Total No. of Questions : 5]

SEAT No. :

P1236

[Total No. of Pages : 3

[4919]-1001
F. Y. B. Sc.
BIOTECHNOLOGY
Bb - 101 : Fundamentals of Chemistry
(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***Neat diagram must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Use of logarithmic table and calculator is allowed.***
5) ***All questions are compulsory.***

Q1) Answer the following: **[8 × 2 = 16]**

a) Define the order of reaction and find out the order of reaction, if it obey the rate expression,

$$\text{Rate} = K \cdot [A]^{1/2} \cdot [B]^{3/2}.$$

b) The kinetic energy of nitrogen gas at 298 K is 7.482KJ. Calculate the number of moles of gas.

(R = 8.314 J/K/mole)

c) Determine the number of phases, component and degree of freedom for the following system in closed vessel.

$$NH_4Cl_{(s)} \rightleftharpoons NH_{3(g)} + HCl_{(g)}$$

d) State and explain the common ion effect.

e) Distinguish between reversible & irreversible cells.

f) Define the terms:

i) Normality

ii) Molality

g) State and explain the formation of co-ordinate bond with suitable example.

h) Explain the Pseudomolecular reactions.

P.T.O.

Q2) Answer the following (Any Four): **[4 × 4 = 16]**

a) Explain the Boyle's & Charle's law as well as deduce these laws from kinetic gas equation.

b) What is first order reaction? Derive the rate constant expression for second order reaction involving a single reactant.

c) Describe with the help of neat diagram, Landsbergers method for determination of molecular weight of solute.

d) 0.5N solution of a salt surrounding two plates of electrode 1.0 cm a part and 0.25 cm^2 in area was found to be offer resistance of 475 ohms. Calculate the equivalent conductance of the solution.

e) Draw the different conformations of ethane and comment on the stability and energy with the help of energy profile diagram.

f) How does hydrogen bonding changes boiling point, melting point, solubility & volatility of substances.

Q3) Answer the following (Any Four): **[4 × 4 = 16]**

a) Explain the different types of molecular velocities and derive the relation between them.

b) Define the energy of activation. how it is determined by graphical method.

c) What is mean by cryoscopic constant? Explain how depression of freezing point of solvent may be used to determine the molecular weight of dissolved substance.

d) A first order reaction is 25% completed in 21 minutes. How long will the reaction take to be 80% completed.

e) State the postulates of Heitler-London theory and Pauling-slater theory.

f) What are amines? Give their classification and explain any one method of preparation.

Q4) Attempt the following (Any Two): **[2 × 8 = 16]**

a) Draw a neat diagram of sulphur system. Explain the areas, curves and triple points with reference to phase rule.

b) Explain SN^1 & SN^2 reactions with suitable example. Give the mechanism and the intermediate steps in these reactions.

c) Discuss inter ionic attraction theory. What is Debye-Huckel-Onsagar equation? Give it and explain the meaning of terms involved in it.

Q5) Attempt the following (Any One): **[1 × 16 = 16]**

a) Give the classification of electrochemical cells and explain each type with suitable example with reference to representation, electrode reactions and e.m.f. of cell.

b) What does mean by isomerism? Give the classification of isomerism and explain each class briefly.

Total No. of Questions :5]

SEAT No. :

P1237

[Total No. of Pages :3

[4919]-1002
F.Y.B.Sc. (Biotechnology)
PHYSICS
Bb -102: Fundamentals of Physics
(2013 Pattern)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of calculator is allowed.***

Q1) Answer the following questions: **[16]**

a) Define elastic limit.

b) State Newton's law of viscosity.

c) Define angle of contact. What is it's value for glass-mercury interface.

d) State second law of thermodynamics.

e) If the efficiency of a refrigerator is 20% then find its coefficient of performance.

f) State principle of superposition of waves.

g) Explain quantization of charge.

h) What is magnetosphere.

Q2) Answer any four of the following questions: **[16]**

a) Distinguish between fundamental and derived units. Classify the following units into fundamental and derived units :

meter, second, ohm, mole, radian, joule, watt, candela.

P.T.O.

b) State and explain Hooke's law. Why steel is more elastic than rubber.

c) Define pressure. State different units used for the measurement of pressure. 1Atmosphere is how many pascal.

d) Define coefficient of viscosity and obtain its unit.

The coefficient of viscosity of water at $10^{o}C$ is 1.3×10^{-3} kg/m^{-s}. Calculate the viscous force between layers 1 cm apart and moving with relative velocity of 2 cm / sec and area of contact between them is 10 cm^2.

e) Define surface tension.

Discusss applications of surface tension.

f) What is the role of physics in life sciences.

Q3) Answer any four of the following questions: **[16]**

a) Define beat.

Two organ pipes open at both the ends sounding simultaneously produce 5 beats per second. If the smaller pipe is 66 cm long then determine the length of the bigger organ pipe. (Speed of sound in air is 330 m/s)

b) For helium gas, critical temperature is $5.3^{o}K$ and critical pressure is 2.25 atm. Calculate the constants a and b for the helium gas.

$R = 8.3 \times 10^{7}$ ergs / gram - mole ^{o}K

1 atm = 1.01×10^{6} dynes / cm^2.

c) Define coefficient of performance and efficiency of refrigerator. Derive relation between them.

d) State and explain characteristics of laser beam.

e) What is the origin of energy bands in the solid?

With the help of energy band diagram distinguish between conductors, insulators and semi-conductors.

f) Explain the term thermal equilibrium.

Q4) Answer any two of the following questions: **[16]**

a) Explain the terms elastic limit, linear limit, breaking stress and breaking point with the help of stress - strain curve.

A wire is 1 m long and 1 mm in diameter. when it is stretched by a weight of 4 kg, its length increases by 0.25 mm. Find the value of stress and strain produced in the wire and Young's modulus of the material of the wire.

b) State Pascal's principle. With the help of a suitable diagram, explain the principle, construction and working of a hydraulic lever.

c) Describe soap bubble method to determine surface tension of a liquid. Derive necessary formula. What are the disadvantages of this method.

d) Show that in a closed organ pipe, only odd harmonics are present. What is the frequency of fundamental tone without and with end correction?

Q5) Answer the following: **[16]**

a) Explain the terms:

i) Adiabatic change

ii) Isothermal change

iii) Isobaric change

iv) Iso choric change

b) What do you understand by spontaneous and stimulated emission? What is population inversion and pumping? State four applications of laser.

OR

a) State and explain Gauss's law in magnetism. State its importance.

b) Define electric lines of force. Discuss various properties of electric lines of force. Four point charges 10 μC, 15 μC, 10 μC and -20 μC are placed on the four corners of a square of side 4m. Calculate the total force on a charge of 15 μC due to the other three charges.

EEE

Total No. of Questions : 8]

SEAT No. :

P1238

[Total No. of Pages : 2

[4919]-1003
F. Y. B. Sc.
BIOTECHNOLOGY
Bb - 103 : Basics of Plant and Animal Sciences
(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***Answer to the two section should be written in separate answer books.***
2) ***All questions are compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

(Botany)

Q1) Answer the following Questions: **[8]**

a) What is sucker? Give one example.

b) Define permeability.

c) What is thigmotropism? Give one example.

d) Give the chemical composition of cell.wall.

Q2) Write short Notes on (Any two): **[8]**

a) Ascent of sap.

b) Simple permanent tissues.

c) Mechanism of photoperiodism.

Q3) Attempt the following (any two): **[8]**

a) Economic importance of fungi.

b) Functions of stem.

c) Significance of Osmosis in plants.

P.T.O.

Q4) Answer in detail (any two): **[16]**

a) Describe the internal anatomy of Dicot and Monocot stem.

b) Explain in detail photophosphorylation.

c) What are phytohormones. Explain the role of phytohormones in plant Biotechnology.

SECTION - II

(Zoology)

Q5) Answer the following: **[8]**

a) Enlist Two characteristics of phylum Protozoa with examples.

b) Name two helminth parasites.

c) Define Epithelial tissue.

d) What are ectoparasities? Give examples.

Q6) Write short notes on (Any Two): **[8]**

a) Effect of temperature on oxygen dissociation curve.

b) Blood cell types.

c) Salient features of class Aves.

Q7) Attempt the following (Any Two): **[8]**

a) Write a note on structure and function of adrenal gland.

b) Salient features of Echinodermata.

c) Parasitic adaptations of Plasmodium.

Q8) Answer the following in detail (Any Two): **[16]**

a) Give an illustrated account of life cycle of Fasciola hepatica.

b) Give detailed account on Apiculture.

c) Describe the structure and working of Amphibian heart.

Total No. of Questions : 7]

SEAT No. :

P1239

[Total No. of Pages : 6

[4919] - 1004
F.Y.B.Sc.
BIOTECHNOLOGY
Mathematics and Statistics
Bb - 104 : Mathematics and Statistical Methods for Biologists
(2013 Pattern)

Time : 3Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of non-programmable scientific calculator is allowed.***
4) ***Solve each section on separate answer paper.***

SECTION - I

(Mathematics)

Q1) Attempt each of the following: **[4 × 2 = 8]**

a) Find modulus and principal argument of $\left(\sqrt{3}+i\right)$. Hence find real and imaginary parts of $\left(\sqrt{3}+i\right)^5$.

b) If $u = xe^y + \sin\left(x^2 + y\right)$, then find u_x and u_y.

c) Find values of x and y such that $\begin{bmatrix} 2x-y & 5 \\ 3 & x-3y \end{bmatrix} = \begin{bmatrix} 6 & 5 \\ 3 & 4 \end{bmatrix}$.

d) Examine the convergence of the series $\sum_{n=1}^{\infty}\left(\frac{n+2}{3n+1}\right)$.

Q2) Attempt any four of the following: **[4 × 4 = 16]**

a) Find rank of the following matrix.

$$A=\begin{bmatrix} 1 & 2 & 1 & 3 \\ 2 & 1 & -4 & -5 \\ 7 & 8 & -5 & -1 \\ 10 & 14 & -2 & 8 \end{bmatrix}$$

P.T.O.

b) Expand $\sin^5\theta$ in terms of sines of multiples of θ.

c) Discuss the convergence of the series $\frac{1}{11}+\frac{1}{21}+\frac{1}{31}+.....$

d) Solve the following system of linear equations:

$x+2y-4z+3w=0$

$x+2y-2z+2w=0$

$2x+4y-2z+3w=0.$

e) Show that the sequence

$\sqrt{3},\ \sqrt{3\sqrt{3}},\ \sqrt{3\sqrt{3\sqrt{3}}},.....$ is convergent.

f) Check whether the vectors

$\{(1,2,5),\ (3,-1,2),\ (0,3,4)\}$ are linearly dependent.

Q3) Attempt any two of the following: **[2 × 8 = 16]**

a) Solve the following differential equation

$$\frac{dy}{dx}=\frac{2x+y+3}{2y+x+1}.$$

b) Find all eigenvalues and eigenvectors for the following matrix.

$$\begin{bmatrix}2 & 1 & 0\\ 1 & 2 & 0\\ 0 & 0 & 2\end{bmatrix}.$$

c) Find the stationary points and determine the nature of the given function.

$$f(x,y)=xy+\frac{8}{x}+\frac{8}{y}.$$

d) i) Show that sum of n n^{th} roots of unity is 0.

ii) If $u(x,y)=\frac{(x^2+y^2)}{(x-y)}$, then

prove that $\frac{\partial u}{\partial x}-\frac{\partial u}{\partial y}=\frac{-4xy}{(x-y)^2}$.

SECTION - II

(Statistics)

Q4) The duration of time from first exposure to HIV infection to AIDS diagnosis is called as incubation period. The incubation periods of a random sample of 7HIV infected patient is given below in years. **[10]**

12.0	10.5
9.5	6.3
13.5	12.5
7.2	

a) Calculate the sample mean.

b) Calculate the sample median.

c) Calculate the sample standard deviation.

d) If the number 6.3 above were changed to 1.5, what would happen to sample mean, median and standard deviation? State whether each would increase, decrease or remain same.

e) Suppose instead of 7 individuals we had 14 individuals (7 more randomly selected observations are added to original data):

12.0	10.5	5.2
9.5	6.3	13.1
13.5	12.5	10.7
7.2	14.9	6.5
8.1	7.9	

Calculate the standard deviation and justify the increase, decrease or same result.

Q5) Consider a family with a mother, father and two children. Let A1 = {mother has influenza}, A 2= {father has influenza}, A3 = {first child has influenza}, A4 = {second child has influenza}, B = {at least one child has influenza}, C = {at least one parent has influenza}, D = {atleast one person in the family has influenza}. **[10]**

a) Define: $A1 \cap A2$, $A1 \cup A2$, $A3 \cap B$, $A3 \cap \overline{B}$ and A1.

b) i) Represent $\overline{C}$ in terms of A1, A2, A3 and A4.

ii) Represent $\overline{D}$ in terms of B and C.

c) Suppose an influenza epidemic strikes a city.In 10% of families the mother has influenza; 10% of families the father has influenza and 2% of families both the mother and father has influenza. Are the events A1 ={mother has influenza} and A2 = {father has influenza} independent.

d) Suppose there is a 20% chance each child will get influenza, whereas 10% of two child families both children will get the infection. What is the probability that atleast one child will get the disease i.e. influenza.

Q6) Attempt any two: **[5 × 2 = 10]**

a) Explain the concept of skewness and kurtosis. Add a note on their types.

b) Pulse rate of healthy men follow a normal distribution with mean 75/ minute and standard deviations of 4/minute. Find the probability that a randomly selected male has pulse rate beyond 85/minute.

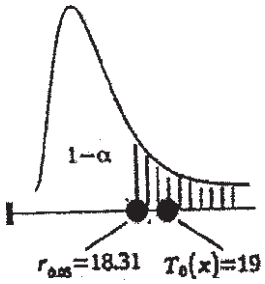
c) Find correlation coefficient between X and Y , given that

$$n = 25,\ \sum x = 75,\ \sum y = 100,\ \sum x^2 = 250,\ \sum y^2 = 500,\ \sum xy = 325$$

Q7) Imagine that you are hired as a cook. Not an ordinary one but a "statistical cook." For a normal population, in testing the two hypotheses. **[10]**

$$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 = 4 \\ H_1 : \sigma^2 = \sigma_1^2 > 4 \end{cases}$$

the data (sample x of size n = 11 such that $S^2 = 7.6u^2$) and the significance ($\alpha = 0.05$) have led to rejecting the null hypothesis because.



where T_0 is the usual statistic. A decision depends on several factors:

- Methodology
- Statistic T_0
- Form of the alternative hypothesis H_1.
- Significance α
- Data x

Since the chef _____ your boss _____ wants the null hypothesis H_0 not to be rejected, find three different ways to scientifically make the opposite decision by changing any of the previous factors. Give qualitative explanations and, if possible, quantitative ones.

OR

Suppose 50 HIV positive men are identified, 5 of whom develop AIDS over next two years. Is the proportion 5 of 50 (10%) a measure of prevalence, incidence or neither. **[10]**

Total No. of Questions : 5]

SEAT No. :

P1240

[Total No. of Pages : 2

[4919]-1005
F. Y. B. Sc.
BIOTECHNOLOGY
Bb - 105 : Fundamentals of Biological Chemistry
(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt all the following: **[8 × 2 = 16]**

a) Define pKa.

b) What is peptidoglycan? Give an example.

c) Enlist basic aminoacids.

d) Define entropy.

e) What do you mean by W-3 Fatty acid? Give an example.

f) Calculate the PI of glycin whose $pKa_1 = 2.3$ & $pKa_2 = 9.6$.

g) Enlist the various Forces which stabilizes nuclic acid structure.

h) Define coenzyme.

Q2) Answer any Four of the following: **[4 × 4 = 16]**

a) Explain quaternary structure of protein with reference to Haemoglobin.

b) Give the role of Folic acid and cyanocobalamine.

c) What is reversible inhibition? Explain competitive inhibition of enzyme with suitable example.

d) Describe energy of activation and transition state hypothesis.

e) Discuss Edman method of protein sequencing.

f) Explain various covalent and non covalent interactions.

P.T.O.

Q3) Answer any Four of the following: **[4 × 4 = 16]**

a) Define homopolysaccharide and describe structure of two homopolysaccharides.

b) Explain the secondary structure of protein with suitable example.

c) Write a note on phospholipids with its functions.

d) Discuss the importance of Redox reactions in biological system.

e) Describe induced fit hypothesis for an enzyme activity.

f) Comment on different types of proteins in the living system.

Q4) Answer any two of the following: **[2 × 8 = 16]**

a) Explain in detail properties of DNA.

b) Classify carbohydrates on the basis of number of sugar units giving examples.

c) Give the comparative account of different types of RNA.

Q5) Answer any one of the following: **[16]**

a) Comment on Allosteric enzymes with suitable example.

b) What are steroids? Give some examples of steroids with biological function.

Total No. of Questions :5]

SEAT No :

P1241

[Total No. of Pages :4

[4919] - 1006
F.Y.B.Sc.
BIOTECHNOLOGY
Bb - 106 : Biophysics and Instrumentation
(New 2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of color pencils restricted to diarams?***

Q1) Attempt the following in two-three sentences **[8 × 2 = 16]**

a) Match the radioisotopes with Their respective half-life:

i)	^{3}H	1)	12.26 years
ii)	^{32}P	2)	14.20 days
iii)	^{35}S	3)	87.20 days
iv)	^{125}I	4)	60 days

b) If a specimen is viewed using a 43X objectivein a microscope with a 15X eyepiece, howmany times has the image been magnified?

c) Enlist the names of the atomizers used in atomic absorption spectroscopy.

d) Define electrospray ionization and matrix assisted laser desorption/ Ionization.

e) Giving justification state if the following statement is true or false - Carrier proteins of cell membrane involved in facilitated diffusion are passive transporters.

P.T.O.

f) If solution containing ATP has absorption of 0.17 in 1 cm cuvette and molar extinction coefficient is 1.54×10^4 mol^{-1} dm^3 cm^{-1} find concentration of ATP solution.

g) Calculate pH of solution containing 0.001 mol of H^+1^{-1}.

h) Name any four Biological buffers.

Q2) Attempt any four of the following **[4 × 4 = 16]**

a) In the adjoining diagram is glass electrode used in pH meter label the parts from 1 to 8. Why glass electrode is always stored in 4M KCl and never in distilled water?

b) Define chromatic aberration and how these can be reduced by increasing focallength, use of low dispersion glass containing fluorite and use of achromat?

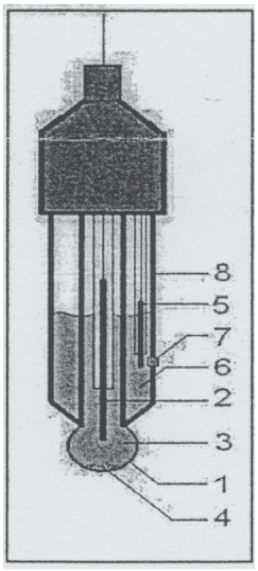
c) How does resolution depend upon the wavelength of light refractive index, and the numericalaperture? What are the functions of immersion oil and the substage condenser?

d) Calculate the standard redox potential change (∇E_o) and, standard free energy change (ΔG_0) for the following reaction:

Given E_0 = --0.08 for *Cyt b*(Fe^{2+}) to *Cyt b* (Fe^{3+}) + e^-

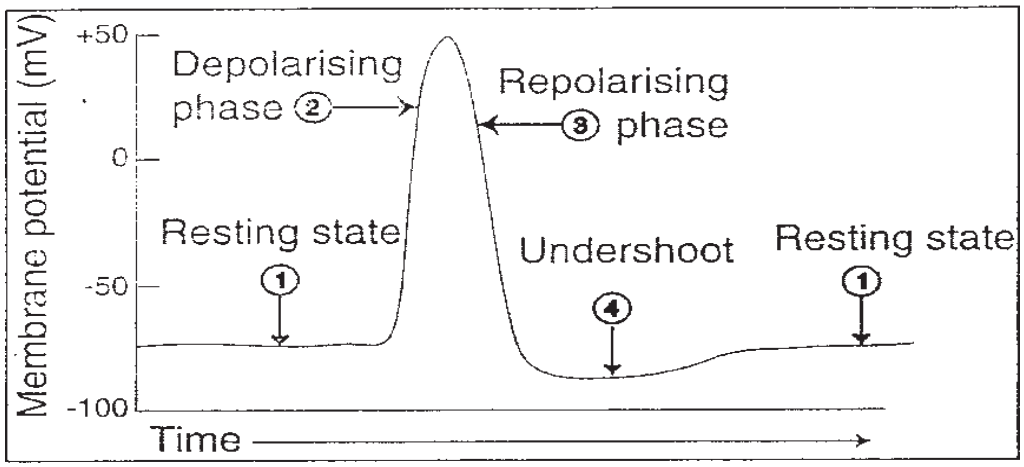
E0 = --0.25 for *Cyt* c(Fe^{2+}) to *Cyt c*(Fe^{3+}) + e^-

$$Cytb\left(Fe^{2+}\right)+Cytc\left(Fe^{3+}\right)\longrightarrow Cyt\ b\left(Fe^{3+}\right)Cytc\left(Fe^{2+}\right)$$



e) With the help of neat labeled diagram explain Na^+/K^+ ATPase pump as active transporter.

f) Given below is a plot of membrane potential (mV) and time (s) exemplifying action potential in neurons. Write the physiological changes occurring in stage 1 to 4 (circled in graph).



Q3) Write short notes on any four of the following: **[4 × 4 = 16]**

a) Double beam spectrophotometer.

b) Emission spectra.

c) Asymmetry of cell membranes.

d) Scintillation cocktails.

e) Pauli's exclusion principle.

f) Voltage gated channels.

Q4) Attempt any two of the following: **[2 × 8 = 16]**

a) How does the scanning electron microscope operate and in what way does its function differ from that of the TEM? The SEM is used to study which aspects of morphology?

b) Explain principle, working and construction of GM counter. Add a note on its advantages and disadvantages.

c) Calculate relative centrifugal force (RCF) exerted at top and bottom of a centrifuge tube being centrifuged in fixed angle rotor, assuming that the rotor dimension for the minimum radius (r_{min}) at the top of the tube is 4.8 cm and for the maximum radius (r_{max}) at the bottom of the tube is 9cm and the rotor is spinning at the speed of 12000 rev min.

Q5) Explain Neil Bohr used atomic spectra to develop his model, It worked only for hydrogen, electron energy is quantized, add a note on its significance and its shortcomings. **[16]**

OR

Elaborate on application of each region of electromagneticspectrum for spectroscopy.

Total No. of Questions : 5]

SEAT No. :

P1242

[Total No. of Pages : 2

[4919]-1007
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 107 : Microbiology
(2013 Pattern) (New)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Answer the following: **[8 × 2 = 16]**

a) Define enriched media. Give two examples.

b) State two distinguishing characteristics of fungi.

c) What is pasteurization.

d) What is a mordant? Give 2 examples.

e) What is pure culture?

f) State two characteristics of viruses that are similar to living things.

g) What is mutualism? Give one example.

h) State contribution of Robert Koch to Microbiology.

Q2) Answer the following (Any Four): **[4 × 4 = 16]**

a) Justify: McConkey's agar is selective and differential media.

b) Enlist salient features of Bergey's Manual of Systematic Bacteriology.

c) Give mode of action of

i) Heavy metals ii) Alcohol

P.T.O.

d) What Biosafety measures you will take while working in microbiology laboratory?

e) Classify the bacteria depending upon temperature requirement for growth.

f) Explain principle of Monochrome staining.

Q3) Answer the following (Any Four): **[4 × 4 = 16]**

a) What is isolation of bacteria? Describe any one method of isolation of bacteria.

b) What is sterilization? Explain use of dry heat for sterilization.

c) With neat labelled diagram explain various phases of bacterial growth curve.

d) Discuss contribution of louis pasteur to Microbiology.

e) Why agar-agar is used as solidifying agent in nutritional media.

f) Describe various colony Formation pattern of bacteria with respect to elevation and margin.

Q4) Answer the following (Any Two): **[2 × 8 = 16]**

a) With neat labelled diagram describe ultrastructure of bacterial cell membrane.

b) Enlist various methods of enumeration of bacteria explain any one in detail.

c) What is endospore? With neat labelled diagram describe process of sporulation in bacterial.

d) Describe in detail one example of plant-Microbe interaction.

Q5) Answer the following (Any One): **[16]**

a) Describe in detail, bacterial classification on the basis of their nutritional requirement.

b) Explain in detail lytic cycle of bacteriophage.

●●●●●

Total No. of Questions : 5]

SEAT No. :

P1243

[Total No. of Pages : 2

[4919]-1008
F. Y. B. Sc.
BIOTECHNOLOGY
Bb - 108 : Computers and Applications
(2013 Pattern) (New Course)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to right indicate full marks.***
3) ***Use of color pencils restricted to diagrams.***

Q1) Attempt all of the following: **[8 × 2 = 16]**

a) What is parallel processing Computer?

b) What is www?

c) Write a note on firewall.

d) Define Minicomputer. Give its features.

e) Draw symbols used in flowchart with its use.

f) Which are the data processing software's?

g) List functions in MS Excel with it use.

h) What is multimedia database?

Q2) Attempt any four of the following: **[4 × 4 = 16]**

a) Write an algorithm and draw flowchart to find factorial of given number.

b) How security is provided in networking and internet?

c) Explain use of search engine in biotechnology.

d) What are the virus symptoms in computer? How they get transmitted?

e) Differentiate between primary memory and secondary memory.

f) Explain biological databases.

P.T.O.

Q3) Attempt any four of the following: **[4 × 4 = 16]**

a) Explain features of workstations.

b) Write and algorithm and draw flowchart to find maximum between three numbers.

c) Explain the different types of databases.

d) What is router in networking? Explain its working.

e) What is microcomputer? Explain its features.

f) Write short note on Multiprocessing, multithreading operating system.

Q4) Attempt any two of the following: **[2 × 8 = 16]**

a) Explain MS-Power Point with its uses.

b) What are the uses of search engines? Explain Google and Yahoo.

c) What is meant by network? Explain network topologies.

Q5) Attempt the following: **[16]**

a) Explain characteristics of algorithm and flowchart. List symbols used in flowchart with its use.

OR

What is internet? What is Networking? How internet and networking is related to each other? Which are the devices used to access internet in LAN?

b) Draw block diagram of computer system and explain each block with its examples.

OR

Explain generations of computer system with respect to memory, power, cost, size, real-time, online, offline. Write a note on Algorithm and Flowchart.

Total No. of Questions : 6]

SEAT No :

P1244

[Total No. of Pages : 2

[4919] - 101
S.Y. B.Sc.
BIOTECHNOLOGY
Bb - 211: Genetics and Immunology
(Semester - I) (2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Answer the following in 2 - 3 sentences **[10×2=20]**

a) What is relaxed and stringent plasmid?

b) Differentiate between wild type and mutant phenotype.

c) Define allele.

d) What is co-repressor?

e) Define : pleotropy.

f) What are Barr bodies?

g) Describe characteristics of Edward's syndrome.

h) Enlist assumptions of Hardy - Weinberg principle.

i) What are point mutations?

j) What is X - linked recessive inheritance?

Q2) Answer the following in 2 - 3 sentences **[5×2=10]**

a) Define hapten.

b) Give male of MHC molecule.

c) What is allotype?

d) Write significance of IgE.

e) Define type III hypersensitivity. Give an example.

P.T.O.

Q3) Attempt any 3 from the following: **[3×5=15]**

a) Define mutation. Explain how radiation and base analogs cause mutations.

b) Explain supplementary genes with suitable example.

c) Define transposons. Discuss in detail transposons in yeast and Drosophila.

d) What are structural aberrations of chromosome? Explain any two types.

Q4) Attempt any 3: **[3×5=15]**

a) What are aneuploids? Explain types of aneuploidy.

b) Write a note on abortive transduction.

c) Explain in detail the process of transfermation in streptococcus.

d) What is a cross over? Discuss significance of crossing over.

Q5) Attempt any 1: **[1×10=10]**

a) Discuss arabinose operon in detail. Add a note on its regulation.

b) Explain with a suitable example, Mendel's law of independent assortment.

Q6) Attempt any 2: **[2×5=10]**

a) Differentiate between humaral and cell mediated immunity.

b) Explain the structure and function of thymus.

c) What is agglutination reaction? Explain with one example.

d) Explain how recombinant vaccines are produced? Give its significance.

Total No. of Questions : 5]

SEAT No. :

P1245

[Total No. of Pages :2

[4919] - 102
S.Y.B.Sc.
BIO TECHNOLOGY
Bb - 212 - Cell Biology
(2013 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Answer in brief: **[10 × 2 = 20]**

a) Define M.phase of cell cycle.

b) What is membrane fluidity?

c) What are ABC transporters?

d) Give the functions of plasmodesmata.

e) What are laminins?

f) Explain the structure of desmosomes.

g) Define 'osmosis'.

h) What is signal recognition particle [SRP]?

i) Explain 'necrosis'.

j) What is membrane repolarization in neurons?

Q2) Short notes (any three) **[3 × 5 = 15]**

a) Different types of membrane proteins.

P.T.O.

b) Ligand gated channels.

c) Protein targetting to peroxisomes.

d) Extracellular matrix of connective Tissue.

Q3) Attempt any three **[3 × 5 = 15]**

a) Structure & function of smooth endoplasmic reticulum .

b) Nuclear pore complex.

c) Explain exocytosis with example.

d) COP - I coated vesicles.

Q4) a) Describe cyclic & non.cyclic photophosphorylation. **[7]**

b) Give an account on mitochondrial structure & function. **[8]**

OR

a) Describe the molecular events of mitosis. **[7]**

b) Explain structure & function of Golgi apparatus. **[8]**

Q5) a) Describe passive &active transport with examples. **[7]**

b) Give an account on protein targetting in mitochondria. **[8]**

OR

a) Describe the events of apoptosis. **[7]**

b) Give an account on cell cycle regulation. **[8]**

Total No. of Questions : 5]

SEAT No. :

P1246

[Total No. of Pages : 2

[4919]-103
S. Y. B. Sc.
BIOTECHNOLOGY
Bb - 213 : Environmental Biology & Biotechnology
(2013 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labelled diagrams wherever necessary.***

Q1) Answer the following in short: **[10 × 2 = 20]**

a) Define Autecology with appropriate example.

b) Stratopause is also called ozonosphere. Why?

c) Write down chemical reactions involved in photochemical smog formation.

d) Define climax community.

e) What is phytogeography?

f) State applications of gene bank for conservation.

g) Define Rhizofiltration. Give one example.

h) Enlist organisms typically used in phycoremediation.

i) Define

   i) Sewage

   ii) Sullage

j) What is remote sensing?

Q2) Write notes on (any three): **[3 × 5 = 15]**

a) Pedogenesis.

b) Microbial degradation of pesticides.

c) Eutrophication.

d) Applications of GIS in environmental Monitoring.

P.T.O.

Q3) Attempt the following (any three): **[3 × 3 = 15]**

a) Describe phosphorous cycle with neat labelled diagram.

b) Discuss laws of thermodynamics with reference to energy transfer in an ecosystem.

c) Explain evolution of aquatic ecosystem with example.

d) Give an account of proceedings of Agenda 21.

Q4) a) Define ecosystem. Explain trophic structure of an ecosystem with suitable example. **[8]**

b) Illustrate phytoremediation as a tool for waste remediation. **[7]**

OR

a) Define EIA. Discuss steps of EIA of an industrial project. **[8]**

b) Explain the conditions in which ex-situ conservation is preferred over in situ conservation. **[7]**

Q5) a) Elaborate with a neat labelled diagram steps (stages) of typical Effluent treatment plant. **[8]**

b) Explain natural and anthropogenic factors affecting ecosystem. **[7]**

OR

a) Elaborate causes and effects of air pollution. **[8]**

b) Illustrate role of biotechnology in environmental management. **[7]**

Total No. of Questions : 5]

SEAT No. :

P1247

[Total No. of Pages : 2

[4919]-201
S. Y. B. Sc.
BIOTECHNOLOGY
Bb - 221 : Molecular Biology
(2013 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer in 2-3 sentences: **[10 × 2 = 20]**

a) Write the findings of Meselson - Stahl experiment.

b) Give salient features of 'Z' form of DNA.

c) Define: Gene clusters.

d) What is telomere?

e) What are exons?

f) Give the role of DNA polymerase II enzyme.

g) What is transition?

h) Give two examples of inhibitors of transcription.

i) What is co-translational translocation of proteins?

j) What is universality of genetic code?

Q2) Write short notes on (any three) **[3 × 5 = 15]**

a) Clover leaf structure of tRNA.

b) Double helical structure of DNA.

c) Genome organisation in eukaryotes.

d) Signal peptide.

P.T.O.

Q3) Answer the following (any three): **[3 × 5 = 15]**

a) Explain the process of protein translocation to mitochondria.

b) What are promoter sequences? State their role in transcription process.

c) Comment on central dogma of molecular biology.

d) Describe gene family with suitable example.

Q4) Describe the process of protein synthesis in prokaryotes. **[15]**

OR

Explain in detail: The process of replication in eukaryotes.

Q5) a) What is DNA damage? Explain any one method to repair DNA damage. **[8]**

b) How transcription regulation takes place in prokaryotes? Explain with suitable example. **[7]**

OR

a) Give an account of chromosome condensation in eukaryotes. **[8]**

b) What is RNA splicing? How type II introns are spliced out to form mature mRNA structure. **[7]**

Total No. of Questions :6]

SEAT No :

P1248

[Total No. of Pages :3

[4919] - 202
S.Y.B.Sc.
BIOTECHNOLOGY
Bb - 222 : Plant & Animal Development
(2013 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Answers to the two sections should be written on separate answer sheets.***
3) ***Draw neat diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Plant Development

Q1) Answer in 2-3 sentences: **[5 × 2 = 10]**

a) Define dedifferentiation.

b) What is sporogenous tissue?

c) Define meristem.

d) Write role of auxins in plant development.

e) What are homeotic genes?

Q2) Answer any four of the following: **[4 × 5 = 20]**

a) Write a note on vegetative patterning.

b) Explain megasporogenesis and development of female gametophyte.

c) Comment on - "Meristem development is dependent on signals from other parts of the plant."

P.T.O.

d) Discuss Fucus as a model system in understanding plant development.

e) Write a note on tapetum.

f) With a suitable example, elaborate aging as a developmental process in plants.

Q3) Answer any one: **[1 × 10 = 10]**

a) With the help of neat, labelled diagrams, discuss development of monocot embryo.

b) Using neat labelled diagrams, explain embryo development in dicotyledons.

SECTION - II

Animal Development

Q4) Answer the following: **[5 × 2 = 10]**

a) What is the role of blastopore during amphioxus embryo development?

b) What is a fate map?

c) Define the terms: Morula, Innermass cell.

d) Write the effect of any two teratogens.

e) Explain the term capacitation.

Q5) Attempt the following:(any four) **[4 ×5 = 20]**

a) Compare and contrast between spermatogenesis and oogenesis.

b) Describe the cleavage pattern in birds.

c) What are homeotic genes? Add a note on their role during pattern formation in Drosophila.

d) Write a note on apoptosis and its significance during development.

e) Liver has capacity to regenerate. Explain.

f) What is ageing? Explain two theories of ageing?

Q6) Attempt any one of the following: **[1 ×10 = 10]**

a) Describe the process of gastrulation in amphioxus.

b) How polyspermy can be prevented during fertilisation? Explain the mechanism.

Total No. of Questions : 3]

SEAT No. :

P1249

[Total No. of Pages : 1

[4919]-203
S. Y. B. Sc.
BIOTECHNOLOGY
Bb - 223 : Scientific Writing and Communication
(Semester - II) (2013 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer in brief: **[5 × 2 = 10]**

a) What are Keywords?

b) Give two titles of important Biotechnology journals.

c) Enlist different types of Audio-Visual aids.

d) Give prepositions related to time.

e) Give any four examples of frequently confused words.

Q2) Write short notes on (any 4): **[4 × 5 = 20]**

a) Literature citation systems.

b) Results and discussion in a research article.

c) Methods in Scientific Reasoning.

d) Guidelines for composing curriculum vitae.

e) Active and passive voice with suitable examples.

f) Hypothesis and Theory with suitable examples.

Q3) Give detailed description of (any one): **[1 × 10 = 10]**

Describe the sequence for preparation of manuscript to be submitted as Research article in a Journal.

OR

Give an account of Basic statistical techniques used for data analysis.

☛ ☛ ☛

Total No. of Questions : 3]

SEAT No. :

P1250

[Total No. of Pages : 2

[4919]-204
S. Y. B. Sc.
BIOTECHNOLOGY
Bb - 224 : Metabolic Pathways
(2013 Pattern) (Semester - II)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***

Q1) Answer in 2-3 sentences: **[5 × 2 = 10]**

a) Define specific activity.

b) What are ligases? Give example.

c) How the sign of ΔG predicts direction of reaction.

d) Define essential fatty acids. Give example.

e) Enlist two inhibitors of electron transport chain.

Q2) Attempt any four: **[4 × 5 = 20]**

a) Write the reactions unique to the process of gluconeogenesis.

b) What do you mean by coupling of reactions? Justify with an example.

c) Pyridoxal phosphate (PLP) is a versatile coenzyme. Support your answer with a suitable example.

d) How are fatty acids transported across mitochondrial membrane for β oxidation.

P.T.O.

e) Explain the significance and reaction catalyzed by the enzymes : Ribulose 1, 5 bisphosphate carboxylase and Ribulose 1, 5 bisphosphate oxygenase.

f) What is ED pathway? Write the reactions unique to this pathway.

Q3) Attempt any one : **[1 × 10 = 10]**

a) Explain TCA cycle in detail. Write a note on its activators, inhibitors and its significance.

b) Discuss urea cycle in detail. How urea cycle is connected to TCA cycle.

Total No. of Questions : 5]

SEAT No :

P1251

[Total No. of Pages : 2

[4919] - 301
T.Y. B.Sc.
BIOTECHNOLOGY
Bb - 331 : Microbial Biotechnology
(2013 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer all the following in 2-4 lines: **[20]**

a) Name any two scientist with their contribution in Microbial Biotechnology.

b) Bacillus sp. was cultured in production medium containing 10 g/L maltose as substrate. After 24 h, only 2 g/L maltose was found in residual broth and 10 gm biomass was recovered. Calculate Y x/s.

c) What is the significance of WIDAL test?

d) Define TDP value and give its significance.

e) What is the role of Malo- Lactic fermentation in wine?

f) Name the two dyes present in EMB agar.

g) Define BOD and give its relevance.

h) Give two examples of microbial polysaccharides.

i) Name any two intrinsic and extrinsic factors responsible for food spoilage.

j) State two advantages of immobilized enzymes.

Q2) Attempt the following questions (any 3) **[15]**

a) Explain the molecular adaptations in psychrophiles.

b) Describe fermentative production of wine.

c) Compare and contrast between Fed Batch and continuous fermentation.

d) Explain with the help of neat labelled diagram an Anaerobic digestor.

P.T.O.

Q3) Write short notes on (any 3) **[15]**

a) Biosensors

b) Spoilage of meat and meat products.

c) Canning as a method of preservation.

d) Microbial polysaccharides.

Q4) a) Explain the methods and principles of primary and secondary sewage treatment (any 2). **[8]**

OR

Explain the various drinking water purification methods with suitable examples.

b) Describe the kinetics of growth in a Fed Batch culture. **[7]**

OR

Describe kinetics of growth in Batch culture using suitable equations of μ, Y, S_R, Ks and μ_{max}.

Q5) Attempt any one of the following: **[15]**

a) Discuss the disease Anthrax with respect to

i) Causative agent.

ii) Symptoms.

iii) Pathogenesis and

iv) Treatment

b) 'pasteurization is not a method of sterilization.' Justify. Describe the different method of pasteurization.

Total No. of Questions : 6]

SEAT No. :

P1252

[Total No. of Pages : 3

[4919] - 302
T.Y.B.Sc.
BIOTECHNOLOGY
Bb - 332 - Plant and Animal Tissue Culture
(2013 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams wherever ncessary.***
3) ***Figures to the right indicate full marks.***
4) ***Both the sections should be written in separate answer books.***

SECTION - I

Plant Tissue Culture

Q1) Answer in Brief: **[5 × 2 = 10]**

a) Define somaclonal variation.

b) Write unified cell theory.

c) Enlist various sources of nitrogen in MS medium.

d) Differentiate between direct and indirect organogenesis.

e) Enlist various solidfying agents used in PTC.

Q2) Answer any four: **[4 × 5 = 20]**

a) Explain the technique of Asceptic inoculation.

b) Describe the methodology for haploid production from microspores.

P.T.O.

c) Give five applications of plant tissue culture.

d) Explain the methodology of embryo culture and give its importance in conservation.

e) Describe chemostat & Turbidostat culture systems.

f) Discuss various factors affecting leaf culture.

Q3) Answer any one **[1 × 10 = 10]**

a) Define somatic embryogenesis. Discuss the stages of embryo development in vitro and add a note on its applications.

b) What are plant growth regulators? Discuss the uses in plant tissue culture.

SECTION - II

Animal Tissue Culture

Q4) Answer in brief: **[5 × 2 = 10]**

a) Write the principle of horizontal laminar airflow.

b) How to detect fungal contamination in animal cell culture.

c) Write any 4 application of ATC.

d) Define sub culture.

e) Define continuous cell line.

Q5) Answer any four: **[4 × 5 = 20]**

a) Explain any one method of cytogenic characterization of cell line.

b) Disadvantages of serum in animal tissue culture medium.

c) Write about the problems associated with organ culture.

d) Write a note on cryopreservation technique.

e) What are the characteristics of transformed cell lines.

f) Describe how CO_2 helps in maintaining pH of the culture.

Q6) Answer any one **[1 × 10 = 10]**

a) Write the rationale behind medium formulation in animal tissue culture.

b) Explain in detail the method to initiate primary cell culture by cold trypsinization.

Total No. of Questions : 5]

SEAT No. :

P1253

[Total No. of Pages : 2

[4919]-303
T. Y. B. Sc.
BIOTECHNOLOGY
Bb - 333 : Biodiversity and Systematics
(2013 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer the following: **[10 × 2 = 20]**

a) Define with example species diversity.

b) Compare & contrast habit & habitat.

c) Define Imprinting.

d) What is demography?

e) Enlist any four positive Interspecific interaction.

f) Define Ex-situ conservation.

g) Enlist attributes of population dispersal.

h) What is genetic drift?

i) Compare & contrast taxonomy & nomenclature.

j) What is molecular taxonomy?

Q2) Write notes on (any 3): **[3 × 5 = 15]**

a) Ecological importance of Biodiversity.

b) Surviorship curve.

c) Biodiversity indices.

d) Communication in agonism.

P.T.O.

Q3) Answer the following (any 3): **[3 × 5 = 15]**

a) Give importance of Biodiversity for food.

b) Discuss proceeding of Rio conference.

c) Explain biotechnology interventions in Ex-situ conservation of Biodiversity.

d) Write a note on Agricultural diversity of India.

Q4) a) What is biological clock? Giving examples explain its importance in organisms. **[8]**

b) Illustrate on growth forms of organisms. Add a note on Age class distribution. **[7]**

OR

a) What is IUCN? Explain its role, working & importance in biodiversity conservation. **[8]**

b) Define Biological species. Explain types of speciation with suitable example. **[7]**

Q5) Write shorts notes on (any 3): **[3 × 5 = 15]**

a) Databases of Biodiversity.

b) Three Domain classification.

c) DNA based taxonomical study.

d) Serotyping.

Total No. of Questions : 5]

SEAT No. :

P1254

[Total No. of Pages : 2

[4919]-401
T. Y. B. Sc.
BIOTECHNOLOGY
Bb - 341 : Large Scale Manufacturing Process
(2013 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All quesstions are compulsory.***
2) ***Draw neat labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following in 2-3 lines: **[10 × 2 = 20]**

a) Explain the concept of Bioprocess engineering.

b) What are analogue resistant mutants?

c) Explain primary screening.

d) Describe continuous fermentation process.

e) Give the functions of baffles.

f) Explain - scale up.

g) Comment on 'defined medium'.

h) Explain the term 'decimal reduction time'.

i) Which factors decide choice of recovery process?

j) Comment on -crystallization.

Q2) Write short notes on (<u>any three</u>) **[3 × 5 = 15]**

a) Chemostat.

b) Role of heating coils & cooling jackets in fermenter.

c) Replica plate method for isolation of auxotrophs.

d) Standard operating practices (SOP).

P.T.O.

Q3) Attempt any three from the following: **[3 × 5 = 15]**

a) Describe super critical Fluid extraction for product recovery.

b) Explain pH control in Fermentation process.

c) Comment on - fluidized bed reactors.

d) Explain - single cell protein.

Q4) a) Explain in detail the process of continuous sterilization method. Add a note on its advantages over batch sterilization. **[7]**

OR

What is $K_L a$? Describe factors affecting mass-transfer.

b) What is biotransformation? Explain 'steroid biotransformation'. Add note on applications of biotransformation. **[8]**

OR

Give the principle of centrifugation. Describe different types of centrifuges with their mechanism for product purification.

Q5) Elaborate large scale manufacturing process of penicillin with respect to producer organism, inoculum development, production medium & product recovery. **[15]**

OR

Describe in detail measurement & control of following parameters in fermentation:

a) Dissolved oxygen.

b) Foam.

c) Microbial biomass.

Total No. of Questions :5]

SEAT No :

P1255

[Total No. of Pages :2

[4919] - 402
T.Y.B.Sc.
BIOTECHNOLOGY
BB - 342 : Biochemical and Biophysical Techniques
(2013 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer all the following in 2-4 lines **[20]**

a) What are biological buffers?

b) Explain the significance of retention time in chromatography.

c) What is resolving power microscope.

d) What is molarity.

e) Explain sedimentation coefficient.

f) Explain Lambert's law.

g) Enlist different components of compound microscope.

h) What is fluorescence?

i) What are chromophore?

j) What is molar extinction coefficient.

Q2) Attempt the following questions (any three) **[3 × 5 = 15]**

a) Distinguish between absorbance, transmittance and optical density.

b) What is electromagnetic radiation (EMR). Explain its significant properties.

c) Explain types of specimen preparation in light microscopy.

P.T.O.

d) How will you prepare:

i) Solution A of 0.8 M, Volume 500ml.

(Molecular weight of solute is 150)

ii) Using above solution A prepare 0.3 M solution of same solute, volume 200 ml.

Q3) Write short note on any three **[3 × 5 = 15]**

a) Inverted Microscopy.

b) Anion exchange chromatography.

c) Types of rotar's in centrifugation.

d) Pulse field electrophoresis.

Q4) a) Distinguish between Native PAGE and SDS - PAGE. add a note on activity staining. **[8]**

OR

Explain the principle and working of fluorescent microscope with neat labelled diagram Add a note a its applications.

b) Compare analytical centrifugation with density gradient centrifugation using suitable examples. **[7]**

OR

Explain the theory and applications of paper chromatography in detail.

Q5) Attempt any one **[15]**

a) What is partition chromatography? Explain the different types of partition Chromatography. Add note on HPTLC.

b) Discuss centrifugation with respect to :

i) Sedimentation coefficient. **[3]**

ii) g and RPM values . **[2]**

iii) Density graditent (Generation of gradient & applications). **[5]**

iv) Rotar types. **[5]**

Total No. of Questions : 5]

SEAT No. :

P1256

[Total No. of Pages : 2

[4919]-403
T. Y. B. Sc.
BIOTECHNOLOGY
Bb - 343 : Recombinant DNA Technology
(2013 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following in 2-4 lines: **[10 × 2 = 20]**

a) Write down the contribution of 'Boyer and Cohen' in recombinant DNA Technology.

b) Define linker and adapter.

c) Give the properties of good host.

d) Enlist various detergents used in nucleic acid isolation.

e) What is insertional inactivation?

f) What is biotinylated probe?

g) Write about FISH?

h) What is a genomic library?

i) Give the guidlines for releasing recombinant products.

j) What is site directed mutagenesis? Give its advantages.

Q2) Attempt the following questions (Any three): **[3 × 5 = 15]**

a) Explain the method for construction of cDNA library.

b) Comment on M-13 phage vectors.

c) Describe Agrobacterium mediated transformation in plants.

d) Discuss various methods used for isolation of plasmid DNA.

P.T.O.

Q3) Write short notes on (Any three): **[3 × 5 = 15]**

a) YAC Vector.

b) DNA ligases.

c) α - Complementation.

d) Variations in PCR.

Q4) a) Explain southern blotting Technique. **[8]**

OR

Discuss the applications of genetic engineering in Human health.

b) What are molecular markers? Explain RAPD in detail. **[7]**

OR

Discuss the salient features of Ti plasmid with neat labelled diagram.

Q5) Attempt any one of the following: **[15]**

a) Explain in detail the Sanger's method of DNA sequencing.

b) Write an assay on PCR covering the following points.

i) Steps involved in PCR.

ii) Factors affecting PCR.

iii) Applications of PCR.