Total No. of Printed Pages:2

SUBJECT CODE NO:- K-09
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (Biotechnology) Examination Oct/Nov 2016
Bioseparation Techniques
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Q. No. 1 of section A and Q. No. 6 of section B are compulsory.
2. Attempt any two questions from remaining four questions of each section.
3. Figures to right indicate full mark.

Section A

Q.1 Attempt any five. 10
1) Capitation
2) Partition
3) Eddy diffusion
4) RPC
5) Resolution
6) Osmotic shock
7) Enzyme
8) Base matrix

Q.2 a) What do you understand by bio separation? Comment on its nature and economic importance. 10
b) Add a note on cell lysis by freeze thaw. 05

Q.3 Explain gel permeation chromatography with respect to following points 15
1) Principles
2) Stationary phase
3) Application.

Q.4 Distinguish between 15
1) HPLC and GC
2) Adsorption and partition
3) NPC and RPC

Q.5 a) Add a note on stationary phase used in HPLC. 08
b) Suggest cell lysis protocol for periplasmic metabolites from gram negative bacteria. 07

Section B

Q.6 Attempt any five. 10

1) Gel polarization
2) Fouling
3) ATPS
4) Use of PEG
5) Bioconversion
6) Filtration
7) RO
8) Dialysis

Q.7 a) Add a note on scale up of centrifuges. 07

b) Add a note on electro dialysis. 08

Q.8 Explain membrane filtration with help of following points 15

1) Principles
2) Types
3) Membrane modules.

Q.9 Explain in detail protein precipitation by salts. 15

Q.10 a) Explain in detail the rationale used in designing a bio separation protocol. 07

b) Explain the bio separation of penicillin. 08

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SUBJECT CODE NO:- K-30
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(Biotechnology) Examination Oct/Nov 2016
Recombinant DNA Technology
(Revised)

[Time:Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 & 6 are compulsory from section A & B respectively.
ii) Attempt any two questions from remaining questions in each section.
iii) Figures to right Indicate full marks.
iv) Draw neat & labelled diagram.

Section A

Q.1 Define / explain any 5 of the following. 10
a) CDNA
b) Reverse transcriptase
c) Phagmid
d) Role of gene
e) YAC
f) DNA polymerase
g) conjugation
h) Selection marker

Q.2 A) Explain genomic libraries 08
B) Describe the overview of cloning 07

Q.3 A) Explain tools which are used in RDT. 08
B) Explain any 2 enzymes which are used in RDT 07

Q.4 A) Explain in detail-Phagmid vector 08
B) Explain bioethics & Biohazards of genetic engineering 07

Q.5 A) Explain procedure of construction of CDNA libraries. 08
B) Explain BAC vector. 07

Section - B

Q.6 Define / Explain any 5 of the following. 10
a) Northern Blot
b) AFLP
c) Transduction
d) r-Human growth hormone
e) DNA vaccine
f) Transgenic Animals
g) Inverse PCR
h) RNAi

Q.7	a)	Discuss methods of gene transfer in plants	08
	b)	Explain site Directed mutagenesis.	07
Q.8	A)	Explain southern blotting	07
	B)	Explain any 2 of RDT product	08
Q.9	A)	Explain Application of RDNA technology	10
	B)	Explain RAPD	05

Q.10 Explain-

A)Subunit vaccine	05
B)RT-PCR	05
C) Conjugation	05

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SUBJECT CODE NO:- K-60
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(Biotechnology) Examination Oct/Nov 2016
Principles of Tissue Engg.
(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.6 are compulsory from section A &B.
ii) Attempt any two questions from the remaining four questions from each section.
iii) Figures to right indicate full marks.
iv) Draw neat & labeled diagram wherever necessary.

Section A

Q.1 Attempt any five of following. 10

a) Cell technology
b) Fibronectin
c) Cellular changes involved in the EMT.
d) Stem cells
e) Cartilage- derived morphogenetic proteins
f) Roles of MRFs.
g) Pleitropy
h) Biominetic Biomaterials.

Q.2 a) Explain the scope of tissue engineering and social challenges. 10

b) Describe gene therapy. 05

Q.3 a) What are the different receptors for extracellular matrix molecules? 10

b) Write a note on proteoglycans. 05

Q.4 a) Describe in detail bone morphogenetic proteins. 10

b) What are the scientific challenges in tissue engineering? 05

Q.5 a) Explain extracellular matrix structure and function. 10

b) Write a notes on fibrillar collagens. 05

Section – B

Q.6 Attempt any five of following. 10

a) Angiogenesis
b) Roles of cytokines
c) Cell – Polymer constructs
d) Cell signaling
e) Collagen gel model
f) Bioreactor cultivation of functional tissues
g) Cell and tissues mechanics
h) Bioreactor technologies

Q.7 a) Explain in detail Invivo synthesis if tissue and organs . 10

b) Describe the roles of basic fibroblast growth factor. 05

Q.8 a) Explain tissue engineering bioreactors. 10

b) Write a note on wound healing. 05

Q.9 a) Write a notes on goals & uses of model tissue and organ buildings. 10

b) Explain the model of cell interactions in collagen lattices. 05

Q.10 a) Explain regulation of cell behavior by matricelluar proteins. 10

b) Write a notes on scaffolds. 05

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SUBJECT CODE NO:- K-90

FACULTY OF ENGINEERING AND TECHNOLOGY

T.E.(Biotechnology) Examination Oct/Nov 2016

Enzyme Engineering &Technology

(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt any two questions from the remaining questions in each section.
iii) figure to right indicate full marks

Section A

Q.1 Attempt any five 10

1) IUB
2) Hydrolases
3) t(1/2)
4) two uses of cellulase
5) catalyst
6) sonic strength
7) rate of reaction
8) substrate for cataloes.

Q.2 a) What are enzymes? Discuss advantages of biocatalysts against chemical catalysis. 10
b) Add a note on oxide reductase class of enzymes. 05

Q.3 Explain in detail giving suitable examples the extraction of enzymes by physical methods. 15

Q.4 a) Explain in detail the role of glucose oxides in food industry. 08
b) Add a note on HFCS. 07

Q.5 Write notes on 15

1) Effect of pH on enzyme catalysis
2) Role of protease as detergent
3) Energy of activation

Section B

Q.6 Attempt any five 10

1) Inteins
2) Artificial enzyme
3) Immobilization
4) PBR
5)physical immobilization
6)any two advantages of immobilised enzymes
7) CNBr-role
8) DE.

Q.7 a) Explain in detail physical methods of immobilization. 08
b) Immobilization of enzyme enhances its stability. Comment on this statement with suitable rationale. 07

Q.8 a) Explain in detail membrane reactors. 08
b) Add a note on applications of immobilized enzymes with suitable examples. 07

Q.9 a) Add a note on interesterification of lipids 08
b) Add note on ribozymes 07

Q.10 Add notes on 08

1) Entrapment of enzymes 07
2) Critical enzymes

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Total No. of Printed Pages:2

SUBJECT CODE NO:- K-157
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(Biotechnology) Examination Oct/Nov 2016
Computational Biology
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt any two questions from the remaining questions in each section.
iii) Figures to the right indicate full marks.
iv) Draw neat and labelled diagram wherever necessary.

Section A

Q.1 Attempt any five of the following: 10
a) Object oriented database
b) DDBJ
c) Uni Gene
d) Entrez
e) MIPS
f) PRINTS
g) SCOP
h) PDB

Q.2 a) Write a note on scope and goal of bio-informatics. 10
b) Explain the database and database management system with suitable examples. 05

Q.3 a) Explain the database query language with suitable examples. 10
b) Write a note on DNA sequencing. 05

Q.4 a) Write a note on protein structure. Explain with suitable example. 10
b) Explain the nature of primary protein structure. 05

Q.5 a) Explain the various analytical tools for protein structure visualization. 10
b) Explain the different composite protein sequence databases with suitable example. 05

Section B

Q.6 Attempt any five of the following : 10

a) Homologous
b) Paralogous
c) HTS
d) BLOSUM
e) Identity matrix
f) FASTA
g) Docking
h) Rooted tree

Q.7 a) Explain the Needleman Wunsch algorithm with suitable example. 10
b) Explain the PAM substitution matrice. 05

Q.8 a) Define and explain phylogeny, homologs, orthologs and paralogs. 10
b) Write the applications of bioinformatics in drug designing. 05

Q.9 a) Write a note on different types of phylogenetic trees 10
b) Explain the BLAST with different variants of BLAST. 05

Q.10 a) Define the biotechnology management. Explain its applications in biotechnology industry. 10
b) Write a note on application of bioinformatics in vaccine design. 05

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-179
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(Bio Tech) Examination Oct/Nov 2016
Advanced Molecular Biology
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 & 6 from section A & B are compulsory.
ii) Attempt any two questions from the remaining questions in each section.
iii) Figures to right indicate full marks.
iv) Draw neat & labelled diagram.

Section A

Q.1 Attempt any five of the following. 10
a) What is Rett syndrome?
b) Write types of Haemophilia & its causes.
c) Define epigenetics.
d) Define molecular modeling.
e) Mendelian dihybrid cross.
f) What is trinucleotide repeats?
g) Write down the cancer causing agents.

Q.2 Write about Mendelian genetics with any two examples. 15

Q.3 Add a note on.
a) X-inactivation & its mechanism 08
b) Cystic fibrosis 07

Q.4 a) Write a note on colon cancer. 08
b) Huntington's syndrome 07

Q.5 Add a note on. 15
1) Computational approaches to predicting energetic
2) Bare body & its function
3) Trinucleotide repeats

Section B

Q.6 Attempt any five. 10
a) Write down the difference between innate & adaptive immunity.
b) What is Tc & Th cell & its function?
c) What is vaccine?
d) Define bio therapeutic.
e) What is memorization?
f) Function of dendritic cells.
g) Properties of N. K. cells.

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Q.7	a)	Write down the advantages & disadvantages of vaccines.	08
	b)	Explain DNA microinjection techniques.	07
Q.8	a)	Features of model organism & explain any one model organism.	10
	b)	Add a note on directed evolution.	05
Q.9		Write down the techniques of random mutagenesis.	15
Q.10		Write down about.	15
	a)	B cell activation.	
	b)	Haematopoiesis	

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-204
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(Bio Tech) Examination Oct/Nov 2016
Plant Tissue Engineering
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt Any two questions from the remaining four questions of each section.
iii) Figures to the right indicate full marks.
iv) Draw neat & labelled diagram wherever necessary.

Section A

Q.1 Attempt any five of the following 10
a) Callus
b) Suspension culture
c) Somaclonal variation
d) Totipotency
e) Redifferentiation
f) Synthetic seeds
g) Sterilization
h) Embryogenesis

Q.2 a) Explain the types of cell suspension culture techniques. 10

b) Explain principles of callus culture. 05

Q.3 a) Explain the plant tissue culture media. 10

b) Describe protoplast culture technique. 05

Q.4 a) What is haploid? Explain anther culture technique. 10

b) Describe embryo culture. 05

Q.5 Write short note on following
a) Synthetic seed 05
b) Micro propagation 05
c) Somaclonal variations 05

Section-B

Q.6 Attempt Any Five of the following 10

a) Agrobacteriom tume faciens.
b) Recombinant proteins
c) Golden rice
d) Bioreactor
e) Genetic engineering
f) Biotic stress
g) Microinjection
h) Nif genes

Q.7 a) Explain direct gene transfer methods. 10

b) Explain design of bioreactors. 05

Q.8 a) Describe the mechanism of crystal protein for insect resistance. 10

b) Explain mechanism of herbicide resistance 05

Q.9 a) Explain marker assisted selection. 10

b) Describe the nif genes. 05

Q.10 Write short note on following

a) Male sterility 05
b) Virus resistance 05
c) Modified carbohydrates 05

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-304
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(Bio Tech) Examination Oct/Nov 2016
Fermentation Technology
(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
1) Q.No.1 and 6 are compulsory.
2) Attempt any two questions from the remaining four questions in each section.
3) Figures to the right indicate full marks.
4)Draw neat and well labeled diagrams wherever required.

Section A

Q.1 Attempt any five questions from the following. 10
1) Inoculum
2) Strain
3) Closed system
4) Steady state
5) Seed media
6) Energy Sources
7) Two examples of antifoaming agent.
8) Upstream processing

Q.2 A) Explain in detail the components of a typical fermentation process. 10
B) Add a note on microbial quantification. 05

Q.3 Explain in detail batch fermentation kinetics with respect to following points- 15
1) Growth kinetics
2) Monod's kinetics
3) Product formation.

Q.4 Write short notes on (any three) 15
1) Microbial screening
2) Solid state fermentation
3) Energy sources
4) Simplex optimization

Q.5 A) Distinguish between submerged fermentation & solid state fermentation. 10
B) Discuss the industrial applications of fed batch process. 05

Section B

Q.6 Attempt any five from the following 10

1) STR
2) Del factor
3) Effluent
4) Scale- down
5) D.O
6) Inception
7) Pseudo plastics system
8) ALR

Q.7 A) Explain in detail scale up windows. 08

B) Give the classification of various sterilization techniques. 07

Q.8 Explain in detail the various approaches used to design batch sterilization process. 15

Q.9 Write notes on (any three) 15

1) Basic design of fermenter.
2) Fermentation broth viscosity or rheology
3) HTST
4) Design of aerator.

Q.10 Enlist various methods used in determination of K_La. Explain in detail the gassing out technique used for determination of K_La. 15

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-237
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(Bio Tech) Examination Oct/Nov 2016
Immunology
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
i) Q.No.1 and Q.No.6 are compulsory from section A & B respectively.
ii) Attempt any two questions from the remaining four of each section.
iii) Figures to the right indicate full marks.
iv) Draw neat & labelled diagram wherever necessary.

Section A

Q.1 Attempt any 5 of the following 10
a) Antibody.
b) Mitogens.
c) Humeral Immune response.
d) DNA vaccines.
e) Antigen presenting cells.
f) Adjuvants
g) Hematopoietic stem cell.
h) Heavy chain.

Q.2 a) Explain Innate and Acquired Immunity. 08
b) Describe function & structure of primary lymphoid organs. 07

Q.3 a) Describe the structure of antibody in detail. 10
b) Describe antigenic determinants on immunoglobulin. 05

Q.4 a) Explain the endocytic pathway for antigen processing & presentation. 08
b) Describe the process of B cell activation. 07

Q.5 a) Describe the classical complement pathway. 08
b) Differentiate between MHC I & II. 07

Section-B

Q.6 Attempt any 5 of the following 10
a) Radial Immunodiffusion.
b) Monoclonal antibody.
c) Delayed type hypersensitivity.
d) Active & passive immunization
e) Metastasis.
f) Autoimmunity.
g) ELISPOT assay.
h) Cross reactivity.

Q.7	Describe the Hybridoma Technology for monoclonal antibodies. Also explain its applications in diagnostics.		15
Q.8	a)	Explain in detail malarial infection.	10
	b)	Describe the types of ELISA.	05
Q.9	a)	Explain radio immunoassay.	08
	b)	Briefly describe tumour antigens.	07
Q.10	a)	Write a note on subunit vaccines.	08
	b)	Explain the development and causes of AIDS.	07

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SUBJECT CODE NO:- K-269
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(Bio Tech) Examination Oct/Nov 2016
Bio-thermodynamics
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 compulsory.
ii) Answer any two questions from the remaining questions of each section.
iii) Assume suitable data, if required and draw neat sketches whenever needed.

Section A

Q.1 Explain following terms. 10
i. Concept of enthalpy.
ii. Helmholtz's free energy.
iii. Raoult's law.
iv. Residual volume.
v. Heat pump.

Q.2 a) State and derive mathematical statement for second law of thermodynamics. Give its application in thermodynamics. 08
b) Construct T-H thermodynamic diagram and explain its features and applications. 07

Q.3 a) Explain the qualitative and quantitative definition of entropy. 07
b) Explain in details VLE for ideal solutions. 08

Q.4 a) What do you mean by equation of state? State and explain Virial equation of state with its significance. 07
b) Calculate the fugacity of liquid water at 298K and 20 bar if the saturation pressure at 298 K is 3.24 kPa and the specific volume of liquid water at 298 K is 1.004×10^{-3} m^3/kg. 08

Q.5 Write short note on. 15
i. Concept of entropy and principle of its increase.
ii. Maxwell's Equations.
iii. Criteria of phase equilibria.

Section- B

Q.6 Attempt any five from the following 10
1) Redox reactions
2) Gibbs free energy
3) Structure of ATP
4) ELISA
5) Acid
6) Open system
7) Metabolism
8) Standard state in biochemistry
9) Osmotic pressure

Q.7 a) Distinguish between reversible and irreversible processes. 05

b) Explain in detail the phase transition reactions giving suitable example 10

Q.8 Explain “proteins” with respect to following points 15

1) Structural / organizational levels of protein
2) Protein solubility
3) Protein dynamics

Q.9 a) Explain in detail the interrelationship between anabolism and catabolism reactions. 10

b) Phosphate buffer is called as the biological buffer – justify. 05

Q.10 Write short notes 15

a) Biological thermodynamics
b) Non equilibrium thermodynamics and life
c) Equilibrium processes.