UNIVERSITY OF PUNE

[4363]-274

T. E. (Biotechnology) Examination- May 2013

COMPUTATIONAL TECHNIQUES AND BIOSTATISTICS

(2008 Course)

Total No. of Questions : 12 **[Total No. of Printed Pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

(1) Answer any three questions from Section I and three questions from Section II

(2) Figures to the right indicate full marks.

(3) Use of Programmable calculator is not allowed.

(6) Assume suitable data, if necessary.

SECTION-I

Q1.

a) Describe the working procedure for fitting a straight line $y = a + bx.$ following terms. [8]

b) Find the values of A and Y which best fit the equation $A = mY + x$ by using the following data. [8]

A	12	15	21	25
Y	50	70	100	120

OR

Q2.

a) Velocity and time are related by the equation of the form $v = a\,t^{b}.$ find "a" and "b" by using the following data. [8]

V	350	400	500	600
t	61	26	7	26

b) Describe the working procedure for fitting the curve of the form [8]

Q3.

a) Evaluate $\Delta^{10}[(1-ax)(1-bx^2)(1-cx^3)(1-dx^4)]$ [6]

b) Assuming that the following values of y belong to a polynomial of degree 4, complete the next three values. [10]

x	0	1	2	3	4	5	6	7
y	1	-1	1	-1	1	-	-	-

OR

Q4.

a) Following data gives the values of x and y. Find $f(12)$ using Lagrange's formula. [8]

x	1.2	2.1	2.8	4.1	4.9	6.2
y	4.2	6.8	9.8	13.4	15.5	19.6

b) What is Interpolation? What are the drawbacks of Lagrange's formula? How can it be used corrected? [8]

Q5.

a) The velocity changes with time of a car as per the given data. [9]

t	2	4	6	8	10	12	14	16	18	20
v	10	18	25	29	32	20	11	5	2	0

Estimate the distance travelled by the car in 20 min.

b) By using Simpson's 1/3rd rule find the value of the function $e^{-x^2}dx$ by taking seven coordinates. [9]

OR

Q6. What is Numerical Integration? What do you mean by Quadrature? Deduct Weddle's rule by using Newton Cote's Quadrature formula? [18]

SECTION-II

Q7.

a) Find the real root of $y=3x-cosx-1$ by Newton's method correct too four decimal places. [8]

b) Use the method of False position to find the fourth root of 32 correct to three decimal places. [8]

OR

Q8.

a) Define Quasi random Sampling method? How can it be formed? When is it used? What is the working procedure adopted for sampling under this method? [10]

b) Define the following terms. [6]

1) Representative Sample
2) Bias
3) Statistics

Q9. Explain the factors considered while choosing a suitable diagram for the representation of any data. [16]

OR

Q10. Write detailed notes on Ogives. Why is it so called? Describe the methods of constructive Ogive? What are its uses? [16]

Q11.

a) A Personal Manager is interested in trying to determine whether absenteeism is greater on the day of the week than on another. His records for the past year show this sample distribution. [10]

Day of week	mon	tue	wed	thu	fri
No of Absentees	66	51	54	48	75

Test whether the absence is uniformly distributed over the week.

b) The mean produce of wheat of a sample of 100 fields is 200lb/acre with a standard deviation of 10lb. Another sample of 150 fields gives the mean at 220 with a standard deviation of 12lb. Assuming the standard deviation of the mean field at 1lb of the universe, find 1% level if the two results are consistent. [8]

OR

Q12.

a) Prices of shares of a company on different days in a month were found to be 66,65,69,70,69,71,70,63,64,68. Discuss whether the prices of the shares be 65. Table value of t=2.262. [9]

b) Find the average rate of increase in population which in the first decade has increased by 20%, in second decade by 30% and in the third decade by 40%. [9]

PUNE UNIVERSITY

[4363]-277

T. E. Biotechnology, Examination - 2013

Fermentation Technology - II

(2008 Course)

[Total No. of Questions: 12] **[Total No. of Printed Pages: 2]**

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

*(1) Answer **any three** questions from each section-I and any three from section-II.*

(2) Figures to the right indicate full marks.

(3) Use of programmable calculator is allowed.

(4) Assume suitable data, if necessary.

SECTION-I

Q. 1. Explain the factors effecting diffusion in Bio processing. (16)

OR

Q. 2. Write short notes on the following. (16)

i. Impeller Reynolds number

ii. Power number

Q. 3. Write short notes on Bubble driven Bioreactors. (16)

OR

Q. 4. Briefly explain the Construction and working of Continuous Countercurrent Decanter. (16)

Q. 5. Define Adsorption. What is its application in Biotech Industries? Explain how the nature of adsorbents affects the efficiency of a process? (18)

OR

Q. 6. Prove that two stage crosscurrent treatment of liquid solution by Contact filtration when the adsorption isotherm is linear, the least Total adsorbent results if the amounts used in each stage are equal. (18)

SECTION-II

Q. 7. List out the equipments used for leaching of fine solids. Explain the Constructions and working of Ball man Extractor. (16)

OR

Q. 8. Soybean oil is to be extracted from granulated soybean seeds in a Countercurrent extraction unit using ethyl ether as a solvent. The Mass flow rate of halibut seeds to the unit is 350kg/hr. The fresh seeds contain 20% oil and are to be extracted to a composition of 1% of oil. The Solvent containing 2% oil to be used as used as a solvent is fed to the unit at The rate 250kg/hr. Determine the number of theoretical stages required. And % recovery of oil. (16)

Concentration	0	0.1	0.2	0.3	0.4	0.5	0.6
Solution retained	0.28	0.34	0.4	0.47	0.55	0.66	0.8

Q. 9. What is membrane fouling? Explain the factors which decrease the Flux through a membrane. How can it be prevented? (16)

OR

Q. 10. Explain the parameters which are used to assess Pervaporation Process? (16)

Q. 11. Define liquid Extraction. What are the fields of its usefulness? (18)

OR

Q. 12. What are the factors affecting the Choice of a solvent in any extraction Operation? Explain how each factor actually affects the efficiency of the operation? (18)

UNIVERSITY OF PUNE

[4363-271]

T.E.(Biotechnology) Examination,2013

GENETIC ENGINEERING

(2008 pattern)

Time-Three hours **Maximum Marks-100**

[Total No. of Question=12] **[Total no. of printed pages= 3]**

Instructions:

(i)Answer Q. No. 1 or Q. No. 2, Answer Q. No. 3 or Q. No. 4, Answer Q. No. 5or Q. No. 6, Answer Q. No. 7 or Q. No. 8, Answer Q. No. 9 or Q. No. 10, Answer Q. No. 11 or Q. No. 12.

(ii)Answers to the two sections should be written in separate answer books.

(iii)Draw neat diagrams wherever necessary.

(iv)Figures to the right indicate full marks.

SECTION-I

Q.1. Describe and discuss in detail the procedure for Southern Blotting with a neat labelled diagram also give its application. (18)

OR

Q.2 Describe RTPCR and give its application. Enlist and describe the usage of the various enzymes involved in RTPCR and PCR. (18)

Q.3 What are Cloning vectors, explain their significance in genetic engineering? Describe a model plasmid cloning vector? (16)

OR

Q.4 What are expression vectors? Give their significance , and describe a typical expression vector. (16)

Q.5 Explain the concept of genomic libraries, how are they constructed? What are cDNA libraries? (16)

OR

Q.6 Write in detail the steps involved in cloning a protein product till mass production. (16)

SECTION-II

Q.7 Answer the following **(9 marks each)** (18)

(i)Explain in detail screening of recombinants using the blue white selection method.

(ii)Describe PCR cloning.

OR

Q.8 Explain the dideoxy sequencing method in detail, with a neat diagram. (18)

Q.9 What are the different ways by which genomic material is transferred in bacteria? Explain with respect to Conjugation and transformation. (16)

OR

Q.10 How are transgenics organisms constructed? What are their significance and applications in biotechnology? (16)

Q.11 Answer the following **(8 marks Each)** (16)

(i)Explain the application of recombinant DNA Technology, in agriculture with a detailed analysis of golden rice.

(ii)What is Human Genome Project?How was it impacted biology and biotechnology?

OR

Q.12 Write a short note on (4 marks each) (16)

(i) RFLP

(ii) AFLP

(iii) DNA diagnostics

(iv) Hep B

UNIVERSITY OF PUNE

[4363]-272

T. E. (Biotechnology] - Examination - 2013

FERMENTATION TECHNOLOGY-I

(2008 Course)

[Total No. of Questions:] **[Total No. of Printed pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** questions from each section.*

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Black figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

(5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(6) Assume suitable data, if necessary.

SECTION I

Q.1] What is Fermentation Technology? Explain application of fermentation technology in detail. [16]

OR

Q.2] Give example of classical fermentation systems with example and explain the inoculum preparation methods in detail. [16]

Q.3]What is medium optimization? Explain in detail any one method of medium optimization. [16]

OR

Q.4] Explain different types of media. Give importance of different media components. [16]

Q.5] Describe in detail activities of acetic acid bacteria and explain production of vinegar [18]

OR

Q.6] Explain following alcoholic beverages production process: [18]
a] Wine
b] Beer

SECTION II

Q.7] Mention the list of antibiotics produced by application of fermentation technology. Explain production process of one of the antibiotic from your list. [16]

OR

Q.8] What do you mean by immobilization? What is the application of immobilization in fermentation technology? Explain one application of enzyme immobilization in detail. [16]

Q.9a] What is mean by solid state fermentation [SSF]? Explain application of SSF in detail. [8]

Q.9b] Enlist the type of fermenters getting utilized in submerged fermentation process. Explain one of them in detail. [8]

OR

Q.10] Explain following modes of operation in stirred tank reactors: [16]
a] Discontinuous batch operations
b] Continuous operation
c] Semi-continuous operations
d] Periodic fed-batch operations

Q.11] What is Scale Up? Explain the concept with suitable case study. [18]

OR

Q.12] Write short note on: [18]
a] GMP
b] Downstream Processing
c] Fermentation efficiency

UNIVERSITY OF PUNE

[4363]-273

B. E. (Biotechnology) Examination - 2013

HEAT TRANSFER (315403)

(2008 Pattern)

[Time : 3 Hours] **[Max. Marks : 100]**

[Total No. of Questions:12] **[Total No. of Printed Pages :3]**

Instructions :

*(1) Answers three questions from **Sections I** and three questions from **Section II**.*

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Black figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

(5) Use of scientific calculator is allowed.

(6) Assume suitable data, if necessary.

SECTION-I

Q1 a) State and explain Buckingham pi-theorem. [6]

b) What are the different modes of heat transfer? Explain with suitable example. [10]

OR

Q2 a) What is the significance of dimensional analysis? Explain its role in data reduction. [6]

b) For convection heat transfer for flow of fluid through a tube, derive the following equation using Buckingham pi-theorem. [10]

$Nu=c\ (Re)^m\ (Pr)^n$

Where c, m and n are constants.

Q3 a) State and explain Fourier's law of conduction. [4]

b) What are fins? Define fin effectiveness and explain different types of fins (at least 3) with neat sketches. [10]

c) Explain the concept of steady state and unsteady state heat transfer. [4]

OR

Q4 a) Find the heat flow rate per unit length through a thick pipe of outer diameter 4 cm and inner diameter 2 cm. (Data: Thermal conductivity of pipe=0.58 W/m-K; Temperature of inner wall of the pipe=70°C and Temperature of outer wall of the pipe=100°C). [4]

b) Derive the equation to find maximum temperature distribution in an infinitely long solid cylinder of radius R in which heat is being generated at a uniform rate of 'q' units per unit volume. The heat transfer coefficient at the surface is 'h' and the ambient temperature is 'T^f'. [10]

c) What is thermal diffusivity? Explain its significance. [4]

Q5 a) Distinguish between natural and forced convection with suitable example. [4]

b) What are types of boiling? Explain the pool boiling curve. [8]

c) Define condensation and types of condensation. [4]

OR

Q6 a) A steel pipe 25 mm ID and 33 mm OD and insulated with rock wool carries steam at 178°C. If the surrounding air temperature is 21°C, calculate the rate of heat loss from one meter length of pipe. The thickness of insulation is 38 mm. Thermal conductivity of steel and rock wool are 10.74 and 0.0418 cal/sec-m^2 °C respectively. The inside and outside heat transfer coefficients are 1356.17 and 2.7133 cal/sec m^2 °C respectively. Contact resistance between the pipe and insulation may be neglected. [10]

b) Explain the concept of thermal boundary layer. [4]

c) Explain the significance of Prandtl number. [2]

SECTION-II

Q7 a) Explain any one case of radiation between two surfaces and derive the necessary equation for the same [8]

b) State and explain i) Stefan Boltzman law ii) Planck's law iii) Wien's law iv)Kirchoff's law [8]

OR

Q8 a) Define i) emissivity ii) gray body iii) opaque body iv) black body [4]

b) What is transmissivity, absorptivity and reflectivity? Based on these explain the specular and diffuse reflection. [8]

c) Explain the concept of shape factor. [4]

Q9 a) Explain with neat sketch working of direct and indirect contact heat exchanger. [6]

b) Derive the equation for log mean temperature difference for parallel flow heat exchanger. [10]

OR

Q10 a) Draw the sketch of 1-2 shell and tube heat exchanger and explain its working. [6]

b) What are the factors that cause fouling? Explain the effect of fouling on heat transfer. [4]

c) Water enters a two-fluid heat exchanger at 55°C and leaves at 85°C. Hot gases enter at 305°C and leaves at 160°C. If the total heat transfer area is 500 m^2 and the overall heat transfer coefficient is 600 kcal/hr , m^2°C, determine the total heat transferred per hour for i) parallel flow and ii) counter flow of the two fluids. [6]

Q11 a) Define the performance measures for evaporators and explain how they are interrelated. [4]

b) Explain different methods of feeding in multiple effect evaporators. [10]

c) Explain the working principle of circulation evaporators with neat sketch. [4]

OR

Q12 a) What are the resistances to heat transfer in evaporators? Explain with neat sketch. [6]

b) What is boiling point elevation? State the Duhring's rule. [4]

c) An evaporator is to be fed with 5000kg/h of solution containing 10% solute by weight. The feed at 40°C is to be concentrated to a solution containing 40% by weight of the solute under an absolute pressure of 1.03 kg/cm^2. Steam is available at an absolute pressure of 3 atmosphere (saturation temperature of 134°C). The overall heat transfer coefficient is 1500 kcal/hrm^2°C. Calculate i) heat transfer area that should be provided ii) the steam requirement. [8]

Temperature, °C	**Enthalpy, kcal/kg**	
	Vapor	**Liquid**
40	613.5	40.5
100	639.2	100.0
134	651.4	134.4

[Total No. of Questions:12] **[Total No. of Printed Pages: *3*]**

UNIVERSITY OF PUNE

[4364]-641

T. E. (*Biotechnology*)(Semester-I) Examination - 2013

(Mass Transfer)(315462)(2008 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

*1 Answer **any three** questions from each **section.***

2 Assume suitable data, if necessary.

*3 Figures to the right indicate **full marks.***

4 Use of programmable calculator is not allowed.

SECTION -I

Q.1 Derive the equations for the following with proper nomenclature and assumptions 16

i. Steady State molecular diffusion in liquids at rest.

ii. Steady State equimolal.

OR

Q.2 Discuss in detail Theories of Mass Transfer. 16

Q. 3 A Write short notes on Distillation Column Internals. 8

B 100 moles of Benzene and Toluene containing 50 mole% Benzene in the residue is 33% by mole. Calculate the total moles of the mixture distilled? Take relative volatility value as 2.4 8

OR

Q. 4 A Define Fenske's Equation. What are its applications? 8

B Data of mole fraction of carbon disulphide in the liquid and in vapour evolved from the mixture during distillation of carbon disulphide carbon tetrachloride mixture as follows. 8

x	0	0.2	0.4	0.6	0.8	1
y	0	0.445	0.65	0.795	0.91	1

Determine graphically number of theoretical plates required.

Q. 5	A	Derive the operating line equation for Equilibrium distillation and deduce the operating lines for various ranges of feed values.	9
	B	Write short notes on the following with suitable examples. i. Minimum Boiling Azeotrope ii. Total Condenser	9

OR

Q. 6		What is Reflux ratio? How does it affect the purity of the product? Write short notes on Minimum and Total Reflux ratio. Which one works best in order to achieve a quality product?	18

SECTION II

Q. 7		Write short notes on Equilibrium solubility of Gases in liquids for the following systems. i. Two Component systems ii. Multi Component systems	16

OR

Q. 8	A	Write short notes on Reboiled absorbers. How efficiency is increased in these type of absorbers?	8
	B	5000Kg/hr of a So_2 air mixture containing 5% by volume So_2 is to be scrubbed with 200000 Kg/hr of water in a packed tower. The exit concentration of So_2 is reduced to 0.15%. The tower operates at 1 atm pressure. The equilibrium relationship is given by Y=30X. If the packed height of the tower is 420cm, estimate the height of transfer unit.	8
Q. 9		1400Kg (bone dry) of granular solid is to be dried under constant drying conditions from a moisture content of 0.2Kg/Kg dry solid to a final moisture content of 0.02Kg/Kg dry solid. The drying surface is given as $0.0615m^2$ /Kg dry solid. Under the same conditions the following rates were previously know. Estimate the time required for drying.	16

Moisture content	0.3	0.2	0.14	0.096	0.056	0.046	0.026	0.016
Rate of Drying	1.71	1.71	1.71	1.46	1.29	0.88	0.54	0.376

OR

Q. 10 Derive the expression for time of drying for the following conditions. 16

i. Constant rate period

ii. Flling rate period

Q. 11 Give a brief description about the following 18

i. Methods of Super saturation

ii. Mier's Super saturation theory

OR

Q. 12 A A hot solution containing 5000kg Na_2CO_3 and water with a concentration of 25% by weight Na2CO3 is cooled to 293 K and crystals of Na_2CO_3.10 H2o are precipitated. At 293 K the solubility is 21.5kg anhydrous Na_2CO_3per 100kg of water. Calculate the yield of Na_2CO_3crystals obtained if 5% of the original water in the system evaporates on cooling. 9

B Write short notes on solubility curves in Crystallization. 9

UNIVERSITY OF PUNE
[4363]-276
T. E. (BIOTECHNOLOGY), Examination 2013
REACTION ENGINEERING (315466)
(2008 Pattern)

[Total No. of Questions:12] **[Total No. of Printed pages :3]**
[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) *Answers any 3 questions from each section*
(2) *Answers to the two Sections should be written in separate answer-books*
(3) *Neat diagram must be drawn wherever necessary.*
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.

SECTION I

Q1 a) Discuss about classification of chemical reactions. [6]

b) Define molecularity and order of reaction. [6]

c) Differentiate between elementary and non-elementary reactions with suitable examples. [6]

OR

Q.2 a) Milk is pasteurized if it is heated to 60^0 C for 25 min but if it is heated to 70^0 C it only needs 15 sec for same process. Determine the activation energy of sterilization process. [9]

b) Explain kinetic model for nonelementary reaction. [9]

Q.3 a) A homogeneous gas reaction A=3R at 200^0 C has the rate $-r_A = 10^{-2}$ $C_A^{1/2}$ (mol/ lit.sec). Find the space time needed for 80% conversion of 50% A and 50% inert feed to a plug flow reactor operating at 200^0 C and 4 atm if the Initial concentration is 0.0625 mol/lit. [10]

b) Define space time and space velocity for flow reactor. [6]

OR

Q.4 a) Derive the equations relating time, initial concentration and conversion of an ideal batch reactor for constant density system. [8]

b) For first order homogeneous gaseous reacting A= 2.5 R is carried out in an isothermal batch reach at 2 atm with 20% (mole) inserts present and the volume increases by 60% in 20 min. In case of constant volume reactor, determine the time required for pressure to reach 8 atm if initial pressure is 5 atm, 2 atm of which consist of inerts. [8]

Q.5 a) Derive the expressions for residence time distribution for pulse input method. [8]

b) Write short note on segregated flow model. [8]

OR

Q.6 a) Write short note on dispersion model. [7]

b) A sample of tracer hytane at 320 k was injected as a pulse to a reactor and the effective conversion measured as a function of time, resulting the following data, [9]

t(min)	0	1	2	3	4	5	6	7	8	9	10	12	14
C(g/m^3)	0	1	5	8	10	8	6	4	3	2.2	1.5	06	0

The measurement represents the exact concentration at the times listed and not average values between the various sampling tests.

a) Construct a figure shows C (t) and E(t) as a function of time.
b) Determine both the fraction of material leaving the reactor that has spent between 3 and 6 min. in the reactor.

SECTION II

Q.7 Write a short note on: [18]

i) Progressive Conversion Model ii) Shrinking Core Model

OR

Q.8 a) Derive overall rate equation for given system A(L) + B(S) =R(L). [9]

Dilute A diffuses through a stagnant liquid film onto a plane surface consisting of B, reacts to produce R which diffuses back into the mainstream. Develop the overall rate expression for the L/S reaction.

b) Explain diffusion through gas film controls in details. [9]

Q.9 a)Discuss about mechanism of solid catalysed reaction. [06]

b)Explain pore diffusion resistance combined with surface kinetics with example [10]

OR

Q10 a) Determine the amount of catalyst required in packed bed reactor for 80% conversion of 1000 mol/min if C_{A0} = 8mol/m^3 of feed. [8]

b) Write short note on: [8]

i) Trickle bed reactor ii) Slurry reactor

Q11 a) Explain different types of inhibitors encountered in enzyme kinetics. [8]

b) Discuss about Michaelis-Menten kinetics. [8]

OR

Q12 Write short note on: [16]

i) Factors affecting growth kinetics
ii) Product limiting microbial fermentation
iii) Substrate limiting microbial fermentation
iv) Enzyme deactivation kinetics

[Total No. of Questions: *12*] **[Total No. of Printed Pages: 4]**

UNIVERSITY OF PUNE

[4363]-278

T. E. (Biotechnology) Examination May - 2013

BIOSEPAREATIONS- I (315468) (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 *Answers to the **two sections** should be written in **separate answer-books**.*

2 *Black figures to the right indicate full marks.*

3 *Your answer will be valued as a whole*

4 *Neat diagrams must be drawn wherever necessary.*

5 *Assume suitable data, if necessary.*

SECTION –I

Q.1	A	What is Ultrasonication ? Discuss various factors affecting Ultrasonication.	6
	B	What is a Bioprocess? Give flow chart of major steps involved in any bioprocess. Explain in detail downstream processing of bioproducts.	10

OR

Q.2	A	Explain types of biotechnology based on biocatalytic developments.	6

	B	What are the different types of adsorption isotherms? How these isotherms can be applied?	6
	C	Give importance of centrifugation in bioseparation operations.	4
Q. 3	A	Explain basis principle of Batch Chromatography? What are the important parameters which affect elution peaks of column chromatography?	9
	B	Write a short note on the following methods of chromatography: i) Frontal Analysis ii) Elution Analysis	9
		OR	
Q. 4	A	What is paper chromatography? Describe the working procedure of paper chromatography with one example	6
	B	What is baseline separation? Explain in detail quality criteria for ideal chromatographic separation	6
	C	A chromatographic separation of a two component samples on a 60 cm column gave the retention of two solutes X_1 and X_2 as 2.7 and 3.3 minute with base widths of the two chromatographic peaks being 0.24 and 0.3 minutes respectively. Calculate : i) No of theoretical plates ii) Plate Height iii) Resolution of two peaks	6
Q. 5	A	What are the different techniques of centrifugation? Explain in detail gradient centrifugation with	8

		One example	
	B	A laboratory centrifuge is used to collect yeast cells after fermentation. The centrifuge consists of a number of cylinders rotated perpendicular to the axis of rotation . During centrifugation the distance between the surface of liquid and the axis of rotation is R_0 = 3 cm, and the distance form the bottom of the cylinder to that axis is R = 10 cm. The yeast cells can assumed to be spherical, with a diameter of d = 8 x 10^{-4} cm and a density of ρ_s = 1.05 g/cm^3. The fluid has physical properties close to those of pure water ρ = 1.0 g/cm^3, η = 1.1 x 10^{-3}Pa.sec. The centrifuge is to be operated at a speed of 1000rpm. How long does it take to have a complete separation?	8
		OR	
Q. 6	A	What is the difference between cross flow filtration and dead end filtration? Explain with neat sketches which type of filtration is more effective	8
	B	Give various types of membrane filtration modules. Explain in detail spiral wound module with its application	8
		SECTION II	
Q. 7	A	Explain basic principle of solvent extraction. How partition co-efficient plays important role in solvent extraction processes?	8
	B	What is drying? Define terms bound moisture content and unbound moisture content with one example	4

	C	Draw a neat sketch of drying rate curve and explain how drying place in four stages.	6
		OR	
Q. 8	A	Draw a neat sketch of saturation curve and explain steps involved in crystallization process	8
	B	Write a short note on : i) Lyophilizer ii) Microwave assisted drying	10
Q. 9	A	What is the scope of bioseparation techniques in industries? Explain how it differs from scope in research.	8
	B	What is scale up? Explain its importance in process economics aspect by giving one detailed case study	8
		OR	
Q. 10	A	Give detailed case study of following processes I) Freeze drying of lactic acid bacteria II) Citric acid production	16
Q. 11	A	Explain with a neat sketch difference between primary and secondary metabolites. Give detail note on recovery of primary and secondary metabolites.	16
		OR	
Q. 12	A	Give detail case study on separation of penicillin as a secondary metabolite.	16

[Total No. of Questions: 12] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE
[4363]-279
T. E. (BioTechnology) Examination - 2013
IMMUNOLOGY AND DIAGNOSTICS (2008 Course)
[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1 *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section II*

2 *Answers to the two sections should be written in separate answer-books.*

3 *Neat diagrams must be drawn wherever necessary.*

SECTION -I

Q.1		Name various features of a secondary immune response that distinguish it from a primary immune response.	18
		OR	
Q.2		Describe the various specific defense mechanisms that the immune system employs to combat various pathogens.	18
Q. 3		Answer the following (8 marks each)	16
	i	What is antigenic specificity? What is an epitope? What is a paratope?	
	ii	Define cell mediated immunity and explain its benefits.	
		OR	
Q. 4		Answer the following (8 marks each)	16
	i	What was Louis pasteur's contribution in the field of Immunology?	
	ii	What is the inflammation? Explain the role in Immune response	
Q. 5		Explain (8 marks each)	16
	i	The principle and procedure for Sandwich ELISA	
	ii	MHC role in immune response	

OR

Q. 6		Write short notes (4 marks each)	16
	i	Different types of WBCs	
	ii	Endogenous pathways of antigen presentation	
	iii	Electrophoresis	
	iv	Lattice hypothesis	

SECTION II

Q. 7		Graft rejection is an immunologic response- Explain giving the major types of rejection reactions.	18

OR

Q. 8		Explain the mechanisms involved in GVHD	18
Q. 9		Answer the following (8 marks each)	16
	i	Diagrammatically represent the life cycle of HIV	
	ii	Differentiate between normal cells and cancer cells	

OR

Q. 10		Answer the following(8 marks each)	16
	i	What are DNA vaccines? Explain the advantages and disadvantages.	
	ii	Explain step-wise the classical pathway	
Q. 11		Write short notes(4 marks each)	16
	i	Immunodeficiency disorders	
	ii	Atopy	
	iii	Immunological surveillance	
	iv	Cancer vaccines and its importance	

OR

Q. 12		Answer the following (8 marks each)	16
	i	Define autoimmune diseases, giving 2 examples.	
	ii	Explain- Immunological Principle of Vaccination	

[Total No. of Questions: *12***]** **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE

[4363]-280

T. E. (*Biotechnology***) Examination - 2013**

BIOINFORMATICS AND MANAGEMENT(2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 ***Answer 3 questions from Section I and 3 questions from Section II.***

2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books***.

3 *Black figures to the right indicate full marks.*

4 *Neat diagrams must be drawn wherever necessary.*

5 *Assume suitable data, if necessary.*

SECTION -I

Q.1		What is a database management system?Describe NCBI as database of databases ,also enlist different applications of bioinformatics.	18
		OR	
Q.2		Give an overview of various biological databases.	18
Q. 3	A	Write a short note on specialized genomic resources like Saccharomyces Genome Database (SGD),and Unigene.	8
	B	Describe NCBI data model.	8
		OR	
Q. 4		Describe the Sequence Retrieval System(SRS)and Entrez , compare and contrast between them.	16
Q. 5		Write short note on (8 marks each) (i)SWISS-PROT and (ii)TrEMBL	16

OR

Q. 6	Describe briefly the various levels of protein structural organization and comment on the significance of using it as a basis for database organization.	16

SECTION II

Q. 7	Describe the following	
	(i)Pairwise and Multiple Sequence alignment	9
	(ii)Local and Global Alignment	9

OR

Q. 8	Write briefly about BLAST and describe the significance and use of its variants.	18
Q. 9	Write about the application of bioinformatics in drug designing.What are the applications of Phylogenetic analysis.	16

OR

Q. 10	Describe concept of phylogeny.What are the steps involved in construction of a Phylogenetic tree, describe briefly.Draw tree depicting homologs orthologs and paralogs describe each.	16
Q. 11	What is concept of management and describe the basic functions of an organization?Describe the various management disciplines.	16

OR

Q. 12	Describe in detail the concept of “Technology Transfer”. Describe SWOT analysis with the help of a case study.	16