Total No. of Questions :5]

SEAT No. :

P288

[Total No. of Pages : 2

[5524]-1
F.Y. B.Sc.
BIOTECHNOLOGY
CHEMISTRY
Bb-101: Fundamental of Chemistry
(2013 Pattern)

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

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

a) Distinguish between order and Molecularity.

b) Define and explain the depression in freezing point.

c) Explain oxidation and reduction reaction with examples.

d) Define triple point and eutectic point.

e) The kinetic energy of nitrogen gas at 300K is 20.041 kJ. Calculate the number of moles of a gas. [R=8.314 J/K/mole.]

f) State and explain formation of covalent bond with suitable examples.

g) What are amines? How are they classified?

h) Define the terms:

i) Molality ii) Mole fraction

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

a) State and explain briefly the Markownikoff's rule as well as anti Markownikoff's rule.

b) Give the difference between Sigma and Pi bond.

c) Describe with the help of neat diagram, Landsberger Method for determination of Molecular weight of solute.

d) The conductance in moles, at infinite dilution of NaCl, HCl and CH_3COONa are 126.45, 426.16, 91.0 respectively. What will be the conductance of CH_3COOH, at infinite dilution?

P.T.O.

e) Explain paramagnetic nature of oxygen and di-magnetic nature of nitrogen with the help of molecular orbital energy level diagram.

f) Draw schematically the phase diagram for sulphur system and apply Gibb's phase rule.

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

a) State the rules to determine the oxidation number.

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

c) Define first order reaction. Derive the equation for rate constant.

d) State the postulates of Heitler-London theory and Pauling-Slater theory.

e) Give the types of substitution reaction and explain each type briefly. (SN^1 and SN^2)

f) For a certain reaction the rate constant 'R' is 2.86×10^{-8} sec^{-1} at 298 K and 4.65×10^{-8} sec^{-1} at 308 K. Calculate the energy of activation of the reaction. Given R= 1.987 cal/deg/mole.

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

a) Derive the expression for E.M.F. of the following cells,

i) Chemical cell with transference.

ii) Concentration cell without transference.

b) What is hydrogen bonding? Explain the types of hydrogen bonding and its effect on physical as well as chemical properties.

c) State the Faraday's laws of electrolysis and write a note on conductometric titration.

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

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

b) What is activation energy? Derive the activation energy equation by graphical method and differential method. Derive the units for activation energy.

Total No. of Questions : 6]

SEAT No. :

P296

[Total No. of Pages : 2

[5524]-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 and labelled diagrams wherever necessary.***

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

a) What is incomplete dominance. Give an example.

b) Enlist the genes and products of arabinose operon.

c) What are insertion sequences.

d) What is pleiotropy.

e) State the causes and symptoms of klinefielter syndrome.

f) What is the difference between F^+ and F^- strain.

g) What are transition and transversion mutations.

h) Define plasmids. Give any 2 examples.

i) What are lethal genes.

j) Define penetrance and expressivity.

Q2) Answer the following. **[5×2=10]**

a) Define artificial passive immunity with an example.

b) State the difference between immunogen and antigen.

c) Define epitope and paratope.

d) Enlist any four functions of antibodies.

e) Enlist the cells involved in adaptive immune responce.

P.T.O.

Q3) Attempt any Three of the following. **[3×5=15]**

a) Describe in detail the process of transformation in streptococcus.

b) Discuss different types of mutagens with examples.

c) Explain dominant epistasis with an example.

d) Define chromosomal abberation. Add a note on aneuploidy.

Q4) Attempt any Three of the following. **[3×5=15]**

a) Write a short note on Multiple alleles.

b) Describe the transposons in yeast systems.

c) Elaborate the concept of gene frequency and allelic frequency.

d) Explain sex linked inheritance with an example.

Q5) Answer Any One of the following. **[10]**

a) Compare and contrast complete and incomplete linkage with suitable examples.

b) Describe in details the working of tryptophan operon.

Q6) Attempt Any Two of the following. **[2×5=10]**

a) Discuss in details the various factors affecting immunogenicity.

b) Describe ELISA and its applications.

c) Define hypersensitivity. Explain any one type.

d) Elaborate the role of bone marrow and thymus in immune function.

Total No. of Questions : 5]

SEAT No. : ____

P297

[Total No. of Pages : 2

[5524]-102
S.Y. B.Sc.
BIOTECHNOLOGY
Bb-212: Cell Biology
(2013 Pattern) (Semeseter - 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) What is MPF?

b) Give the functions of cholestrol in plasma membrane.

c) What are intermediate filaments?

d) Define Osmosis.

e) Explain facilitated diffusion.

f) What is Neoplasia?

g) Write the significance of 'G_1' phase.

h) Define phagocytosis.

i) Differentiate between open and closed mitosis.

j) Explain Hyperpolarisation.

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

a) Tight Junction.

b) Ion channel receptor.

c) Nuclear Pore Complex (NPC)

d) Lysosomes.

P.T.O.

Q3) Attempt any three: **[3×5=15]**

a) Explain the mechanism synaptic transmission.

b) Write the basic framework of Extra Cellular Matrix (ECM).

c) Comment on the functions of vacuoles in plant cell.

d) Write a note on various phospholipids present in plasma membrane.

Q4) a) Describe in detail structure and functions of mitochondria. **[7]**

b) Explain cyclic and Non cyclic photophosphorylation in chloroplast. **[8]**

OR

a) Describe in detail various steps involved in meiosis. **[7]**

b) Write a detailed notes on cell surface receptors. **[8]**

Q5) a) Explain in detail check points regulating cell cycle. **[7]**

b) Elaborate protein targetting to nucleus with suitable diagrams. **[8]**

OR

a) Describe extrinsic pathway of Apoptisis. **[7]**

b) Write a detailed Note on molecular mechanism of cancer. **[8]**

EEE

Total No. of Questions : 5]

SEAT No. :

P298

[Total No. of Pages : 2

[5524]-103
S.Y. B.Sc.
BIOTECHNOLOGY
Bb-213: Environmental Biology and Biotechnology
(2013 Pattern) (Semeseter - 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 the following in short.: **[10×2=20]**

a) Define ecological succession.

b) Short note on Inosphere.

c) Enlist the factors responsible for entrophication.

d) Define biogeochemical cycle.

e) Compare Autogenic & Allogenic succession.

f) Explain food web.

g) What is EIA.

h) Give applications of remote sensing in climate monitoring.

i) Explain Environmental Audit.

j) Define phytoremediation.

Q2) Write a note on (Any three): **[3×5=15]**

a) Biogeochemica cycle.

b) GIS in environmental monitoring.

c) Microbial Biodegradation of pesticides.

d) Wild life protection act 1972.

P.T.O.

Q3) a) What is bio-remediation? Explain different types of bioremediation & give it's significance. **[8]**

b) Define phytogeography. Describe in detail the major terrestrial communities. **[7]**

OR

a) Elaborate different methods of conservation of biodiversity. Give applications of biotechnology in conservation of biodiversity. **[8]**

b) What are the natural factors affecting the ecosystem. **[7]**

Q4) a) Describe in detail causes & effect of soil pollution. **[8]**

b) What is hazardous waste? Describe in detail any two methods of it's disposal. **[7]**

OR

a) Describe different types of ecological succession what do you meant by pioneer species in ecological succession. **[8]**

b) With the help of diagram, describe cycling of carbon in biosphere. **[7]**

Q5) Write short notes on (any three): **[15]**

a) Integrated waste management.

b) Ecosystem evolution.

c) Remote sensing.

d) Toxins in environment.

EEE

Total No. of Questions :5]

SEAT No. :

P289

[Total No. of Pages : 3

[5524]-2
F.Y. B.Sc. BIOTECHNOLOGY
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) ***Use of calculator is allowed.***
4) ***Neat and labelled diagrams must be drawn wherever necessary.***

Q1) Attempt all of the questions. **[8×2=16]**

a) What is a system of unit? List different systems.

b) Define : (i) elsticity and (ii) elastic limit.

c) Explain (i) reflection and (ii) refraction of light.

d) State the uses of ultrasonic waves.

e) What do you mean by charge of substance? Explain the conservation of charge.

f) Define: (i) streamline and (ii) turbulent flow of a liquid.

g) What is magnetosphere?

h) Define: (i) specific heat and (ii) latent heat of a substance

Q2) Attemp ANY FOUR of the following : **[4×4=16]**

a) Briefly discuss the inter-relationship between physics and life sciences.

b) Explain the constuction and working of a mercury barometer. Write the appropriate formula.

c) Define : (i) Stress and strain (ii) young's modulus (iii) Bulk modulus and (iv) modulus of rigidity.

d) Define fundamental and derived quantities. List the seven important fundamental quantities along with appropriate units and symbols.

e) State Doppler's effect. Derive an expression for apparent frequency when the source is moving towards and away from a stationary observer.

P.T.O.

f) Define (i) angle of contact, (ii) copillarity and (iii) surface tension of a liquid. Write the appropriate formula to determine the surface tension of a liquid using angle of contact.

Q3) Attempt ANY FOUR of the following : **[4×4=16]**

a) Write a note on thermal equilibrium. Hence state the zeroth law of thermodynamics.

b) Define (i) critical pressure, (ii) critical volume, (iii) critical temperature and (iv) critical coefficients of Van der waal's gas.

c) State and explain Gauss's Law in magnetism.

d) What are the conditions of a good refrigerant.

e) Distinguish between conductors and insulators.

f) Write down the conditions for sustained interference.

Q4) Attempt ANY TWO of the following : **[2×8=16]**

a) What is biomagnetism? Discuss biomagnetism in animals, birds and humans.

b) Explain Coulomb's law of electrostatic force. Express Coulomb's law in vector form. The radius of any standard nucleus is 10^{-15} m. What would be the electrostatic force between two protons situated at the edge of the nucleus along its diameter?

(Given: Charge of proton = 1.6×10^{-19}C, $\frac{1}{4\pi \in_0}=9\times10^9$ Nm^2/C^2)

c) State and derive Poiseuille's law for the flow of liquid through a capillary tube. Give the physical significance of Poiseuille's equation.

d) State the first law of thermodyanamics. Dicuss its applications for i) isochoric process and ii) Cyclic process.

At normal temperature (0ºC) and normal pressure (1.013×10^5 pa) when 1 gm of water freezes, its volume increases by 0.091 cm^3. Calculate the change in internal energy. (Given : Latent heat of ice L = 80 cal/gm)

Q5) Answer ANY ONE : **[1×16=16]**

a) Define:

i) Spontaneous emission

ii) Stimulated emission

iii) Optical pumping

iv) Population inversion

Give any four applications of LASER light.

b) Define:

i) Plane polarized light

ii) Unpolarized light

iii) Partially polarized light

iv) Plane of polarization

Explain polarization by reflection. State and prove Brewster's law of polarization.

OR

a) Define magnetization $(\overline{M})$ and magnetic susceptibility (χ_m).

Distinguish diamagnetic, paramagnetic, and ferromagnetic substances.

b) Define thermal efficiency (η) and coefficient of performance (β) of a refrigerator. Obtain the relationship between them.

A refrigerator works under reversible cycle between temperatures 177ºC and 327ºC. Calculate (i) Thermal efficiency and (ii) Coefficient of performance.

Total No. of Questions :6]

SEAT No. :

P300

[Total No. of Pages : 2

[5524]-202
S.Y. B.Sc.
BIOTECHNOLOGY
Bb - 222 : Plant and 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) What is differentiation?

b) Write role of tapetum.

c) What is commitment in plant?

d) Enlist types of ovules.

e) Write a note on double fertilization.

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

a) Explain role of environmental Inductive stimuli in flowering.

b) Write a note on ageing and senescence.

c) Describe principles involved in plant development.

d) Elaborate factors involved in in-vitro organogenesis.

e) Discuss vegetative patterning in plant development.

Q3) Attempt any one : **[1×10=10]**

a) Explain in detail molecular regulation on development in 'Arabidopsis'.

b) Describe embryogenesis in monocot with labelled diagram.

P.T.O.

SECTION - II

(Animal Development)

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

a) Explain the fast block mechanism to avoid polyspermy.

b) Write any two types of blastula.

c) Define the term vitellogenesis.

d) What is primary induction?

e) Define the term teratogenesis.

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

a) Explain in detail about the process of oogenesis.

b) What is holoblastic cleavage? Describe different types of holoblastic cleavage with suitable examples.

c) Define the term apoptosis. Explain extrinsic pathway.

d) Describe different types of regeneration in animal with suitable examples.

e) Explain the term cell lineage with example.

f) Explain the role of Gap genes & pair rule genes in Drosophila patterning.

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

a) Describe the process of gastrulation in chick embryo.

b) What are stem cells? Describe types of stem cells with characteristic features and suitable examples.

Total No. of Questions : 3]

SEAT No. : ____

P301

[Total No. of Pages : 1

[5524]-203
S.Y. B.Sc.
BIOTECHNOLOGY
Bb-223: Scientific Writing and Communication
(2013 Pattern) (Semeseter - II)

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) Define prepositions with examples.
b) Give the meaning of the terms - accent and pronunciation.
c) What is an Abstract?
d) What are antonyms?
e) What is prefix and suffix?

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

a) Statistical Data Analysis?
b) Deductive and Inductive reasoning.
c) Guidelines for Authors.
d) Literature survey.
e) Material and methods in a Research Article.
f) Hypothesis and Law.

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

Describe the sequence in which the contents should be organized in a Research Article.

OR

Write a detailed note on planning and organization of an oral presentation.

EEE

Total No. of Questions : 3]

SEAT No. :

P302

[Total No. of Pages : 2

[5524]-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) ***Neat diagrams must be drawn wherever necessary.***

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

a) Give the significance of oxidative phase of HMP shunt.

b) Name the different complexes involved in ETC.

c) Define: Enzyme activity, Turnover number.

d) Write the reaction catalysed by Rubisco.

e) What are Ketogenic amino acids. Give two examples.

Q2) Attempt any FOUR **[4×5=20]**

a) Define K_m. Calculate V_o when substrate concentration is 2 K_m.

b) What are ketone bodies. How are they synthesized.

c) Gluconeogenesis is not the exact reversal of glycolysis. Justify.

P.T.O.

d) Differentiate between cyclic and noncyclic photophosphorylation.

e) Write the reaction catalysed by glutamate amino transferase and alanine amino transferase.

f) Write the significance of NADPH in biological system.

Q3) Attempt any ONE **[1×10=10]**

a) Explain in detail activation, transport and β oxidation of stearic acid. Give its energetics.

b) Discuss in detail reaction in TCA cycle. TCA is central pathway in metabolism. Justify.

Total No. of Questions : 8]

SEAT No. :

P290

[Total No. of Pages : 2

[5524]-3
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 sections should be written in seperate answer books.***
2) ***All questions are compulsory.***
3) ***Neat labelled diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

(Plant Science)

Q1) Answer the following questions. **[4×2=8]**

a) Define suckers and give two examples.

b) Enlist any two unique features of plant cell.

c) Define endoosmosis.

d) What is inflorescence?

Q2) Write short notes on (Any two) : **[2×4=8]**

a) Important characters of angiosperms.

b) Modifications of root

c) Fungi

Q3) Attempt the following (Any two): **[2×4=8]**

a) What is diffusion? Give its significance.

b) Discuss essential nutrients for growth and development of plant.

c) Give distinguishing characters of algae.

Q4) Answer in detail (Any two) **[2×8=16]**

a) Explain in brief photo-morphogenesis

b) Discuss in detail respiration.

c) Explain in detail photophosphorelation.

P.T.O.

SECTION - II
(Zoology)

Q5) Answer the following questions: **[4×2=8]**

a) Give any two examples of phylum echinodermata.

b) What is a myelinated nerve fibre?

c) Mention any two characteristic features of mollusca.

d) What are trophic hormones?

Q6) Write short note on (Any Two) : **[2×4=8]**

a) Excretory system of Frog.

b) Hormones of Adrenal Medulla.

c) Structure and functions of smooth muscle.

Q7) Attempt the following (Any Two) : **[2×4=8]**

a) Explain the effect of pH on oxygen-dissociation curve.

b) Give an account on products obtained from Apiculture.

c) Explain the characteristic features of Aves.

Q8) Answer the following (Any Two) : **[2×8=16]**

a) Give a detailed account on sericulture.

b) Describe the life cycle and parasitic adoptations of liver fluke

c) Write a note on structure and function of spiral cord.

Total No. of Questions : 5]

SEAT No. :

P303

[Total No. of Pages : 2

[5524]-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 mark.***

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

a) Give significance of normal flora in human health.

b) Define field coefficient?

c) What is TDP?

d) What is Saurkraut?

e) Enlist various sources of contamination of milk.

f) Write applications of Eijkman test.

g) What is MEOR?

h) Enlist different microbes used as biofertilizer and biopesticide.

i) What are growth linked products? Give examples.

j) What is false presumptive test?

Q2) Attempt the following questions (Any Three) **[15]**

a) Describe Monod's equation in detail.

b) Enlist different added preservations used in food preservation. Explain mode of action of any two.

c) Explain different methods used to remove turbidity in drinking water purification.

d) Describe Biotransformation with suitable example.

P.T.O.

Q3) Write short notes on (Any Three) **[15]**

a) Spoilage of fruit and vegetable.

b) Microbial Sweetners.

c) Colour defects in milk.

d) H A C C P.

Q4) a) Explain any two secondary methods of sewage treatment. **[8]**

OR

Describe food infection and food intoxication with suitable example.

b) Describe any two methods of immobilization of enzyme/cell and write its applications. **[7]**

OR

Classify organisms based on salt requirement for growth add note on adaptations in halophiles.

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

a) Describe various methods used for grading of milk and add a note on preservation of milk.

b) Describe disease Polio with respect to

i) Causitive agent.

ii) Symptoms.

iii) Pathogenesis.

iv) Diagnosis.

v) Treatment.

Total No. of Questions : 6]

SEAT No. :

P304

[Total No. of Pages : 3

[5524]-302
T.Y. B.Sc.
BIOTECHNOLOGY
Bb-332 : Plant & Animal Tissue Culture
(Semester - III) (2013 Pattern)

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.***
4) ***Answer to each section should be written in separate answer books.***

SECTION - I

Plant Tissue Culture

Q1) Answer in brief. **[5×2=10]**

a) Explain the term dedifferentiation.

b) Enlist two applications of pollen culture.

c) Explain somatic embryo.

d) Draw neat labelled diagram of Horizontal Laminar Air Flow.

e) Define an explant.

Q2) Answer any four. **[4×5=20]**

a) Write a note on embryo culture & Give its applications.

b) Explain surface sterilization technique w.r.t. explant.

c) Write role of various phytohormones used in tissue culture media.

d) What are protoplasts. Describe methods of its isolation.

e) Explain in detail, endosperm culture.

f) Give the applications of suspension culture.

P.T.O.

Q3) Answer any One **[1×10=10]**

a) Differentiate between direct & indirect organogenesis. Describe the various factors affecting organogenesis. Add a note on the application of organogenesis in plant tissue culture.

OR

a) What is totipotancy? Explain it's role in tissue culture & give detail applications of plant tissue culture.

SECTION - II

Animal Tissue Culture (ATC)

Q4) Answer the following in 3-4 lines. **[5×2=10]**

a) Give role of phenol red in ATC media.

b) Define monolayer culture.

c) Organic material should not be kept in laminar air flow cabinet when U.V. is switched on. State true or false & Justify.

d) Define cell line.

e) Give applications of cell repositories.

Q5) Answer the following. (Any Four) **[4×5=20]**

a) Define vital stain. Add a note on it's applications in ATC.

b) What is organ culture. Explain advantages & disadvantages of organ culture.

c) Write characteristics of transformed cell lines.

d) Explain aseptic culture conditions in ATC.

e) Give advantages & disadvantages of serum in ATC medium.

f) Give comparative account of finite vs infinite cell lines.

Q6) Explain different methods of cell disaggregation in detail. **[10]**

OR

Write a note on cryopreservation. Explain it's need in ATC and also comment on role of cryoprotectants during cell preservation. **[10]**

Total No. of Questions : 5]

SEAT No. :

P305

[Total No. of Pages : 2

[5524]-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.***
3) ***Draw neat and labelled diagrams.***

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

a) Define Biodiversity hotspots.

b) Enlist importance of systematics.

c) Explain alpha diversity.

d) What is carrying capacity of an ecosystem.

e) Define habit and habitat.

f) Define population richness.

g) Define mutualism.

h) Enlist applications of biodiversity data bases.

i) Explain allopatric speciation.

j) Define Endangered species.

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

a) Importance of biodiversity for food., fodder and fibre.

b) Age class distribution of a population.

c) Outcomes of Rio conference.

d) Livestock diversity of India.

P.T.O.

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

a) What is Biome? Elaborate on Aquatic biomes with suitable examples.

b) Explain the reasons responsible for population fluctuations.

c) Importance of molecular tools in biosystematics - Explain.

d) Explain any two behaviour patterns of animals.

Q4) a) Write a note on methods used in in-situ conservation & justify its sifnificance over ex-situ conservation. **[8]**

b) Explain the mathematical model of competition. **[7]**

OR

a) Explain current methods applied in the analysis of biodiversity and supplement it with a note on indices used in biodiversity analysis. **[8]**

b) What is Prey-predator dynamics? Explain with the help of model. **[7]**

Q5) Write short note on (any 3): **[3×5=15]**

a) Chemotaxonomy.

b) Domesticated plants.

c) IUCN categories.

d) Sancturies.

EEE

Total No. of Questions :5]

SEAT No. :

P307

[Total No. of Pages : 2

[5524]-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 the following in 2-4 lines : **[10×2=20]**

a) What are strong and weak acids?

b) What do you mean by chromophores?

c) Define Molar Extinction Coefficient.

d) What is retardation factor?

e) Define Wavelength.

f) Give the use of SDS in PAGE.

g) What is numerical aperture of microscope?

h) What is intrinsic fluorescence?

i) Define sedimentation cofficient.

j) What is bright field microscopy?

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

a) Explain hypochromic and hyperchromic shift.

b) Describe analytical and instrumental errors in experimentation.

c) The molecular weight of sucrose is 342. Calculate the amount of sucrose that will be used to prepare :

   i) 300 ml of 7% solution

   ii) 100 ml of 0.5 M solution

d) The molecular weight of NaOH is 40. How will you prepare 250 ml of 2.5 N solution. What will be the volume of above solution used to prepare 300 ml of 1 N solution.

P.T.O.

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

a) SDS - PAGE

b) gel filtration

c) Inverted microscopy

d) Biological hazards in laboratory.

Q4) a) What is affinity chromatography? Explain different types and give its applications. **[8]**

b) Give principle and applications of pulse field gel electrophoresis **[7]**

OR

a) Explain the principle and applications of confocal microscope. **[8]**

b) What are buffers? Explain their importance in biological systems with suitable examples. **[7]**

Q5) Attempt any one : **[1×15=15]**

a) What is spectroscopy? Give the principle, instrumentation and working of UV-visible spectrophotometer. Add a note on its applications.

b) Discuss centrifugation with respect to :

i) Types of cetrifugation

ii) Angular velocity and R.C.F.

iii) Density gradient centrifugation

iv) Types of rotors

v) Applications of centrifugation in biology

Total No. of Questions : 5]

SEAT No. :

P308

[Total No. of Pages : 2

[5524]-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 2-3 lines: **[20]**

a) Plasmid.

b) Annealing, Temperature.

c) Electroporation.

d) Palindromic sequences.

e) Multiple cloning site.

f) Transfection.

g) How will you determine purity of DNA.

h) Expression vector.

i) Origin of replication.

j) Milestones in genetic engineering.

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

a) Explain Maxam Gilbert method for DNA sequencing.

b) Write a note on DNA fingerprinting.

c) Discuss λ phage as a gene cloning vector.

d) Applications of genetic engineering in Agriculture and Pharmaceutical industry.

P.T.O.

Q3) Answer the following questions (any 3): **[15]**

a) Explain the method of site directed mutagenesis for gene manipulation.

b) Discuss the biosafety guidelines for the use of genetically modified organisms.

c) How does the alkaline lysis solution I, II and III helps in isolation of plasmid DNA and not the genomic DNA.

d) Explain the importance of genome mapping in genomic studies.

Q4) a) With the representative example explain how Bacterial Artificial chromosome is used for sequencing projects. **[8]**

b) Discuss the recipe for carrying the polymerase chain reaction with their appropriate roles. **[7]**

OR

a) Explain the automation and uses of sanger's method of sequencing in sequencing projects. **[8]**

b) Enlist the methods used for transformation in animals. Discuss any one in detail. **[7]**

Q5) Strategically explain the construction of cDNA library w.r.t. **[15]**

- Method
- Primers
- Vector - lost pair
- Screening of recombinants
- applications

OR

a) Discuss the moleculor tools used in genetic manipulations. **[8]**

b) How will you transfer your gene of interest (GoI) in plant cells. **[7]**

EEE

Total No. of Questions :5]

SEAT No. :

P292

[Total No. of Pages : 2

[5524]-5
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 labelled diagram wherever necessary.***
3) ***Figures to the right indicate full marks.***

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

a) Define dissociation constant.

b) Name a fatty acid with four double bonds. Also indicate position of double bonds.

c) Define glycosidic bond.

d) Give two features of peptide bond.

e) What are storage polysaccharides? Give two examples.

f) What are essential fatty acids? Give two examples.

g) Give any one chemical reaction used for detection of amino acids.

h) What are allosteric enzymes?

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

a) Define buffer. Write its main constituents and principles of Buffer action.

b) What are steroids? Write its various functions.

c) What is the difference in structure of amylase and amylopectin? Explain.

d) Define phosphodiester bond. Show Hydrogen bonding between Adenine and Thymine.

e) Briefly explain quaternary structure of protein with an example.

f) Describe the difference between lock and key model and Induced fit hypothesis of enzyme activity.

P.T.O.

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

a) Phospholipids are amphipathic in nature. Justify.

b) Write structures of Uracil, phosphatidylcholine, fructose and reducing sugar.

c) Explain the role of water in biological systems.

d) What are structural polysaccharides? Give one example with structure.

e) Describe Transition state hypothesis.

f) Glucose exhibits the phenomenon of mutarotation. Explain.

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

a) Explain α-helix and β-pleated structure of proteins.

b) Give structure and biochemical role of thiamine pyrophosphate and FMN as co-enzymes.

c) Explain salient features of Watson-Crick Model of DNA with suitable diagram.

Q5) Attempt any one of the following **[1×16=16]**

a) Explain clssification of amino acids based on R group.

b) i) Give a detailed account of enzyme classification.

ii) With neat labelled diagram, explain structure of peptidoglycan and give its significance.

Total No. of Questions : 5]

SEAT No. :

P293

[Total No. of Pages : 2

[5524]-6
F.Y. B.Sc.
BIOTECHNOLOGY
Bb-106: Biophysics and Instrumentation
(2013 Pattern)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat of labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of scientific calculator is allowed.***

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

a) Define Rydberg's constant.

b) What are Infra-red waves? Give its application.

c) Define Isobars.

d) What is Action Potential?

e) What are homeothermic animals.

f) Give applications of Mass Spectroscopy.

g) What is refraction of light?

h) What is chromatic aberration?

Q2) Attempt Any Four of the following. **[4×4=16]**

a) Describe Sommerfield's relativistic atom model.

b) Give principle,construction and working of flurometer.

c) What are Gamma (γ) rays. Give their properties.

d) With neat labelled diagram explain Fluid Mosaic Model.

P.T.O.

e) Explain bimetallic Thermometer. Give its application.

f) Explain dark field microscope.

Q3) Attempt Any Four of the following. **[4×4=16]**

a) 1 gram of radium is reduced by 2.1 milligram in 5 years by α–decay. Calculate the half life period of radium.

b) Discuss electromagnetic wave spectra.

c) Write a Note on ECG.

d) Describe Hertz experiment to demonstrate electromagnetic wave.

e) Describe RIA (radio immuno assay). Give its application.

f) Give principle, construction and working of pH meter.

Q4) Attempt Any Two of the following. **[2×8=16]**

a) Describe scanning electron Microscope.

b) Explain Energy level diagram of Hydrogen atom.

c) Explain Emission spectra of sodium atom.

d) Explain G.M. counter.

Q5) Attempt any one of the following. **[1×16=16]**

a) Give principle, working and applications of scintillation counter.

b) Describe in detail liquid drop and shell model of Nucleus.

Total No. of Questions : 5]

SEAT No. :

P294

[Total No. of Pages : 2

[5524]-7
F.Y. B.Sc.
BIOTECHNOLOGY
Bb-107 : Microbiology
(2013 Pattern)

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. **[8×2=16]**

a) Enlist four distinguishing characters of fungi.

b) What is role of fixative and accentuator in staining?

c) Give mode of action of chlorine on microorganism?

d) What is breeds count?

e) Define mixed culture. Give 2 examples.

f) Enlist any two human diseases caused by bacteria and viruses each and its respective causitive agent.

g) State Koch's postulate.

h) What is commensalism? Give one example.

Q2) Attempt Any Four of the following. **[4×4=16]**

a) Discuss role of Louis Pasteur in development of Microbiology.

b) Explain any one method to obtain pure culture.

c) What are biosafety measures? State its importance in handling microorganisms.

P.T.O.

d) What is Selective Media? Write role of selective agent in Selective Media with example.

e) Describe construction, working and use of Autoclave.

f) Write distinguishing characters of cyanobacteria. Add its economic importance.

Q3) Write self explanatory note on any four of the following. **[4×4=16]**

a) Archaebacteria.

b) Lysogency.

c) Radiation as a sterilizing agent.

d) Biogenesis vs Abiogenesis

e) Theories of staining.

f) Ultrastructure of Endospore.

Q4) Attempt Any Two of the following. **[2×8=16]**

a) What is differential staining? Describe principle, procedure and application of blood staining.

b) Discuss different classes of bacteria on the basis of nutritional requirement.

c) Explain Plant-Microbe interaction with any one example.

Q5) Describe in detail structure of Gram negative bacterial cell wall. Add note on principle of Gram staining. **[16]**

OR

With neat labeled diagram explain different phases of bacterial growth curve. Add a note on any one method for cell enumeration.

Total No. of Questions : 5]

SEAT No. :

P295

[Total No. of Pages : 2

[5524]-8
F.Y. B.Sc.
BIOTECHNOLOGY
Bb-108 : Computers and Applications
(2013 Pattern)

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

Instructions to the candidates:

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

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

a) What is the role of an operating system?

b) Differentiate between MAN and LAN.

c) Which Linux commands are used for directory manipulation?

d) What is a bridge? Give its use.

e) List different types of computer viruses.

f) Give use of RAM and ROM.

g) What is an attribute? List different types of attributes.

h) What are the differences between high level programming languages and low level programming languages?

Q2) Attempt Any Four of the following. **[4×4=16]**

a) What is a network topology? Explain any one in detail.

b) Write advantages of DBMs over file system.

c) Discuss in short working of Laser Printer.

d) Explain various ways in which a virus can attack a computer system.

e) Write a short note on relational data model.

P.T.O.

Q3) Attempt Any Four of the following. **[4×4=16]**

a) What is an abstraction? Discuss three levels of abstraction.

b) What are input devices? Explain any one in detail.

c) List various types of cables used in computer networking. Explain any one in detail.

d) What is an algorithm? Explain its characteristics.

e) What are different storage devices used in computer? Explain any one in detail.

Q4) Attempt Any Two of the following. **[2×8=16]**

a) Explain different generations of computers in detail.

b) Write a short note on Medline.

c) What are different types of graphs used in Ms-Excel? Give steps of creation of any one graph.

Q5) Attempt all of the following. **[2×8=16]**

a) Write an algorithm and draw a flowchart to display fibonacci series upto n terms.

OR

Write an algorithm and draw a flowchart to find maximum of 3 numbers.

b) Explain ISO-OSI model in detail.

OR

Write an algorithm and flow chart to find the reverse of a given number.