Total No. of Printed Pages:2

SUBJECT CODE NO:- K-20
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Bio-Tech.) Examination Oct/Nov 2016
Advanced Genetic Engineering
(Revised)

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

Please check whether you have got the right question paper.

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

Section A

Q.1 Attempt any five 10
1) Define native protein.
2) What are mammalian cell lines?
3) Define immigration.
4) What is chromosomal mapping?
5) Write application human genome project.
6) Proteome
7) Gene therapy.
8) Application of micro arrays.

Q.2 Write a note on
1) Si RNA 08
2) ARMS-PCR 07

Q.3 Write about therapeutics & give detailed about human growth hormone. 15

Q.4
a) Write the application of genetic engineering. 05
b) What is a viral vaccine? 10

Q.5
a) Give a note on identification of missing children. 08
b) Explain diagrams of cystic fibrosis by PCR. 07

Section B

Q.6 Attempt any five 10
1) Why plant act as bioreactor.
2) What is biodiversity?
3) What is role of model organism?
4) What is FDA & it's role in Genetic engineering?
5) Define the term transgenesis.
6) Drawbacks of GM food.
7) Name various methods in gene transferring in plants.
8) What is senescence tolerance in plant?

Q.7 Add a note on. Benefits, risk & drawback of Genetic engineering. 15

Q.8 Write genetic engineering in various animal models like drosophila & zebra fish. Write its importance. 15

Q.9
a) Applications of somadonal variants. 08
b) Write about pro -vitamin A & its role. 07

Q.10 Write note on
a) Herbicide resistance in plant 07
b) Write in detail about transgenic & knockout mice. 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-49
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Biotechnology) Examination Oct/Nov 2016
Unit Operations
(Revised)

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

Please check whether you have got the right question paper.

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

Section A

Q.1 Explain following terms
a) Two film theory 03
b) Distinguish between molecular and eddy diffusion 03
c) Mechanism of crystallization 04

Q.2 a) Derive from fundamentals the expression for steady state equimolal counter diffusion of gas A through another gas B. 08

b) Explain the concept of theoretical stage. State an expression for Murphree tray efficiency. 07

Q.3 a) Find an expression for the determination of total time of drying of a wet solid material under constant drying conditions to a final moisture content well below the critical moisture content. 10

b) Give detail classification of drier used in industries. 05

Q.4 a) A continuous counter- current drier is to be used to dry 10000kg per hour of wet solid containing 5% water (wet basis) to a water content of 0.1% (wet basis). Ambient air at 27^0C and a humidity of 0.0075 will be heated to 150^0C and the heated air is passed through the drier. The air leaving the drier is at 70^0C with a percentage humidity of 10 percent. Calculate the air required the heat supplied in the preheater. 15
Saturation humidity at 70^0C=0.299
Humid heat of inlet air= 0.243 cal/gmol^{0}K.

Q.5 Write note on 15
i. MIERS saturation theory
ii. Method of supersaturation
iii. Freeze drying

Section-B

Q.6 Explain following terms
i. Total reflux 03
ii. Bond law 03
iii. Single stage batch extraction process 04

Q.7	a)	Discuss the factors which govern the selection f solvents to be used for liquid- liquid extractions.	07
	b)	Write in short the procedure to determine the number of theoretical stages for counter current multistage extraction.	08
Q.8	a)	Explain in detail the McCabe and Thiele method for finding number of theoretical stages of distillation column.	10
	b)	Derive Rayleigh's equation for differential distillation.	05
Q.9	a)	Derive the expression for the effectiveness of a screen. How does this vary with capacity?	10
	b)	Compare closed and open circuit size reduction operation.	05

Q.10 Write note on 15

i. Ball mill
ii. Azeotropic distillation
iii. Application of extraction in biological system

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-80
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (BioTech.) Examination Oct/Nov 2016
Nanotechnology
(Revised)

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

Please check whether you have got the right question paper.

N.B
i) Q.No.1 and 6 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 well labelled diagram wherever necessary.

Section A

Q.1 Attempt any five 10

1. Convert 1nm to micrometer
2. Give two examples of nanoscience in nature.
3. Semiconductor
4. Enlist two properties of nanomaterials.
5. Emulsion
6. Electromagnetic radiation
7. Metals and non metals
8. Give two examples of inert gas.

Q.2 Explain the concept of nanotechnology with respect to following points. 15

1. Definition
2. Nano in daily life
3. Application of nano technology in water treatment

Q.3 Explain in detail the methods of synthesis employed for carbon nanotubes 15

Q.4
a) Give the schematic representation of classification of methods of nano particle synthesis. 08
b) Add a note on Quantum dots as semiconductors. 07

Q.5 Write notes on (any 3) 15

1. Dimensions of nanopaticles
2. Electrochemical method
3. Functionalization of CNTs.
4. Advantages of nanotechnology

Section B

Q.6 Attempt any five 10

1. Secondary electrons
2. Condensers
3. Microscopy
4. Dyes used in diagnosis
5. Wavelength of UV light
6. Bells law
7. Sol
8. Role of vacuum in electron microscopy

Q.7 a) Distinguish between light and electron microscopy 10

b) Give the principle of SEm. 05

Q.8 Enlist various biological methods used in synthesis of nanoparticles. Explain in detail any two biological methods employed for synthesis of nanoparticles. 15

Q.9 What do you understand by biosensors? Explain in general the instrumentation of a biomass. Explain cantilever biosensor. Explain cantilever biosensor and plasmonic biosensors. 15

Q.10 Write notes on

1. AFM 10
2. Sol Gel method 05

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-145

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E.(BioTech.) Examination Oct/Nov 2016

Bioethics Biosafety and Intellectual Property Rights [Elective-II]

(Revised)

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

Please check whether you have got the right question paper.

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

Section A

Q.1 Attempt any five from the following 10

1) Bio ethics
2) Bio safety
3) Bio technology
4) Risk
5) GMP
6) Genome
7) Label
8) Bio safety Level

Q.2 What do you understand by Bioethics? Explain in detail its need and relevance to Biotechnology. 15

Q.3 What do you understand by human Genome project? Elaborate its ethical implications. 15

Q.4 Explain GM food with respect to its 15

1) History
2) Techniques and
3) Applications.

Q.5 Write notes on (any 3) 15

1) Labelling of GM products
2) Human cloning
3) GLP
4) Levels of bio safety

Section B

Q.6 Attempt any five from the following 10

1) Stem cells
2) Gene
3) Patent
4) Copyright
5) PCR
6) IPR
7) Drugs
8) Patent number

Q.7 Explain in detail the concept, types and utility/ advantages of intellectual property rights. 15

Q.8 Explain in detail the properties, types and applications of stem cells. 15

Q.9 a) Explain farmer's rights. 07

b) Explain plant breeder's rights 08

Q.10 Add notes on (any three) 15

1) Geographical Indication
2) UPOV
3) Compulsory licensing
4) WTO
5) Harvard mouse

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-194
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(BIOTECH) Examination Oct/Nov 2016
Fermentation Technology - II
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.No.1 of section A and Q.No.6 of section B are compulsory.
ii) Attempt any two questions from remaining questions in each section.
iii) Figures to right indicate full marks.
iv) Draw neat and well labeled diagrams wherever required.

Section-A

Q.1 Attempt any five from the following 10
1) Organic acid
2) Structure of lysine
3) Polyol
4) Metabolic engineering
5) anaerobic respiration
6) Tower reactor
7) Vitamin
8) Facultative microbes.

Q.2 Give metabolic pathways of 15
1) Penicillin
2) Glycerol
3) Lactic Acid

Q.3 Explain in detail the upstream processing of citric acid with the help of following points 15
1) Inoculum development
2) Production media
3) Bioreactors used

Q.4 Add a note on ABE fermentation. 15

Q.5 a) How metabolic engineering leads in enhancement of product yield? Justify with suitable example 08
b) Can chromatographic techniques be used as an industrial purification protocol for dextran? Justify. 07

Section-B

Q.6 Attempt any five from the following. 10

1) Probiotic milk
2) Starter culture
3) E.C.no of lipase
4) Transesterification
5) GPC
6) glycosylation's
7) Spacer arm
8) Malting.

Q.7 a) Distinguish between biocatalysis and catalysis based on chemical catalyst. 10

b) Add a note on bio diesel production. 05

Q.8 Explain in detail the process of cheese technology. 15

Q.9 Explain in detail the purification protocol of any recombinant protein based on affinity chromatography. 15

Q.10 Write notes on 15

1) HDCC
2) Raw material used for wine production
3) Whey fermentation.

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-355
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(BIOTECH) Examination Oct/Nov 2016
Elective-I: Food Biotechnology
(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.
IV. Draw neat & labeled diagram.

Section A

Q.1 Attempt any five of the following 10
1. Unit operations in food industry (write steps).
2. Separating.
3. Effect of irradiation on food constituents.
4. Write the four names of food borne pathogens.
5. Write the names of food contaminants.
6. Mixing.

Q.2 Explain chemical safety of food products and write about heavy metals & fungal toxins. 15

Q.3 Write note on: 15
1. Food quality control.
2. Role of Biotechnology in food industry.

Q.4
a) Write about food preservation advantages & disadvantages. 05
b) Add a note on irradiation & its effect on food processing. 10

Q.5
a) What is the indication for food borne pathogen contamination in any food products? 10
b) Write down food processing methods in food industry. 05

Section-B

Q.6 Write any five of the following: 10
1. Define symbiotic Nutracuticals.
2. Caretenoids.
3. Role of lycopene.
4. Pectin.
5. Octacosanol.
6. Write the examples of nutraceuticals.

2016

Q.7	a)	Write a note on food production of caretenoids.	10
	b)	Write the process of flavour production is cheese.	05
Q.8	a)	What is shelf life of food & food products & write factors affecting on it.	10
	b)	Add a note on Rancidity & its role in food biotechnology.	05
Q.9	a)	Write down the major nutraceuticals & their applications & write application of it.	10
	b)	Explain the recent developments in food industry.	05
Q.10	a)	Add a note on flavour production.	10
	b)	Write a note on food application of algae.	05

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-356
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(BIOTECH) Examination Oct/Nov 2016
Elective-I: Environmental Biotechnology
(Revised)

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

Please check whether you have got the right question paper.

N.B i) From each of the section solve 3 questions of which Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) draw diagram wherever required
iii)figure to the right indicate full marks

Section A

Q.1 Attempt any five of the following 10
1. Hemisphere.
2. Stratosphere.
3. Outdoor air pollution.
4. Control measures of oil pollution.
5. What is pollutants & write its types.
6. Hazards of soil erosion.
7. Acid rain creators.

Q.2 What is erosions & write the types of erosions & brief each erosion in detailed. 15

Q.3 a) Explain the advantages & Hazards of biotechnology in recent gears. 10

b) Which are the global environmental problems in recants gears. 05

Q.4 What is waste monitoring & write the management of solid waste including medical wastes hazardous waste. 15

Q.5 Write a note on 15
1. Salinization.
2. Eutrophication.
3. Insecticides.

Section-B

Q.6 Attempt any five of the following 10
1. Define xenobiotics.
2. Role of phytoremediation.
3. Draw PFR.
4. Which microorganism used is Bio sorption.
5. What is green engineering?
6. Classification of pesticides.

2016

Q.7 How can we use Biotechnology in leather industry dairy & dye industry. 15

Q.8 Write a note on 15

1. Turnery industry.
2. Bioengineering perspectives.
3. Ethics of environmental Biotechnology.

Q.9 What is Biosorption which microbes used in biosorption& what is mechanism for it's study & which factors affect on the same. 15

Q.10 a) Write the chemical properties of xenobioties. 08

b) How we reliable on biotechnology & what is biotechnological systems. 07

Total No. of Printed Pages:1

SUBJECT CODE NO:- K-226
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(BIOTECH) Examination Oct/Nov 2016
Introduction to Biological Programming
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Question no.1 and 6 are compulsory.
ii) Attempt any two questions from the remaining four questions of each section.
iii) Figures to right indicate full marks.

Section A

Q.1 Attempt any five, each carries two marks. 10
a) List out the operators used in C++.
b) 'While' statement in C++ with an example.
c) 'Switch' statement in C++ with an example.
d) 'goto' statement in C++ with an example
e) What is a function in 'C++'? Explain with an example.
f) 'for' statement in C++ with an example.
g) One dimensional and two dimensional array.
h) Note on a function overloading.

Q.2 Explain the all types of operator used in C++ with suitable examples. 15

Q.3 What is an input and output device? Explain with suitable diagrams. 15

Q.4 What is a function in C++? Explain passing array to function with an example. 15

Q.5 What is the loop statement in C++? Explain all types with examples. 15

Section B

Q.6 Attempt any five each carries two marks. 10
a) What is class and object? Explain with examples.
b) What is method? Explain with an example.
c) What is an instance variable? Explain with an example
d) Note on an encapsulation.
e) Note on an abstraction.
f) What is a multiple inheritance? Explain with an example.
g) Note on a 'ofstream class'.
h) Note on a Bio Python.

Q.7 What is the method? Explain method overloading and overriding with an example. 15

Q.8 Explain the Bio Python with libraries which address the needs of current and future work in Bioinformatics. 15

Q.9 Explain the concepts of an object oriented programming with applications. 15

Q.10 Explain the R. software along with applications in Bioinformatics with suitable examples. 15

2016

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-257
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(BIOTECH) Examination Oct/Nov 2016
Biochemical Reaction Engg.
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Question number 1 and 6 are compulsory.
ii) Answer any two questions from each section from remaining.
iii) State clearly for assumption made and draw neat sketches wherever required.

Section A

Q.1 a) What are the methods to determine rate expression? 10
b) What is order of reaction?
c) Elementary reaction.
d) Half-life method.
e) Second order Reaction.
f) 2HI $\rightarrow H_2 + I_2$ what is the order of reaction given above.
g) Write rate of disappearance of A for the following reaction.
A+ B → R

h) A → R, A → S Which is this reaction known as.

Q.2 a) The rate constant of a certain reaction rate are 1.6 x 10^{-3} and 1.625 x 10^{-2} /s at 10°C and 30°C. 08
Calculate the activation energy.
b) A reaction with stoichiometric equation $^1/_2\ A + B \rightarrow R + {}^1/_2\ S$ has the following rate equation 07
$-r_A=2C_A^{0.5}\ C_B$ what is the rate expression for this reaction if the stoichiometric equation is written as A+2B →2R+S?

Q.3 a) Explain elementary and non-elementary reactions. 07
b) Write in detail temperature- dependent term of a rate equation from Arrhenius's Law. 08

Q.4 Show that the decomposition of N_2O_5 at 67^{0}C is a first order reaction. Calculate the value of rate constant 15
Data:-

Time, min	0	1	2	3	4
$C_{N_2O_5}$ mol/l	0.16	0.113	0.08	0.056	0.040

Q.5 a) The half-life of first order reaction A→B is 10min. What percent of A remains after 80 min? 08
b) What are the variables affecting rate of reaction. 07

Section B

Q.6 10

Define / Explain (Any 5)

a) Free radicals
b) Batch for mentor
c) Damkohler number
d) Graphical representation of PFR
e) Types of reactor
f) Space velocity
g) Varying volume batch reactor
h) Enzyme fermentation.

Q.7 Derive the performance equation for mixed flow reactor / CSTR with graphical representation. 15

Q.8 Explain M.M kinetics. 15

Q.9 An industrial unit has-two mixed flow reactors of unequal size for producing a rectified product according to first order Kinetics. How should those reactions be connected to obtain a maximum production rate. 15

Q.10 Write a note on 15

a) Autocatalytic reaction
b) Size comparison of single reactor
c) Inhibition by foreign substance

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-291
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(BIOTECH) Examination Oct/Nov 2016
Animal Cell Science & Technology
(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.
ii) Attempt any two questions from the remaining four of each section.
iii) Figures to the right indicate full marks.
iv) Draw neat and labelled diagram wherever necessary.

SECTION A

Q.1 Attempt/Define any 5 of following. 10
a. Typical instruments used in animal cell culture.
b. Tissue plasminogen activator.
c. Antibodies production using Animal cell culture.
d. Micro titre technology.
e. HeLa cell line.
f. Gene therapy.
g. Types of animal tissue culture.
h. Differentiate between serum and plasma.

Q.2 a) What is the significance of water in success of Animal cell culture experiments? Also write different purification techniques. 10
b) Describe the method of chemical sterilization in brief. 05

Q.3 a) Explain the biology of cultured animal cells. 10
b) What are limitations of animal tissue culture? 05

Q.4 a) Explain the phenomenon of animal cell differentiation in brief. 05
b) Write in detail about cell adhesion. 10

Q.5 a) What are the different types of cell signalling exhibited by animal cells? 05
b) What is a Balanced Salt Solution? 05
c) List down the disadvantages of serum. 05

SECTION B

Q.6 Attempt any 5 of following. 10
a. Viability
b. Clonal population
c. Process control
d. Monolayer culture
e. Sources of trypsin
f. Cell line
g. Feeder layers
h. Biological Safety Cabinet.

2016

Q.7	a)	What is tissue disaggregation? Describe different methods of the same.	10
	b)	What is Primary Culture?	05
Q.8	a)	What are the different criteria for Sub culturing process?	05
	b)	What is 3-Dimensional cell culture?	05
	c)	What are quality control methods?	05
Q.9	a)	How are the suspension cultures scaled up?	10
	b)	List down the conditions used to improve clonal growth.	05
Q.10	a)	Describe the phenomenon of cell-line transformation in detail.	10
	b)	Explain the method of cloning rings for obtaining clonal population.	05