 B.	Explain the production of Entomopathogenic fungi.	[06]

Q 5 A.	Explain Microbial Enhanced Oil Recovery in detail.	[06]
Q 5 B.	Describe microbial mechanisms of desulphurization.	[06]
	OR	
Q 5 B.	Discuss phytoremediation in detail.	[06]

Q 6 A.	Give a detail account on manufacture of valuable products through transgenic gene expression in crops.	[06]
Q 6 B.	Explain in detail about production of transgenic banana and mango.	[06]
	OR	
Q 6 B.	Discuss in detail about various transformation techniques used for transgenic plants.	[06]

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No. of Printed Pages: 02

[A-87] SARDAR PATEL UNIVERSITY

M. Sc. -Integrated Biotechnology – Ninth Semester Examination

Friday, 03rd November 2017

Time: 10:00 am to 01:00 pm

PS09CIGEB2: Waste Management

Q.1 **Mark the right answer of following questions.** **Total Marks – 70** [08]

1. Problem of solid wastes disposal can be reduced through _____.
   a. Recycling b. Lesser pollution c. Treatment & disposal d. Population control
2. Facilities that perform the function of preparing recyclables for marketing are referred to as ____.
   a. TSD b. MRF c. WTE d. RDF e. All of these
3. Under RCRA definition, a waste that explodes or reacts with water or acid and is unstable is considered to be _____.
   a. Ignitable b. Corrosive c. Reactive d. Toxic e. a & b both f. All of these
4. _____ components are included in category 3 of biomedical wastes.
   a. Cytotoxic drugs b. Catheters & tubing c. Attenuated vaccines d. Chemicals & Pesticides
5. Most municipal wastes end up _____.
   a. As compost b. In an incinerator c. In an open dump d. In a sanitary landfill
6. Which of the following is not a method for the disposal of hazardous wastes?
   a. Land filling
   b. Thermoplastic
   c. *In-situ* vitrification
   d. Organic polymer stabilization
7. Metal extraction and plastic separation are the responsibilities of _____ stackholders.
   a. Preliminary E-waste generators
   b. Formal sector
   c. Business/Government sector
   d. Major stackholder
8. Secure landfills require all except one of the following _____.
   a. Single liners
   b. Ground water monitoring
   c. Post closure activities
   d. Leachate collection system

Q.2 **Answer the following questions. (ANY SEVEN OUT OF NINE)** [14]

1. What are the objectics of municipal solid waste management?
2. Explain basal convention and RCRA in brief.
3. Which factors affect biological treatment processes of hazardous wastes?
4. What are the specifications of landfill site?
5. Enlist regulation related with E-waste management.
6. How E-waste is different than general wastes?
7. Explain mechanisms of syngas production.
8. Which inorganic chemicals are produced from hospitals? Write applications of any four.
9. Describe different types of radioactive wastes.

Q.3 A. Outline sound technologies of collection, transfer and enlist treatment technologies for municipal solid waste management. [06]

B. Describe objectives and processes of various components used for material recovery facilities. [06]

OR

B. What are the advantages of RDF? Write a note on refused derived fuel. [06]

Q.4 A. Describe physical treatment processes used for management of hazardous wastes (any six) [06]

B. Explain thermoplastic, thermo-settling and encapsulation of stabilization technologies used for hazardous waste disposal. [06]

OR

B. Discuss various chemical treatment technologies generally used for management of hazardous wastes. [06]

Q.5 A. How separation of E-waste components is carried out? Write a note on treatment of E-wastes. [06]

B. Write short notes on: 1. Effects of E-wastes on environment and human health
2. Types of incinerator used for waste management [06]

OR

B. Summarize different metal recovery processes used for management of solid/liquid wastes. [06]

Q.6 A. Which different types of hazards caused by biomedical wastes? Describe advantages and processes of biomedical waste minimization. [06]

B. Explain requirement and advantages of segregation of BMW at source, labeling and container details used for BMW collection with their probable treatment options. [06]

OR

B. Discuss various treatment and disposal technologies used for radioactive waste management. [06]

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SARDAR PATEL UNIVERSITY

M. Sc. Integrated Biotechnology (IG-EBT) 9th Semester
External Theory Exam - November 2017
PS09CIGEB4 – Environmental Issues and Impact Assessment
09th November 2017 (Thursday), 10:00 am to 1:00 pm

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) Environmental Impact Assessment (EIA) is mandatory under which one of the following India legislations?

[A] Indian Forest Act
[B] Air (Prevention and Control of Pollution) Act
[C] Wildlife Protection Act
[D] Environment (Protection) Act

(ii) Which one is not the on-site activity performed in Environmental audit?

[A] Interaction with local staff
[B] Inspection of field conditions
[C] Sampling and test
[D] Audit Scheduling

(iii) Which statement is not correct for hazardous wastes?

[A] They contain one or more of toxic compounds
[B] They catch fire easily
[C] They are nonreactive and stable
[D] They are capable of corroding metal containers

(iv) Right to clean environment is guaranteed in Indian Constitution by

[A] Article 14
[B] Article 19
[C] Article 21
[D] All of the these

(v) Human activities add 7-9 gigatons of CO_2 per annum into the atmosphere. Major contributor to this CO_2 is_____

[A] Burning of fossil fuels
[B] Clearing of forests for agriculture
[C] Fermentation industries
[D] Cement industries

(vi) _____ has published guidelines for different sectors which outline the significant issues to be addressed in the EIA studies.

[A] DBT
[B] MOEF
[C] DST
[D] Planning Commission

(vii) Full form of SQS _____

[A] Standard Quality Sources
[B] Standard Quality Series
[C] Stream Quality Standards
[D] Stream Quantity Standards

(viii) Full form of MCDM

[A] Multi Criteria Decision Making
[B] Multi Criteria Development Make
[C] Multi Condition Decision Make
[D] Multi Component Decision Making

P.T.O.

Q.2. Attempt any Seven of the following **2x7=14**

(a) What are the objectives of environmental audit?
(b) What is environmental audit?
(c) Enlist the major Environmental acts and rules applicable in India
(d) Which are ecologically sensitive areas that are notified by the govt. of India (Ministry of Environment and Forest)?
(e) What are strategic metals and minerals? Give two examples of each.
(f) Define the role of WQT for water related project assessment.
(g) What is SIAM and for which kind of project assessment it is useful.
(h) Write the significance of public hearing step of EIA cycle
(i) Write the significance of Ad-hoc method

Q. 3. [A] Describe different phases of EIA cycle. **[06]**

[B] Enlist emerging methods of EIA and discuss any two in detail **[06]**

OR

Q. 3. [B] Write the following **[06]**

(1) Discuss types and significance of matrices used in EIA study.
(2) Map Overlay method

Q. 4. [A] Write a note on 'Environmental Indicators of Water Quality' including 'Ecological Indicators'? **[06]**

[B] Enlist & discuss different parameters that are included as part of planning & Design phase of transport related project. **[06]**

OR

Q. 4. [B] Discuss site-dependent and site-independent guidelines for industrial sector development. **[06]**

Q. 5. [A] Write a note on Central Pollution Control Board (CPCB). **[06]**

[B] 'Environmental audit is one of the important tool for sustainable development' – Justify. Highlight the importance of, objectives and methods used to carry out this procedure. **[06]**

OR

Q. 5. [B] Give a detailed account on requirements and procedures for seeking environmental clearance. **[06]**

Q. 6. [A] Explain in detail the causes of urban growth and problems associated with it. **[06]**

[B] Enlist various 'Geologic hazards'. Briefly describe any one in detail the causes, consequences and prevention of geologic hazard. **[06]**

OR

Q. 6. [B] Enlist the major current environmental problems and explain any one in detail. **[06]**

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SARDAR PATEL UNIVERSITY

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

Wednesday, 1st November, 2017

10:00 am to 1:00 pm

PS09CIGGB1: Genetics of Mammalian Development

TOTAL MARKS: 70

Q.1 Tick mark / select the correct answer for the following. (*Both correct option and the corresponding answer for a particular option needs to be written in provided answer book*) **(08 Marks)**

1) One of the following delaminates to form hypoblast and epiblast:
   a) Outer cell mass (OCM)
   b) Inner cell mass (ICM)
   c) Antrum fluid
   d) Corona radiata

2) Progeria is the result of a dominant mutation in the gene that encodes _____ protein.
   a) Sirtuin
   b) Nestin
   c) Desmin
   d) Lamin A

3) During male development, _____ duct differentiate to become the epididymis and vas deferens.
   a) Mullerian duct
   b) Mesonephric duct
   c) Wolfian duct
   d) Sex cords

4) HPV contains an oncogene that produces a protein called:
   a) E7
   b) F7
   c) H9
   d) Z10

5) _____ gene is responsible to form thorax and abdomen in drosophila:
   a) Nanos
   b) Kruppel
   c) Sox
   d) MITF

6) Transcription factors have _____ domains:
   a) 4
   b) 5
   c) 3
   d) 2

7) Trisomy 21 is known as _____ syndrome.
   a) Patau
   b) Down
   c) Edward
   d) Turner

8) Distortion of a normally formed tissue by extrinsic pressure is known as _____.
   a) Malformation
   b) Deformation
   c) Disruption
   d) Syndrome

Q.2 Answer **any seven** from the following: (2 × 7) **14**

a) Explain the terms animal pole and vegetal pole.
b) What is the role of ZP3 protein in mammalian fertilization?
c) What is endocrine disruptor? Give any two examples.
d) Give the classification of cleavage patterns.
e) Enlist various RNA localization techniques.
f) What are silencers?
g) Differentiate between genotypic and phenotypic heterogeneity.
h) What are congenital abnormalities? Enlist few congenital abnormalities.
i) Enlist sex chromosomal and autosomal aneuploidy.

Q.3 (A) Give a detailed account on spermatogenesis. **6**

(B) What is capacitation? Elucidate the molecular events that take place during capacitation of a mammalian sperm. **6**

OR

(B) Write an explanatory note on stem cells. **6**

Q.4 (A) Write an explanatory note on ageing with special reference to causes of ageing. **6**

(B) What are teratogens? Discuss the teratogenic effects of heavy metals, nonyphenol and bisphenol A. **6**

OR

(B) Write a brief overview on fetal alcohol syndrome. **6**

Q.5 (A) Citing suitable examples, explain the significance of transcription factors in development. **6**

(B) Explain antisense RNA technique for the determination of gene functions. **6**

OR

(B) Explain regulation of expression of segmentation genes by Bicoid gradients in D. melanogaster. **6**

Q.6 (A) Write a brief overview on male and female infertility factors. **6**

(B) Discuss nature of human syndromes. **6**

OR

(B) Write a short note on positional gene cloning. **6**

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SEAT No._____

No. of printed pages: 02

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SARDAR PATEL UNIVERSITY

M. Sc Integrated Biotechnology – Nine (09) Semester Examination

Friday, 03 – 11- 2017, Time: 10:00 A.M to 01:00 P.M

COURSE NUMBER AND NAME –PS09CIGGB2-FOOD BIOTECHNOLOGY

Note: (1) All questions are compulsory. (2)Figure to right indicate marks.Maximum Marks: 70

Q.1 Choose the most appropriate answer from the four alternatives givens. [8]

1. Acinetobacteror bacteria do not reduce the .....

   (A) Nitrates (B) Carbon (C)Ammonia(D)Calcium

2. Alteromonas bacteria found in the .....

   (A)Seafoods (B) Poultry product(C) Milk product (D) Vegetable

3. Probiotic Capable of surviving, colonizing and proliferating in the.....

   (A)Gut (B) Small Intestine (C)Stomach (D)Large Intestine

4. .....is probiotic strain.

   (A)Lactobacillus brevis (B) E. coli(C)Enterobacter sp.(D)Pseudomonas sp.

5. Immuno –tests detect for .....

   (A)DNA (B) Protein(C)RNA(D) Both (A) and (B)

6. Detection of new genes by .....

   (A)Gel electrophoresis (B)PCR (C) ELISA (D) None of them

7. Protoplast fusion use the .....

   (A)Sucrose (B)Polyethene glycol (C)2,4-Dichloromethoxic acid (D) Kinetin

8. Single cell protein produces from .....

   (A)Fish (B) Algae (C) Vegetable (D)Plants

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

1. Write the general characteristic of Debaryomyces and Alternaria.
2. Brief note on Lactobacillus and Enterococcus
3. Write the characteristic of probiotic.
4. What are the therapeutics uses of prebiotics.
5. Brief note on resistant starch.
6. Why the use of labelling and traceability in GM Foods.
7. Define the HACCP.
8. Enlist the different techniques for use for better nutrition.
9. Which techniques use for seedless variety fruits production?

Q.3	A.	What is FSSAI? What are the points cover in the guidelines? Discuss any three points.	[6]
	B.	Discuss the activities of food biotechnologies in food industry.	[6]
		OR	
	B.	Write a short note on Aspergillus and Acromonas.	[6]
Q.4	A.	Enlist the health effects of probiotics. Discus any three mechanisms.	[6]
	B.	Write a short note on Dietary fiber.	[6]
		OR	
	B.	What are the fermented milk products? Discuss any three fermented milk products.	[6]
Q.5	A.	What are the techniques used for improvement of food product? Explain any two techniques.	[6]
	B.	Define GMOs. Discuss the current guideline for the production of GMOs.	[6]
		OR	
	B.	Write a short note on HACCP principles and its application.	[6]
Q.6	A.	Discuss the method and importance of Golden rice.	[6]
	B.	Explain the techniques of protoplast fusion and its application.	[6]
		OR	
	B.	Write a short note on Vitamins.	[6]

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No. of printed page: [02]

SEAT No._____

[A26]

Sardar Patel University

M.Sc-IGBT-9 Sem **Examination**

Tuesday, 07th Nov 2017

10:00 A.M. to 01:00 P.M.

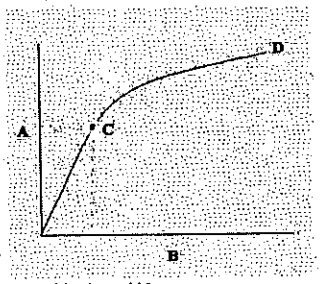
PS09CIGGB3-Metabolic Engineering

Total marks: 70

Note: 1. Attempt all the questions (including multiple choice questions)
2. Draw neat and labeled diagram wherever necessary.

Q.1 **Multiple choice questions:** **(08)**

1 For expression of whole the pathway cascade, _____ is preferable.
a) all are under different inducible promoters
b) all are under different constitutive promoters
c) all as multicistronic under single promoter
d) all are on different plasmid

2 

The Michaelis-Menten equation is v_o=Vmax [S]/(Km+[S]) is plotted in the graph shown. The following i) vo ii) Vmax iii) [S] and iv) point used to determine Km, are the labels represented each part of the graph labeled with letters A,B,C, and D. The correct order of A,B,C and D representation is_____.
a) i, ii, iv, iii
b) i, iv, iii, ii
c) i, iii, iv, ii
d) iii, i, iv, ii

3 For heterofermentative metabolism following is not true
a) Lactate produce by reduction of pyruvate
b) for ethanol production, pyruvate decarboxylase is preferred route
c) Acetate production results in energy generation
d) conversion of AcCoA to EtOH require 2 NAD^+

4 For understanding carbon commitment from central metabolism toward aromatic amino acid, *E. coli* with mutant of _____ gene is used.
a) aroA
b) aroB
c) aroG
d) aroF

5 With application of metabolic engineering, production of PHAs is possible in _____
a) *Arabidopsis thaliana*
b) Cotton
c) Maize
d) All of the these

6 In ABE fermentation, acid are produced to _____
a) Balance reducing power
b) Produce energy
c) Produce metabolites
d) Sinking reactions.

7 Following is **NOT** true for PCB degradation.
a) provides energy and carbon in initial transformation process
b) more the clorination slower the degradation
c) PCB has two phenyl rings
d) ring opening is required for degradation of PCB

8 Among member(s) of lignocellulosic waste, i) starch, ii) cellulose, iii)

[P.T.O.]

hemicellulose and iv) lignin, _____ is/are heteropolymer in nature.

a) i, ii b) iii, iv c) iv d) iii

Q.2 Answer the following (Any seven) **(14)**

1. What is the central metabolism?
2. Enlist and briefly explain the signals used to regulate the metabolic network.
3. What is the fundamental of metabolic flux balance analysis?
4. What is sensitivity coefficient?
5. Briefly explain E4P is rate limiting step.
6. Schematically present the strategies for engineering of PHA production.
7. Briefly explain increasing product selectivity in antibiotic synthesis.
8. Role of bioinformatics in reconstruction of metabolic pathways.
9. Briefly describe the properties of yeast as a host for expression of genes.

Q.3 a) Enlist various cellular transport processes and give a detailed note on the passive transport system. **(06)**

b) Explain different types of nodes based on branch point rigidity. Explain self regulatory branch point control in detail using isocitrate splitting reaction. **(06)**

OR

b) State and derive Briggs-Haldane equation for steady state assumption. **(06)**

Q.4 a) What is metabolic control analysis? Explain in detail flux control coefficient. **(06)**

b) Explain the perturbation of nitrogen regulation in *E. coli* on over expression of PCK gene. **(06)**

OR

b) Explain the determined system using example of citric acid production in *Candida lipolytica.* **(06)**

Q.5 a) Write a detail note on metabolic engineering of β-lactam antibiotics biosynthesis by increasing enzyme activity. **(06)**

b) Justify "evolution of H_2 is inevitable during acidogenic stage during ABE fermentation". **(06)**

OR

b) Explain in detail production of L-Cysteine with the metabolic engineering of sulfur incorporation. **(06)**

Q.6 a) Discuss the degradation of toluene by *Pseudomonas putida* mt-2. **(06)**

b) Why increasing the substrate range is important? Explain the strategies required for utilization of starch by *Saccharomyces cerevisiae* for ethanol production. **(06)**

OR

b) What is system biology? Explain the role of system biology in metabolic engineering. **(06)**

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(A-30) SEAT No._____ SL No. of pages 02

SARDAR PATEL UNIVERSTITY
M.Sc (INTEGRATED) BIOTECHNOLOGY (General Biotechnology)- IX SEMESTER
FINAL EXAMINATION, November - 2017.

PS09CIGGB4: Immunotechnology

Date 9th Nov. 2017 **TIME: 10:00 am to 1.00pm** **Max. Marks:70**

Thursday

Q.1 **Attempt all the questions** **1x8=8**

(i) The rearrangement of Ig gene was first experimentally shown by _____
a. Kabat b. Dreyer c. Bennett d. Tonegawa

(ii) The antibody class is defined by the presence of type of
a. Heavy chain b. light chain c. constant region d. variable region

(iii) The antigen-antibody affinity can be studied by
a. ELISA b. Western blotting c. Surface plasmon resonance
d. all the three

(iv) ..... reaction shows visible clumping when Ag and Antibody reacts.
a. Precipitation b. Agglutination c. ELISA d. None of these

(v) ..... is a result of an autoimmune attack on the pancreas.
a. Graves' disease b. Diabetes Mellitus c. Autoimmune Anemias
d. Multiple sclerosis

(vi) Arthus reaction is observed in the following hypersensitivity reaction
a. Type I b. Type II c. Type III d. Type IV

(vii) Human papilloma virus causes cancer in
a. Cervical b. Liver c. nasopharyngeal d. skin

(viii) *bcl-2* is an example of .....gene
a. Growth factor b. growth factor receptor c. Tumor suppressor
d. regulate apoptosis

Q.2 **Attempt <u>any seven</u> questions** **2x7=14**

(i) What is humanized antibody?
(ii) What is receptor editing?
(iii) What is agglutination reaction?
(iv) Explain principle of RIA.
(v) Explain different formats of ELISA.
(vi) Define anergy.
(vii) Enlist proposed mechanisms for induction of autoimmunity.
(viii) Mention different types of graft.
(ix) Explain immunosuppressors and their uses.

(P.T.O.)

Q.3	A	Describe mechanism of recombination of Immunoglobulin genes for generation of antibody diversity.	06
	B	What is HAT selection? Describe the process.	06
		OR	
	B	Write a note on "Phage display library for monoclonal antibody production".	06
Q.4	A	Explain Principle and construction of Fluorescence activated cell sorter.	06
	B	What are attenuated vaccines? How are they produced? Also mention their advantages and disadvantages.	06
		OR	
	B	Write a note on methods of Immunohistochemistry.	06
Q.5	A	Describe SLE (Systemic lupus erythematosus) and Myasthenia gravis in detail.	06
	B	Explain steps in mast cell degranulation using diagram. What are its consequences?	06
		OR	
	B	Write a note on severe combined immunodeficiency.	06
Q.6	A	How immunity is produced against virus? Explain in detail	06
	B	Write a note on: (i) Tumor antigens **OR** (ii) Cytokine receptors.	06

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SEAT No._____ S/C

No. of Printed Pages: 02

(A-5)

SARDAR PATEL UNIVERSITY

M. Sc. -Integrated Biotechnology – Ninth Semester Examination

Wednesday, 1st November 2017

Time: 10:00 am to 01:00 pm

PS09CIGIB1: Biofertilizers & Biopesticides

Total Marks – 70

Q.1 Mark the right answer of following questions. [08]

1. In mass production of *Baculovirus* which parameter is required for screening?
   a. LD_{50}, LT_{50} b. *In-vivo* studies c. Plant damage d. Feeding ability e. All of these f. None
2. Which deuteromycetes also known as green muscardine fungi?
   a. *Beauveria bassiana* b. *Metarhizium* c. *Cephalosporium* d. *Entomophthora*
3. All of the following are advantages of solid state fermentation except _____.
   a. Less chances of contamination
   b. Smaller amount of energy consumption
   c. Downstream process is expensive
   d. Lesser amount of liquid is produced
4. _____ pigment is produced by *Azolla* under high light intensity or low temperature.
   a. Phycocyanin b. Phycorubin c. Carotenoids d. Chlorophyll e. Anthocyanin
5. Gelatin, starch and cellulose are widely used in _____ liquid formulations of bio-pesticides.
   a. Emulsion b. Suspension-Concentrate c. Oil dispersion d. Capsule suspension
6. *Gln B* acts as a sensor for _____.
   a. High concentration of glutamine
   b. Concentration of α-ketoglutarate
   c. High ATP
   d. All of these
7. After penetration/invagination *Frankia* envelop of plant material is made of _____.
   a. Xylan b. Cellulose c. Pectin d. Chitin e. a, b & c f. All of these
8. From the following which statement is correct for H_2 recycling process of nitrogen fixation?
   a. H_2 dependent ATP synthesis
   b. Protection of nitrogenase from O_2
   c. Conservation of carbon substrate
   d. All of these

Q.2 Answer the following questions. (ANY SEVEN OUT OF NINE) [14]

1. What are the advantages of liquid biofertilisers?
2. Briefly explain different ways of biofertilisers field applications.
3. Discuss key enzymes of *Acetobacter diazotropicus*.
4. Draw well labeled diagram of N_2 fixation in heterocytous algae.
5. Write advantages and disadvantages of microbial pesticides.
6. Discuss objectives and roles of integrated pest management.
7. What are the limitations and survival difficulties of biofertilisers?
8. What are the advantages and limitations of wettable powder formulation of bio-pesticides?
9. Write the role of *Pseudomonas* as bio-control agent.

Q.3 A. What are the functions of simbiosome membranes? Describe symbiotic nitrogen fixation process. [06]

B. Outline genetics and regulation process of biological nitrogen fixation. [06]

OR

B. Discuss mechanisms of inorganic and organic phosphorus solubilization by microbes. [06]

Q.4 A. Explain entire mass production process of biofertiliser along with preparation of carriers. [06]

B. Describe any six plant growth promoting characteristics of different microbial inoculants with their appropriate mode of action. [06]

OR

B. Write taxonomy and physiology of *Frankia*. Give brief note on *Actinorhizal* symbiosis. [06]

Q.5 A. Describe correct sequence of infection, mode of action, physiology and types of toxins produced by *Bacillus thuringiensis*. [06]

B. What are the advantages of *Bacillus popilliae* as insecticides? Explain physiology and infection process of *Bacillus popilliae* in detail. [06]

OR

B. Write short notes on: **1.** *Nematodes* as bio-pesticide **2.** *PPLO* as bio-control agent [06]

Q.6 A. Which fermentation technologies are widely used for bio-pesticide production? Describe mass production and recovery process of microbial pesticides. [06]

B. Write detailed bio-pesticide formulations of *Trichoderma viride*. [06]

OR

B. Give detailed account on compatibility studies of microbial and chemical pesticides. [06]

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SEAT No._____

5C

No. of Printed Pages: 02

SARDAR PATEL UNIVERSITY

CA-73

M. Sc. -Integrated Biotechnology – Ninth Semester Examination

Friday, 3rd November 2017

Time: 10:00 am to 01:00 pm

PS09CIGIB2: Waste Management

Total Marks – 70

Q.1 Mark the right answer of following questions. [08]

1. Landfills must control litter: _____
   a. On site b. Off site c. In quantities which creates nuisance d. a & c both e. All of these
2. All the following are used in integrated waste management except _____.
   a. Incineration b. Recycling c. Waste to Energy d. Logging e. Composting
3. Which of the following is not a method for the disposal of hazardous wastes?
   a. *In-situ* vitrification c. Organic polymer technique
   b. Thermoplastic d. Encapsulation
4. "Source reduction" refers to decrease amount of any pollutant which enters to environment prior to recycling, treatment or disposal is associated with _____.
   a. RCRA b. Clean water act c. HW (M & H), rules d. Pollution prevention Act
5. Runoff that results from roads, parking lots and pollutant storage areas exposed to rain refereed as _____.
   a. Effluent b. Grey water c. Influent d. Storm water e. Dirty water
6. Spent nuclear fuel and any liquid contains radioactivity is an example of _____
   a. HWL b. ILW c. LLW d. MLW e. All of these
7. Facilities that perform the function of preparing recyclables for marketing are referred to as _____.
   a. WTE b. RDF c. TSD d. MRF e. All of these
8. _____ components are included in category 7 of biomedical wastes.
   a. Microbial cultures c. Contaminated blood & body fluids
   b. Catheters and tubing d. Animal tissues and organs

Q.2 Answer the following questions. (ANY SEVEN OUT OF NINE) [14]

1. Discuss prime characteristics of hazardous wastes.
2. Explain source-pathway-receptor consequence model used for risk assessment.
3. What are the agenda of MSW management?
4. How E-waste is different than general solid wastes?
5. Write examples and application of inorganic chemicals produced by hospitals.
6. Explain synthetic gases production processes from wastes.
7. Discuss types of radioactive wastes.
8. Write categories of universal wastes.
9. Enlist regulatory mechanism of E-wastes.

Q.3 A. What are the advantages of MRF? Outline different processes used for material recovery facilities. [06]

B. Describe collection, elements of transfer and significance of transfer stations used for MSW management. [06]

OR

B. What are the advantages of RDF? Write a note on refused derived fuel. [06]

Q.4 A. Describe site selection, specification and facilities of land filling/secured land filling process. [06]

B. Explain encapsulation, thermoplastic and thermo-settling disposal processes of solidification of hazardous wastes. [06]

OR

B. Discuss any six physical treatment processes used for management of hazardous wastes. [06]

Q.5 A. How sorting of E-wastes is carried out? Write a note on treatment of E-wastes. [06]

B. Write short notes on: 1. Effects of E-wastes on environment and human health [06]

2. Types of incinerator used for waste management

OR

B. Outline the different metal recovery processes used for management of solid/liquid wastes. [06]

Q.6 A. Explain different categories of biomedical wastes. Describe advantages and processes of BMW minimization. [06]

B. Discuss various treatment and disposal technologies used for radioactive waste management. [06]

OR

B. Give details of requirement and advantages of segregation of BMW at source, labeling and containers used for BMW collection with their probable treatment options. [06]

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SC

(A-31) SEAT No._____ No. Of printed pages: 02

Sardar Patel University
M.Sc. Integrated Biotechnology IX Semester (IGIBT)
Biotechnology of Fermentation and Biotransformation-II (PS09CIGIB4)
Thursday, 09th November 2017
10:00 am to 1:00 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 The acyl group from penicillin molecule is removed by_____enzyme.
(a) Pen acylase (c) Pen acetylase
(b) Pen hydrolase (d) Pen amidase

2 _____ is the precursor for streptomycin biosynthesis.
(a) D- glucose (c) 6 APA
(b) PAA (d) None of these

3 In Koji fermentation process for citric acid production, prior to sterilization, the pH of wheat bran is adjusted to_____ .
(a) 2 (c) 4
(b) 6 (d) 8

4 Direct fermentation of L- Glutamic acid is carried out by using____.
(a) Mutated (c) Wild
(b) Single (d) Mixed

5 α -amylase is a hydrolase enzyme that catalyses the hydrolysis of internal__ linkages in starch to yield products like glucose and maltose.
(a) α -1,4-glycosidic (c) α -1,2-glycosidic
(b) α -1,6-glycosidic (d) α 1,3-glycosidic

6 Amylose constitutes _____ of the starch molecule and is a linear chain consisting of repetitive glucose units.
(a) 10-15% (c) 30-35%
(b) 20-25% (d) 40-45%

7 The spider silk protein is rich in amino acids___ and_____.
(a) Gly and arg (c) Arg and ala
(b) Ala and arg (b) Ala and gly

8 The following enzyme directly degrades fibrin.
(a) Streptokinase (c) Staphylokinase
(b) Urokinase (d) Lumbrokinase

P.T.O.

Q.II		**Answer the following (Any seven)**	(14)
	1.	Write the examples of precursors and their role used in penicillin production. .	
	2.	What is an auxotrophic strain?	
	3.	What is herbal vinegar?	
	4.	Give four industrial applications of Glutamic acid.	
	5.	What is saccharification?	
	6.	Write about lipase inhibitor.	
	7.	What is fermentation economics?	
	8.	What is the market potential of biosteel?	
	9.	What is dragline protein?	
Q.III	(a)	Discuss biosynthesis of streptomycin.	(06)
	(b)	Describe various strategies for production of semisynthetic penicillin.	(06)
		OR	
	(b)	Discuss various steps in the recovery of penicillin from fermentation broth.	(06)
Q.IV	(a)	Write a note on types of vinegar.	(06)
	(b)	Explain the surface and submerged culture process of citric acid production.	(06)
		OR	
	(b)	Give a schematic diagram explaining purification and recovery of citric acid.	(06)
Q.V	(a)	Explain the industrial applications of Lipase.	(06)
	(b)	Classify types of amylases by microbes explaining their roles in enzymatic reaction.	(06)
		OR	
	(b)	Discuss process parameters for microbial α-amylase production.	(06)
Q.VI	(a)	Write a detailed note on Biosteel production.	(06)
	(b)	Discuss production of streptokinase and its purification.	(06)
		OR	
	(b)	Give a note on production and purification of thrombinase.	(06)

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SEAT No._____

S/C

Number of printed pages: 02

SARDAR PATEL UNIVERSITY

[A-7] M. Sc. (Integrated) Biotechnology – Ninth Semester Examination

Wednesday, 1st November, 2017

10:00 am to 1:00 pm

PS09CIGMB1: Genetics of Mammalian Development

TOTAL MARKS: 70

Q.1 Tick mark / select the correct answer for the following. (*Both correct option and the corresponding answer for a particular option needs to be written in provided answer book*) **(08 Marks)**

1) One of the following delaminates to form hypoblast and epiblast:
   a) Outer cell mass (OCM)
   b) Inner cell mass (ICM)
   c) Antrum fluid
   d) Corona radiata

2) Progeria is the result of a dominant mutation in the gene that encodes _____ protein.
   a) Sirtuin
   b) Nestin
   c) Desmin
   d) Lamin A

3) During male development, _____ duct differentiate to become the epididymis and vas deferens.
   a) Mullerian duct
   b) Mesonephric duct
   c) Wolfian duct
   d) Sex cords

4) HPV contains an oncogene that produces a protein called:
   a) E7
   b) F7
   c) H9
   d) Z10

5) _____ gene is responsible to form thorax and abdomen in drosophila:
   a) Nanos
   b) Kruppel
   c) Sox
   d) MITF

6) Transcription factors have _____ domains:
   a) 4
   b) 5
   c) 3
   d) 2

7) Trisomy 21 is known as _____ syndrome.
   a) Patau
   b) Down
   c) Edward
   d) Turner

8) Distorsion of a normally formed tissue by extrinsic pressure is known as _____.
   a) Malformation
   b) Deformation
   c) Disruption
   d) Syndrome

1

Q.2 Answer **any seven** from the following: (2 × 7) **14**

a) Explain the terms animal pole and vegetal pole.
b) What is the role of ZP3 protein in mammalian fertilization?
c) What is endocrine disruptor? Give any two examples.
d) Give the classification of cleavage patterns.
e) Enlist various RNA localization techniques.
f) What are silencers?
g) Differentiate between genotypic and phenotypic heterogeneity.
h) What are congenital abnormalities? Enlist few congenital abnormalities.
i) Enlist sex chromosomal and autosomal aneuploidy.

Q.3 (A) Give a detailed account on spermatogenesis **6**

(B) What is capacitation? Elucidate the molecular events that take place during capacitation of a mammalian sperm. **6**

OR

(B) Write an explanatory note on stem cells. **6**

Q.4 (A) Write an explanatory note on ageing with special reference to causes of ageing. **6**

(B) What are teratogens? Discuss the teratogenic effects of heavy metals, nonyphenol and bisphenol A. **6**

OR

(B) Write a brief overview on fetal alcohol syndrome. **6**

Q.5 (A) Citing suitable examples, explain the significance of transcription factors in development. **6**

(B) Explain antisense RNA technique for the determination of gene functions. **6**

OR

(B) Explain regulation of expression of segmentation genes by Bicoid gradients in D. melanogaster. **6**

Q.6 (A) Write a brief overview on male and female infertility factors. **6**

(B) Discuss nature of human syndromes. **6**

OR

(B) Write a short note on positional gene cloning. **6**

——— X ———

Note: Answer to all questions (including multiple choice questions) should be written in the provided answer book only.

SEAT No._____

S/C

Number of Printed Pages = 2

[A-9]

Sardar Patel University
M. Sc. Integrated Biotechnology, Ninth Semester Examination
Friday, 03rd November, 2017
10:00 a.m. – 01:00 p.m.
PS09CIGMB2: ADME & Toxicology

TOTAL MARKS: 70

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

1) The effect produced by external (physical or environmental) events or internal (physiological or psychological) factors, referred to as stressors.
   a) Discomfort
   b) Anxiety and fear
   c) Stress
   d) All of these

2) The word toxicology derived from
   a) Toxicon
   b) Toxican
   c) Toxicom
   d) Toxicam

3) Which of the following is generally avoided for intramuscular drug administration
   a) Sciatic nerve
   b) Cephalic vein
   c) Jugular vein
   d) All of these

4) Which of the following is not a parameter of toxicology
   a) TD50
   b) FD50
   c) LD50
   d) ED50

5) A particular dose of a chemical A, is toxic to animals in vivo. Another chemical, B, is not toxic even when given at doses several orders of magnitude higher than A particular dose of a chemical A, is toxic to animals in vivo. Another chemical, B, is not toxic even when given at doses several orders of magnitude higher than the dose of A. When A and B are given together at the same dose, the toxic response is greater than that of the dose of A alone. This is an example of:
   a) Antagonism
   b) Synergism
   c) Additivity
   d) Potentiation

6) The acceptable daily intake (ADI) is based on the
   a) NOEL
   b) NOAEL
   c) LOEL
   d) LOAEL

7) Which information may be gained from an acute toxicity study?
   a) The LD50
   b) The therapeutic index
   c) The target organ
   d) All of these

8) The renal corpuscle is composed of:
   a) Senecio
   b) Heliotropium
   c) Saxitoxin
   d) Bracken

Q.2 Answer **any seven** from the following: **14**

a) What is out-breeding?
b) Why are animals used in experiments?
c) What is parenteral route of drug administration?
d) Differentiate between presynaptic and postsynaptic receptors.
e) Define out-crossing.
f) Define quantal dose–response relationships.
g) What is functional and chemical antagonism?
h) Explain half life of chemicals in blood plasma.
i) What is the basic mechanism underlying the toxicity of botulinum toxin?

Q.3 (A) Discuss the various physical and physiological parameters of laboratory mice. **6**

(B) Give a brief account on the laws protect animals in research? **6**

OR

(B) Explain in brief (i) Animal pain (ii) Three way rotational cross **6**

Q.4 (A) What is receptor? Discuss the G protein–coupled receptors with suitable example. **6**

(B) Discuss the effect of dose on the magnitude of drug binding. **6**

OR

(B) Write a note on agonists. **6**

Q.5 (A) Discuss phase I and phase II reactions of toxic compound removal. **6**

(B) How genetic variability alter human toxic response? **6**

OR

(B) Discuss the chemical factors alter toxic response in detail. **6**

Q.6 (A) How NOEL and LOEL is used for identification of toxicological threshold levels? Explain. **6**

(B) Explain the risk assessment of carcinogens in detail. **6**

OR

(B) Discuss the steps involved in recommending the maximum recommended starting dose (MRSD) for clinical trials. **6**

—X—

SC

[A27/A28/A29]

No. of printed page: [02]

Sardar Patel University

M. Sc. IGBT-9 Sem **Examination**

Tuesday, 07th Nov 2017

10:00 A.M. to 01:00 P.M.

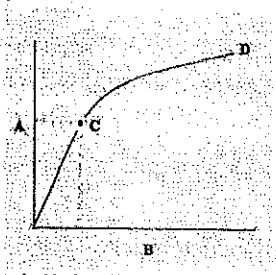
PS09CIGMB3/ PS09CIGEB3/ PS09CIGIB3-Metabolic Engineering

Total marks: 70

Note: 1. Attempt all the questions (including multiple choice questions)
2. Draw neat and labeled diagram wherever necessary.

Q.1 **Multiple choice questions:** (08)

1 Fueling reactions produce the _____ precursor metabolites needed for biosynthesis.
a) 10 c) 12
b) 11 d) 13

2 

The Michaelis-Menten equation is v_o=Vmax [S]/(Km+[S]) is plotted in the graph shown. The following i) vo ii) Vmax iii) [S] and iv) point used to determine Km, are the labels represented each part of the graph labeled with letters A,B,C, and D. The correct order of A,B,C and D representation is_____.
a) i, ii, iv, iii c) i, iv, iii, ii
b) i, iii, iv, ii d) iii, i, iv, ii

3 The fundamental principle underlying Flux Balance Analysis is
a) Steady state c) Conversion of Mass
b) Equilibrium State d) Conversion of substrate

4 For understanding carbon commitment from central metabolism toward aromatic amino acid, *E. coli* with mutant of _____ gene is used.
a) aroA c) aroB
b) aroG d) aroF

5 Polyhydroxyalkanoates (PHAs) which are accumulated as a carbon and energy storage material under the condition like
a) Excess Nitrogen sources c) Excess Phosphorus sources
b) Excess Carbon sources d) Excess Magnesium soucres

6 Source of Nitrogen for the production of amino acid is come from
a) Serine c) Lysine
b) Cysteine d) Glutamine

7 Following is **NOT** true for PCB degradation.
a) provides energy and carbon in initial transformation process
b) more the clorination slower the degradation
c) PCB has two phenyl rings
d) ring opening is required for degradation of PCB

8 The most attractive aspect of metabolic engineering of yeasts is _____
a) GRAS c) Known genome information
b) Not producing any toxin d) All of above

[P.T.O.]

Q.2 **Answer the following (Any seven)** **(14)**

1. Write down the importance of studying metabolic engineering.
2. Define: Anaplerotic reactions.
3. What is black box model?
4. What is dilution effect?
5. What is the sensitivity coefficient?
6. Write down advantages and disadvantages of Bioplastics.
7. Briefly explain role of global regulators in enhancing the antibiotics production.
8. Enlist the bioinformatic tools used for Metabolic engineering.
9. Write down the applications of functional genomics.

Q.3 a) Derive and state Briggs-Haldane modification of Michaelis-Menten equation. **(06)**

b) Explain different types of nodes based on branch point rigidity. Explain self regulatory branch point control in detail using isocitrate splitting reaction. **(06)**

OR

b) Explain in detail about cellular transport processes require energy input. **(06)**

Q.4 a) Define metabolic flux balance analysis. Explain determined system with example. **(06)**

b) Discuss metabolic engineering of DAHP production by recycling of pyruvate. **(06)**

OR

b) Enlist types of control coefficients determined MCA. Describe any two in detail. **(06)**

Q.5 a) Why are the advantages of PHA production under non-PHA producers? Explain the selection of genes for transferring to non-PHA producer and their role using appropriate example. **(06)**

b) Discuss about the impact of growth limitation for the production of Lysine. **(06)**

OR

b) Explain in detail 'why solvent production is not possible without acid production in *Clostridia*'. **(06)**

Q.6 a) What is superbug? Discuss the role of genes present on TOL plasmid and their involvement in bioremediation of toluene. **(06)**

b) Explain DNA microarray fabrication in detail. **(06)**

OR

b) What is the system biology? Explain the role of system biology in metabolic engineering. **(06)**

-x-

(A-33) SEAT No._____ No. of pages 02

SC

SARDAR PATEL UNIVERSTITY

M.Sc (INTEGRATED) BIOTECHNOLOGY (Medical Biotechnology)- IX SEMESTER

FINAL EXAMINATION, November - 2017.

PS09CIGMB4: Immunotechnology

Date 9th Nov. 2017 **TIME: 10:00 am to 1.00pm** **Max. Marks:70**

Thursday

Q.1 **Attempt all the questions** **1x8=8**

(i) The coexpression of μ and δ heavy chains on pre-B cell is due to the absence of
(a) Signal sequence (b) Switch region (c) Promoter sequence (d) all of the above

(ii) Humanized antibodies have_____ ending.
(a) -mab (b) -umab (c) -ximab (d) –zmab

(iii) Organisms suitable for use in modified live vaccine is produced by
(a) Inactivation (b) genetic recombination (c) hybridization (d) attenuation

(iv) ..... reaction shows visible clumping when Ag and Antibody reacts.
(a) Precipitation (b) Agglutination (c) ELISA (d) None of these

(v) ..... is a result of an autoimmune attack on the pancreas.
(a) Graves' disease (b) Diabetes Mellitus (c) Autoimmune Anemias
(d) Multiple sclerosis

(vi) Antibodies against A, B and O antigens are of the ..... class.
(a) IgG (b) IgM (c) IgD (d) IgE

(vii) Luminex assay is done for
(a) MHC matching (b) minor antigen matching (c) pre-existing antibodies
(d) all the three

(viii) ***bcl-2*** is an example of .....gene
(a)Growth factor (b) growth factor receptor (c) Tumor suppressor
(d) regulate apoptosis

Q.2 **Attempt <u>any seven</u> questions** **2x7=14**

(i) What is class switching?
(ii) What is HAT selection?
(iii) Explain principle of RIA technique.
(iv) Explain principle of Avidin-Biotin Complex method.
(v) Explain different formats of ELISA.
(vi) Define anergy.
(vii) Enlist proposed mechanisms for induction of autoimmunity.
(viii) Mention different types of graft.
(ix) What are immunomodulators?

CP 7.0

Q.3	A	Enlist and discuss various events responsible for generation of antibody diversity.	06
	B	Discuss large scale production of polyclonal antibody.	06
		OR	
	B	Write a note on "Phage display library for monoclonal antibody production".	06
Q.4	A	What are attenuated vaccines? How are they produced? Also mention their advantages and disadvantages.	06
	B	Explain Principle and construction of Fluorescence activated cell sorter.	06
		OR	
	B	Write a note on methods for determination of antibody affinity.	06
Q.5	A	Describe SLE (Systemic lupus erythematosus) and Myasthenia gravis in detail.	06
	B	Explain steps in mast cell degranulation using diagram. What are its consequences?	06
		OR	
	B	Write a note on primary immunodeficiency.	06
Q.6	A	Discuss the effector stage reactions causing graft rejection.	06
	B	How immunity is produced against virus? Explain in detail	06
		OR	
	B	Write a note on tumor antigens.	06

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(2)