P242

[3819] - 2

F.Y. B.Sc. (Biotechnology)
PHYSICS
Bb - 102: Fundamentals of Physics
(New) (2008 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Answer should be specific and to the point.*
3) *Figures to the right indicate full marks.*
4) *Use of calculator is allowed.*

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

a) What do you understand by fundamental unit and derived unit?

b) State newton's law of viscosity.

c) Define surface tension. State its dimensions.

d) Explain any two applications of beats.

e) Define molar heat capacity. Give its unit.

f) An ideal gas absorbs 1000 kcal of heat from the source and does an amount of work 8400 Joules, during its expansion. How much is the increase in internal energy?

g) Differentiate between laevo - rotatory and dextro - rotatory optically active substances.

h) Define magnetic susceptibility.

Q2) Attempt any four. **[16]**

a) Write a note on International system of unit.

b) A metal cube of side 10cm is subjected to a shearing stress of 10^6 kg wt. Calculate the modulus of rigidity of the cube if its top face is displaced by 0.02 cm with respect to the bottom.

P.T.O

c) Define. i) Gauge pressure ii) Pascal. Convert 3psi into pascal and bar.
d) With the help of suitable diagram, explain the principle, construction and working of Pitot's tube.
e) Explain the air compression refrigeration cycle.
f) The efficiency of a carnot engine is 50%. When the temperature of the source is reduced by 200°K, its efficiency reduces to 25%. Find the working temperatures.

Q3) Attempt any four. [16]

a) With the help of suitable diagram, explain the principle, construction and working of hydraulic lever.

b) Discuss the applications of surface tension.

c) Wavelengths of two sound notes in air are $\frac{65}{130}$ m and $\frac{65}{135}$ m respectively. When each of these notes produces 3 beats per second with a third note of fixed frequency find the frequency of third note.

d) Using first law of thermodynamics show that $C_p - C_v = R$.

e) A magnetic induction of 2×10^{-4} Wb/m^2 in vacuum produces a magnetic flux of 2.4×10^{-8} Wb in a bar, a area of cross section 2×10^{-5} m^2. Calculate the intensity of magnetization. Given: ($\mu_o = 4\pi \times 10^{-7}$ Wb/A - m).

f) Define co-efficient of performance and efficiency of refrigerator. Obtain relation between them.

Q4) Attempt any two. [16]

a) With the help of suitable diagram, explain the principle, construction and working of rotating cylinder method to find the viscosity of liquids.

b) Describe soap bubble method to determine surface tension of a liquid. Derive necessary formula. Give advantages and limitations of it.

c) What do you mean by beats? If two sound waves having equal amplitude and frequencies n_1 and n_2 are sounded together. Then show that.

i) Time interval between two successive maxima is $\frac{1}{n_1 - n_2}$.

ii) Frequency of beats is $n_1 - n_2$.

Q5) a) Define the three critical constants of the gas. Obtain the critical constants in terms of van der waal's constants.

b) Define magnetic field. State Gauss's law for magnetism. Give its importance.

Discuss nuclear magnetism. Give its applications in the field of medicine.

[16]

OR

a) What is the origin of energy bands in solid? With the help of energy band diagrams, distinguish between the conductors, insulators and semiconductors. Two point charges of 2 μc are separated by a distance of 0.5m in air. Calculate the force of interaction between them.

Given $\dfrac{1}{4\pi\varepsilon_o} = 9\times10^9\,\mathrm{Nm^2/c^2}$.

b) Define:

    i)   Spontaneous absorbtion.

    ii) Spontaneous emission.

    iii) Stimulated emission.

    iv) Population inversion.

Give any four applications of LASER.

✸✸✸✸✸

P243

[3819] - 3
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 103: Basic Biosciences
(New Course) (2008 Pattern)

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

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *Draw neat & labelled diagram wherever necessary.*

   3)   *Answer to the sections should be written in two separate answer books.*

   4)   *Figures to the right indicate full marks.*

SECTION - I
(Botany)

Q1) Answer the following questions.   **[8]**

   a)   Define vernalization.

   b)   Give any two examples of under ground modified stem.

   c)   Enlist Biotechnologically important algale.

   d)   Name any two growth stimulating plant harmone.

   e)   Give distinguishing internal character of monocot leaf.

   f)   Enlist two distinguishing characters of Angiosperms.

   g)   Define dormancy.

   h)   Explain In Vivo morphogenesis.

Q2) Write short notes on Any Three of the following.   **[12]**

   a)   Dicot leaf.

   b)   Site of synthesis of cytokinin.

   c)   Economic importance of Gymnosperms.

   d)   Photoperiodism.

Q3) Attempt any two of the following. **[10]**

   a) Explain methods of breaking of seed dormancy.

   b) Justify plant as a life form.

   c) Give key characters of pteridophytes.

Q4) Define fungi? Give the classification of fungi & state distinguishing characters of each division. **[10]**

OR

Explain internal organization of any two vegetative plant organs.

SECTION - II
(Zoology)

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

   a) Define sericulture.

   b) Enlist any two examples of phylum mollusca.

   c) Write any two character of phylum chordata.

   d) Give any two important factors required for vermiculture.

   e) Name any one endoparasite & it's host.

   f) Write any two uses of silk.

   g) Enlist useful arthopods.

   h) Name any two fresh water fishes used in aquaculture.

Q6) Write short notes on (any three): **[12]**

   a) Production of vermicompost.

   b) Symptoms & control measure of Jawar stem borer.

   c) Respiratory organ in vertebrates.

   d) Sketch & label life cycle of Fisciola.

   e) Uses of aquaculture.

Q7) Attempt any two.   [10]

    a)   Comparative account on excretory system in animal.

    b)   Sketch, label & describe life cycle of <u>Bembyx</u> <u>mori</u>.

    c)   Describe any two types of parasites.

Q8) Attempt the following.   [10]

    Sketch, label & explain in detail life cycle of <u>Plasmodium</u> <u>vivax</u>.

<div align="center">OR</div>

    Cultivation of mulberry.

<div align="center">✻✻✻✻✻</div>

P460   **[3819] - 503**

S.Y. B.Sc.

BIOTECHNOLOGY
Metabolic Pathways
(24041) (Old) (2004)

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) Attempt the following in 2-3 sentences (any eight) :   **[8 x 2 = 16]**

     a) Distinguish between NAD^+ and $NADP^+$ with reference to their role in biological oxidation reduction reactions.

     b) Give the role of Biotin, as coenzyme for enzymes in carboxylation reactions.

     c) What is the manifestation of metabolic dissorder - Mapple syrup disease?

     d) Enlist the enzymes involved in desaturation of fatty acids.

     e) Mention the significance of C_4 pathway.

     f) Draw the structures of pyrimidines in DNA.

     g) Illustrate α-carben in fatty acids.

     h) How pyruvate is utilized in muscles anaerobically?

     i) In following reaction

$$A \longrightarrow B \qquad \Delta E^{0'} = -1.14V$$

$$B \longrightarrow C \qquad \Delta E^{0'} = +0.82V$$

     Calculate $\Delta G^{0'}$ for conversion of $A \longrightarrow C$ if 2 electrons move from A to C.

     j) With example, write an exergonic reaction.

Q2) Give justifications of the following pathways.   **[4 x 4 = 16]**

     a) Gluconeogenesis.

     b) β-Oxidation.

     c) HMP Shunt.

     d) E.T.C.

     e) C_3 Pathway.

     f) Oxidative phosphorylation.

Q3) Attempt the following :

    a)   Write short note on : **[8]**

        i)   Glycolysis.

        ii)   Nitrogen fixation.

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

Q4) a)   Explain the role of carnitine in β - oxidation, add a note on β - oxidation & its energetics. **[8]**

    b)   What is Calvin cycle? Explain. **[8]**

Q5) What is competitive and uncompetitive inhibition? Add a note on allosteric regulation. **[16]**

<div align="center">OR</div>

Describe the role of various enzymes & hormones Glycogen metabolism.

<div align="center">✦ ✦ ✦ ✦</div>

P461   **[3819] - 504**

S.Y. B.Sc. (Sem. - I)
BIOTECHNOLOGY
Bb - 214 : Fundamentals of Ecology & Environment

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.

Q1) Attempt the following :   **[20]**

   a)   Define the following terms :

      i)   Stratosphere.

      ii)   Synecology.

      iii) Autotrophs.

   b)   Classify the following :

      i)   Phytogeographical regions of India.

      ii)   Limiting factors.

   c)   Explain the following :

      i)   Producers.

      ii)   Estuarine ecosystem.

      iii) Green house effect.

      iv)   Aerobic degradation.

      v)   Ecological efficiency.

Q2) Write short notes on (Any three) :   **[15]**

   a)   Cybernetics.

   b)   Net primary productivity.

   c)   Phytoremediation.

   d)   Anaerobic Lagooning.

Q3) Attempt the following (Any two) :   **[15]**

   a)   What is cell immobilization? Give its advantages in waste water treatment.

   b)   Describe biotic & abiotic components of an ecosystem.

   c)   What are biopesticides? Elaborate their use in agriculture.

Q4) a) What is soil pollution? Describe pesticide pollution in soil. **[8]**

OR

Describe in brief eutrophications & its effects.

b) What is plastic? Describe its biodegradation. **[7]**

Q5) a) What is food spoilage? Describe different factors influencing food spoilage. **[8]**

OR

What is biogeochemical cycle? Describe nitrogen cycle.

b) Write in brief on energy budget. **[7]**

✦✦✦✦

P249

[3819]-101

S.Y. B.Sc. (Sem. - I)
BIOTECHNOLOGY
Bb - 211 : Genetics & Immunology
(Old and New) (2008 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) Attempt <u>any eight</u> of the following: **[8 × 2 = 16]**

    a)   Differentiate between autopolyploidy and allopolyploidy.

    b)   Define epistasis.

    c)   What are conjugate vaccines?

    d)   Define margination.

    e)   Differentiate between monoclonal & polyclonal antibodies.

    f)   What is cross reactivity?

    g)   Define generalised transduction.

    h)   Differentiate between lytic and lysogenic phages.

    i)   Define mutation.

    j)   What are deletions?

Q2) Attempt the following (any two):   **[2 × 8 = 16]**

    a)   What is an operon? Explain the mechanism of lactose operon. Add a note on catabolite repression.

    b)   Explain with a suitable diagram, the process of bacterial transformation.

    c)   Explain the mechanism of Ac/Ds transposition in <u>Zea</u> <u>mays</u>.

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

    a)   Explain the principle of western blotting.

    b)   Describe various chemical factors that play a role in innate immunity.

    c)   Write a note on adjuvants.

    d)   What are B cells? Add a note on their activation.

    e)   Write a note on major histocompatibility complex.

Q4) Attempt the following (Any four): [4 × 4 = 16]

   a) Explain codominance with suitable example.
   b) Differentiate between F transfer & Hfr transfer.
   c) What is abortive transduction?
   d) What are base substitutions? How they bring about change in nucleotide sequence?
   e) In jimsonweed, purple flowers (P) is dominant to white (P) and spiny pods (S) are dominant to smooth (S). A true breeding plant with white flowers and spiny pods is crossed to a true breeding plant with purple flowers and smooth pods. Determine the genotypes & phenotypes of F_1 & F_2 generations.

Q5) Attempt the following (Any two): [2 × 8 = 16]

   a) Explain Ouchterlony's & Mancini method of detecting the concentration of antigen or antibody.
   b) Explain in detail fine structure of an antibody molecule.
   c) Describe in detail the inflammation process.

P250

[3819]-102

S.Y. B.Sc. (Sem. - I)
BIOTECHNOLOGY
Bb-212 : Cell Biology (2008 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 must be drawn wherever necessary.*

Q1) Attempt any eight of the following: **[16]**

    a)   What is autoradiography?

    b)   Write about the components of nucleus.

    c)   Give the principle of TEM.

    d)   With suitable diagram give structure of elementary particle.

    e)   What do you mean by MTL?

    f)   Write the role of Pigments in photosynthesis.

    g)   How cell size is determined?

    h)   What do you understand by bulk transport?

    i)   Distinguish between xylem and phloem.

    j)   Write role of caspases in cell death.

Q2) Write short notes on any four: **[16]**

    a)   Hemidesmosomes.

    b)   Types of cancer.

    c)   Stages of necrosis.

    d)   Permanent tissue of plants.

    e)   Structure and role of intermediate filaments.

Q3) Answer any four: **[16]**

    a)   Give detail structure and function of golgi complex.

    b)   Explain the process of group trans location across the membrane.

    c)   With suitable diagram explain the process of meiosis I.

    d)   Differentiate between inner and outer membrane of mitochondria.

    e)   Membranes are asymmetrical. Justify.

Q4) Attempt any two: **[16]**

a) Relate structure of chloroplast with its function.

b) With one suitable example explain the process of cell differentiation.

c) Explain in detail how cdk cyclins regulate cell cycle.

Q5) Attempt any two of the following: **[16]**

a) Explain the mechanism of receptor tyrosine kinase mediated signaling.

b) Give an account of extrinsic and intrinsic cell death.

c) What do you mean by cytoskelton? Write in detail about its structure & function.

☛   ☛   ☛

P251

[3819]-103

S.Y. B.Sc. (Sem. - I)

BIOTECHNOLOGY

(Bb - 213) Molecular Biology (2008 Pattern)

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

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *All questions carry equal marks.*

    3)   *Use of color pensils restricted to diagram.*

Q1) Attempt the following questions in 2-3 sentenses: **[16]**

    a)   Illustrate 'Auery's experiment' with a diagram.

    b)   Draw the diagrams of 70s & 80s ribosomes & labell it rRNAs & proteins.

    c)   Define

        i)   Pseudogene.

        ii)   Minisatellites.

        iii)   Microsatellites and

        iv)   LTRs.

    d)   What are Hotspots?

    e)   Give a schematic representation of hydrogen bonded G & C.

    f)   Enlist the four promoter sequences used by RNA pol II.

    g)   Write the ingridents used in construction of nucleosomes.

    h)   Why is the nascent polypeptide glycosylated?

Q2) Write short notes on: **[16]**

    a)   UV as mutagen.

    b)   Aminoacyl tRNA synthase.

    c)   Post transcriptional modifications.

    d)   Euchromatin.

    e)   Antitermination.

Q3) Give diagrammatic representation of (Any 4):   **[16]**
   a)   Initiation complex of RNA polymerase I.
   b)   t-RNA.
   c)   Rhoindependent termination.
   d)   Meselson and stahl experiment.
   e)   Mershy and chase Experiment.

Q4) a)   What are chemical mutagens? Explain mechanism of any two chemical
           mutagens in details.   **[8]**
                              OR
           Explain in detail the DNA repair of E.coli.

   b)   Discuss the transcription of 5.8s rRNA, t-RNA and ꝰ6ꜱ RNA in detail.
                                                                                            [8]
                              OR
           Write a detailed account of post translational modifications.

Q5) a)   Explain the translational events occuring in E.coli.   **[16]**
                              OR
   b)   Write notes on - (any two)
        i)   80s initiation complex.
        ii)   Elongation and termination of replication.
        iii) Enzymes participating in replication.

☛ ☛ ☛

P252

[3819]-201

S.Y. B.Sc. (Sem. - II)

BIOTECHNOLOGY

Bb - 221 : Environmental Biology And Biotechnology (New)

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 any eight of the following: **[16]**

   a)   What is nudation?

   b)   Define food chain & write its type.

   c)   What is toposphere?

   d)   Discuss in brief zonation in ground water.

   e)   Define Eutrification.

   f)   What is toposphere?

   g)   Explain the term pedogenesis.

   h)   What is Homeostasis?

   i)   Explain autotrophic succession.

   j)   What is biomedical waste?

Q2) Attempt any two: **[16]**

   a)   With the help of suitable diagram explain carbon cycle.

   b)   How energy flows in a marine ecosystem and write about its organisation.

   c)   What is phytoremediation? Explain with suitable examples.

   d)   Discuss causes and effects of soil pollution.

Q3) Attempt the following (any four):   **[16]**

   a)   Discuss Liebig's law of minimum with suitable example.

   b)   Write short notes on cybernetics.

   c)   Explain scope of ecology & add notes on its relevance.

   d)   With suitable examples enumerate on bioindicators.

   e)   What is biotransformation? Write a note on biodegradable plastics.

   f)   With the help of diagram explain soil profile.

Q4) Answer any two: **[16]**

    a)   Write in detail stages involved in succession.

    b)   Define Ecosystem. Describe the structure of an ecosystem and add note on its stratification.

    c)   Write in detail the various methods used for disposal of municipal solid waste.

Q5) a)   What are biotic and abiotic component of environment? Explain each in detail.   **[16]**

<div align="center">OR</div>

    b)   Enumerate in detail the different causes effects of air pollution and the measure to control it.

<div align="center">☛   ☛   ☛</div>

P290

[3819-A]-11
B.Sc. (Applied)
BIOTECHNOLOGY
M-11: Microbial Biotechnology - I
(Sem. - I)

Time : 1½ Hours]　　　　　　　　　　　　　　　　　*[Max. Marks : 30*

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Neat labelled diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*

Q1) Select the correct option:　　　　　　　　　　*(5 × 1 = 5)*

　a)　Fungi reproducing only by asexual modes are included in _____ class.
　　　i)　Ascomycetes.
　　　ii)　Zygomycetes.
　　　iii)　Deuteromycetes.
　　　iv)　Basidiomycetes.

　b)　LAL test is used for detecting _____ in the pharmaceutical products.
　　　i)　Toxin.
　　　ii)　Pyrogen.
　　　iii)　Pathogen.
　　　iv)　None.

　c)　_____ is a molecular technique for identification of bacteria.
　　　i)　16S rRNA sequencing.
　　　ii)　Gram staining.
　　　iii)　Biochemical testing.
　　　iv)　Motility testing.

　d)　_____ is an example of symbiosis.
　　　i)　Commensals in human in testine.
　　　ii)　Lichens.
　　　iii)　Plasmodium in human RBCs.
　　　iv)　None of these.

P.T.O.

e) _____ part of the bacterial cell shows presence of D-aminoacids.

    i)   Cell membrane.

    ii)   Flagella.

    iii) Cell wall.

    iv) Endospore.

Q2) Attempt any FIVE of the following: *(5 × 2 = 10)*

a) Give the types of granules present in the prokaryotic cells.

b) Give the classification of bacteria on the basis of carbon and energy sources utilized by them.

c) Mention various antibiotic producing fungi.

d) What is a bioassay?

e) Explain the significance of Bergey's Manual.

f) How are nitrogen fixers cultivated?

g) How does a fungal medium differs from bacterial medium?

Q3) Attempt any THREE of the following: *(3 × 5 = 15)*

a) How are ruminants benefitted from cellulose degraders.

b) Mention any five biotechnology industries in India.

c) Explain in details how are bacteria classified on the basis of their cell wall structure.

d) What are the important quality assurance tests done to check the purity of an industrial product.

e) How is chromatography important in assaying fermented products.

☞   ☞   ☞

P291

[3819-A]-13

B.Sc. (Applied) (Sem. - I)
BIOTECHNOLOGY
M-13: Microbial Genetics & Immunology

Time : $1\frac{1}{2}$ Hours]　　　　　　　　　　　　*[Max. Marks : 30*

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Neat labelled diagrams must be drawn wherever necessary.*

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

Q1) Select the correct option:　　　　　　　　　　　**[5]**

a) Which of the following cell possess polymorpho nucleus?

   i) B cells.

   ii) Neutrophils.

   iii) Macrophage.

   iv) Erythrocytes.

b) All of the Mendelian alleles for different traits showed.

   i) Epistasis.

   ii) Codominance.

   iii) Incomplete dominance.

   iv) Dominance and recessiveness.

c) UV-induced damage of DNA by formation of pyrimidine dimers are repaired by photolyase on activation by.

   i) Blue light.

   ii) IR light.

   iii) Red light.

   iv) UV-C light.

d) The following are true about cell mediated immunity.
   i) Antigen specific function is the role of the T-lymphocytes.
   ii) Cell mediated immunity can activate the complement system.
   iii) √ interferon is an important Mediator of B cell activation.
   iv) It is not effective against tumor cells.
e) Which of the following is incorrect about bacterial plasmids?
   i) They are extra chromosomal, self replicative.
   ii) Transfer can be through conjugation process.
   iii) They are single stranded.
   iv) They can encode antibiotic resistance proteins.

Q2) Attempt any FIVE of the following: **[10]**
   a) Enlist the different domains in antibody structure.
   b) Define:
      i) Point mutation.
      ii) Karyotype.
   c) What is Co-dominance?
   d) What is clonal selection theory?
   e) Justify: vaccines develop active immunity.
   f) Give any 2 applications of Radio Immuno Assay.
   g) What is transduction?

Q3) Attempt any THREE of the following: **[15]**
   a) Explain the role of alkylating & hydroxylating agents in induced mutations.
   b) What is operon? Describe Arabinose operon.
   c) Explain the role of memmory cells in immunity.
   d) Write a note on Enzyme Linked Immunosorbent Assay.
   e) Discuss Mendelian inheritance pattern with examples.

☛ ☛ ☛

P292

[3819-A]-14

B.Sc. (Applied)

BIOTECHNOLOGY

M-14: Recombinant DNA Technology

(Sem. - I)

Time : 1$\frac{1}{2}$ Hours] *[Max. Marks : 30*

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) Define the following: **[5]**

   a) Vector.

   b) Point mutation.

   c) Bacteriophage.

   d) Restriction endonucleases.

   e) Plasmid.

Q2) Attempt any five of the following: **[10]**

   a) Write any four applications of northern blotting.

   b) Write the role of following in r-DNA technology.

      i) Ligases.

      ii) Alkaline phosphatase.

   c) Write the characteristics of ideal vector.

   d) Write the regulatory aspects for release of GM crops.

   e) Write any four applications of DNA polymerases.

   f) Write the characteristics of ideal host.

   g) Write the names of the membranes used for blotting in northern and Southern blotting.

Q3) Attempt any three of the following: **[15]**

   a) Explain the process of cDNA synthesis from mRNA.

   b) Explain the principle of DNA sequencing with applications.

   c) Write the principle of PCR and Describe the steps involved in PCR.

   d) Write the applications of genetic engineering in microbes.

   e) Distinguish between RAPD and RFLP.

☛ ☛ ☛

P293

[3819-A]-15

B.Sc. (Applied) (Sem. - I)

BIOTECHNOLOGY

M-15/P-15: Fundamentals of Biological Chemistry

Time : $1\frac{1}{2}$ Hours] *[Max. Marks : 30*

Instructions to the candidates:

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

Q1) Select the correct option: **[5]**

a) The most probable amino acid occurring at bents and turns of polypeptide is
   i) Tryptophan.
   ii) Proline.
   iii) Alanine.
   iv) Isoleucine.

b) Mixture of _____ is used for isoelectric focusing.
   i) Ampholytes.
   ii) Salts.
   iii) Amino acids.
   iv) Nucleotides.

c) _____ is the coenzymatic form of vitamin $B_{12.}$
   i) Biotin.
   ii) Deoxyadenosyl cobalamine.
   iii) Folic acid.
   iv) NAD.

d) A sugar is reducing due to the presence of a free _____.
   i) Ketonic carbon.
   ii) Anomeric carbon.
   iii) Epimeric carbon.
   iv) Aldehydic carbon.

e) Binding of oxygen to the haemoglobin molecule is known as _____ binding.
   i) Substitution.
   ii) Transitory.
   iii) Cooperative.
   iv) None of these.

Q2) Attempt any FIVE of the following: **[10]**
   a) Explain the use of ammonium sulphate in protein purification.
   b) Differentiate between allosteric and non allosteric enzymes.
   c) Why are lipids amphipathic? What is their behaviour in water?
   d) What is Handerson Hasselbalch equation.
   e) Prove that Km equals substrate concentration at one-half maximal velocity.
   f) Differentiate between DNA and RNA.
   g) Define:
      i) Sap value.
      ii) Iodine number.

Q3) Attempt any THREE of the following: **[15]**
   a) Describe the structure and function of mRNA and tRNA.
   b) Classify lipids with suitable examples.
   c) What is secondary structure of proteins? Add a note on Ramchandran plot.
   d) Elaborate on the cell wall structure of prokaryotes.
   e) What is Line-Weaver Burk plot? Give its importance.

☛ ☛ ☛

P294

[3819-A]-17

B.Sc. (Applied) (Sem. - I)

BIOTECHNOLOGY

M-17/P-16: Biophysics and Instrumentation

Time : 1½ Hours]   *[Max. Marks : 30*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Neat labelled diagrams must be drawn wherever necessary.*

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

Q1) Select correct option: **[5]**

    a)   Image formed by dark field microscope appears _____.

        i)   Bright.

        ii)   Dark.

        iii)   Coloured.

        iv)   Red.

    b)   Though melting point of platinum is 1600°C, platinum resistance thermometer can be used maximum upto _____ °C.

        i)   1400.

        ii)   1200.

        iii)   1000.

        iv)   1600.

    c)   Pure rotational spectra of the molecule can be obtain using _____ radiations.

        i)   IR.

        ii)   UV.

        iii)   Microwave.

        iv)   Visible.

d) The potential difference across the plasma membrane of an animal cell at rest varies between _____.

i) 20 mV to 200 mV.

ii) 2 mV to 20 mV.

iii) -2 mV to -20 mV.

iv) -20 mV to -200 mV.

e) Unstable _____ is the origin of radioactivity.

i) Neutron.

ii) Proton.

iii) Nucleus.

iv) Electron.

Q2) Attempt any FIVE of the following: [10]

a) What is the role of cholesterol and glycolipids in plasma membrane?

b) What is ground and excited state of molecule? Define fluroscence.

c) Write principle of pH meter and give its two applications in biotechnology.

d) What is the role of instruments in analysis of biomolecules?

e) State the principle of electrophoresis apparalus & write the applications of electrophoresis.

f) Draw neat labelled diagram of electron gun of SEM.

g) What is the difference between diffusion & osmosis.

Q3) Attempt any THREE of the following: [15]

a) Write a note on bioenergetics of mitochondria.

b) With the help of block diagram explain principle, construction & working of colorimeter.

c) With the help of N to P ratio explain the stability of nucleus.

d) With the help of ray diagram explain construction and working of TEM.

e) Give any five applications of IR spectroscopy to biomolecules.

☞ ☞ ☞

P295

[3819-A]-19

B.Sc. (Applied) (Sem. - I)

BIOTECHNOLOGY

P-11: Plant Tissue Culture - I

Time : 1$\frac{1}{2}$ Hours]   *[Max. Marks : 30*

Instructions to the candidates:

  1)   *All questions are compulsory.*

  2)   *Neat labelled diagrams must be drawn wherever necessary.*

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

Q1) Select the correct option and rewrite the statement: **[5]**

  a)   Cell theory was proposed by:

    i)   Morel and Martin.

    ii)   Murashige and Skoog.

    iii) Schleiden and Schwann.

    iv)   Skoog and Miller.

  b)   The temperature maintained in plant tissue culture room is usually.

    i)   18-20ºC.

    ii)   22-24ºC.

    iii) 25-27ºC.

    iv)   29-30ºC.

  c)   B5 Medium is formulated by:

    i)   Gamboorg et-al.

    ii)   P.R. White.

    iii) Nitsch and Nitsch.

    iv)   Murashige and Skoog.

d) Haploid plants are obtained through _____ culture.
   i)   Embryo.
   ii)   Pollen.
   iii) Endosperm.
   iv)   Meristem.

e) Callus formation is the out come of:
   i)   Differentiation.
   ii)   Redifferentiation.
   iii) Dedifferentiation.
   iv)   Cytodifferentiation.

Q2) Answer in short (any five):   **[10]**
   a)   What are different types and subtypes of suspension cultures?
   b)   What are HEPA Filters? Mention its applications.
   c)   Enlist the essential inorganic ingradients in plant tissue culture medium.
   d)   What is paper raft nurse technique?
   e)   'Callus is a heterogenous mass of proliferative cells'. Justify.
   f)   Discuss the effect of sucrose on cytodifferentiation.
   g)   Define organ culture and enlist its types.

Q3) Answer in detail (any three):   **[15]**
   a)   Enlist the types of culture vessels and closures used in plant tissue culture. How they are cleaned and sterilised?
   b)   Discuss the root tip culture technique with applications.
   c)   Write a note on selection of culture medium.
   d)   Comment on assessment of growth of cell cultures.
   e)   what are the characteristics of callus.

☛ ☛ ☛

P297

[3819-A]-20-A

B.Sc. (Applied)

BIOTECHNOLOGY

P - 13: Micropropagation Techniques

(Sem. - I)

Time : 1$\frac{1}{2}$ Hours]

[Max. Marks : 30

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Neat-labelled diagrams must be drawn wherever necessary.

    3)   Figures to the right indicates full marks.

Q1) Select the correct option: **[5]**

    a)   Invitro mass scale propagation is termed as _____.

        i)   Clonal propagation.

        ii)   Vegetative propagation.

        iii)   Micropropagation.

        iv)   Reproduction.

    b)   The serological test for virus indexing is _____.

        i)   Agglutination.

        ii)   Immunodiffusion.

        iii)   Immunophoresis.

        iv)   ELISA.

    c)   _____ put forth the concept of hormonal regulation of invitro Morphogenesis.

        i)   Murashige & Skoog.

        ii)   Skoog & Miller.

        iii)   Cocking & Razdan.

        iv)   Morel & Martin.

d) The presence of _____ in the proliferation medium also induces embryogenesis in cells of callus.
   i) Kinetin.
   ii) Complex organic supplements.
   iii) 2, 4-D.
   iv) Gibberellins.

e) The shoot tip culture technique was developed by _____.
   i) Ball.
   ii) Murashige.
   iii) Debergh.
   iv) Morel.

Q2) Answer in short (any five): **[10]**
   a) What is organogenesis and caulogenesis?
   b) Enlist various growing media used for transplantation.
   c) Elaborate on induction and development of somatic embryos.
   d) Define hyperhydration and mention its symptoms.
   e) Write a note on dessicated artificial seed production.
   f) 'Tissue culture raised plants are costly' - Justify.
   g) What are merestemoids? How they are formed?

Q3) Answer in details (any three): **[15]**
   a) Define virus indexing and discuss various methods of virus indexing.
   b) Enlist the types of green house based on environment control and discuss the methods of environment control.
   c) Discuss the limitations of Micropropagation.
   d) Enlist the factors affecting somatic embryogenesis and discuss the role of PGR in somatic embryogenesis.
   e) 'Invitro raised plants require acclimatization', comment and justify.

☛ ☛ ☛

P298

[3819-A]-21

B.Sc. (Applied) (Sem. - II)

BIOTECHNOLOGY

M-21: Microbial Technology - II

(2008 Pattern)

Time : 1$\frac{1}{2}$ Hours]   *[Max. Marks : 30*

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Neat labelled diagrams must be drawn wherever necessary.

    3)   Figures to the right indicate full marks.

Q1) Select the correct option: **[5]**

    a)   _____ is not a constituent of large scale fermentation media.

        i)   Molasses.

        ii)   Corn steep liquor.

        iii) Tryptone.

        iv) Hydrocarbons.

    b)   Requirements for designing batch sterilization are:

        i)   Original number of microorganisms.

        ii)   Thermal death characters of design organism.

        iii) Profile of sterilization cycle.

        iv) All of the above.

    c)   Monod equation is the most frequently used expression relating.

        i)   Growth rate to nutrients.

        ii)   Growth rate to time.

        iii) Growth rate to growth limiting substrate concentration.

        iv) Both (i) and (ii).

d) The direct operating cost does not include.
   i) Utilities and supplies.
   ii) Raw material.
   iii) Labor cost.
   iv) Plant size.

e) The precursor used for penicillin G production is:
   i) Phenyl acetic acid.
   ii) Benzoic acid.
   iii) Phenomy acetic acid.
   iv) α - amino butyric acid.

Q2) Attempt any FIVE of the following   **[10]**

   a) Describe the uses of single cell protein.
   b) What are Good Laboratory Practices?
   c) What are the factors affecting $K_l a$.
   d) Give the properties of immobilized enzymes.
   e) What is biotransformation? Give an example.
   f) How is serum free media advantageous over serum containing media?
   g) Explain scaling up of a fermentation process.

Q3) Attempt any THREE of the following:-   **[15]**

   a) What is media sterilization? Give the kinetics of batch sterilization process.
   b) Describe the industrial production of alcohol.
   c) What is cell disruption? Describe in detail Mechanical Methods of cell disruption techniques.
   d) Diagramatically explain the construction and design of a bioreactor.
   e) Explain in detail how pH and temperature is controlled in a fermentation process.

☛ ☛ ☛

P299

[3819-A]-22

B.Sc. (Applied)

BIOTECHNOLOGY

M-22/P-22: Ecology, Waste Management and Biodiversity

(2008 Pattern) (Sem. - II)

Time : 1$\frac{1}{2}$ Hours]   *[Max. Marks : 30*

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Draw neat labelled diagram wherever necessary.*

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

4) *Use of calculators is allowed*

Q1) Multiple choice questions.   **[5]**

     a)   Geothermal energy is _____ source of energy.

         i)   Non-conventional non renewable.

         ii)   Non-renewable conventional.

         iii)   Renewable conventional.

         iv)   Renewable non-conventional

     b)   The particulate matter which has size less than _____ nm is called respirable particulate matter.

         i)   50 μ

         ii)   15 μ

         iii)   100 μ

         iv)   None of these.

     c)   _____ is not an example of artificial ecosystem.

         i)   Garden

         ii)   Crop field

         iii)   Petridish

         iv)   None of these

d) In-situ steam sparging of soil is a treatment recommended only when _____ are excess in the given soil.
   i) Lipids
   ii) Aromatic compounds
   iii) Volatile compounds
   iv) None of these

e) _____ is an example of ex-situ conservation of organisms.
   i) National park
   ii) Biosphere reserve
   iii) Embryo transfer
   iv) Santuary.

Q2) Attempt any FIVE of the following **[10]**
   a) Compare and contrast Niche and Habitat
   b) What is 'stone leprosy'?
   c) Ozone depletion is observed more in polar region; Why?
   d) Enlist the conditions when ex-situ conservation is preferred over in-situ conservation of organisms.
   e) What is food web? Give types of food chains.
   f) Define with example:
      i) Xenobiotic
      ii) Synecology
   g) What is FISH technique? How it can be used as a tool of classification?

Q3) Answer any THREE of the following:- **[15]**
   a) Explain the structure of an ecosystem with one example.
   b) Explain sources and mechanism of Green House effect.
   c) Illustrate how organisms are classified on the basis of
      i) Morphology
      ii) Chemical composition
   d) Elaborate on use of biodiversity as 'Gene Pool'
   e) Give pictorial presentation of typical effluent treatment plant. Add a note on Activated Sludge Process as a secondary treatment.

☞ ☞ ☞

P301

[3819-A]-25

B.Sc. (Applied) (Sem. - II)

BIOTECHNOLOGY

M-25: Plant and Animal Tissue Culture

(2008 Pattern)

Time : $1\frac{1}{2}$ Hours] [*Max. Marks : 30*

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) Multiple choise questions. **[5]**

 a) The reversion of differentiated cell to meristematic status is termed as____

 i) Differentiation

 ii) Cytodifferentiation

 iii) Redifferentiation

 iv) Dedifferentiation

 b) Phenol red is added in DMEM to detect _____

 i) Change in pH

 ii) Contamination

 iii) Osmolarity

 iv) Oxygen tension

 c) The pore size of HEPA Filters is _____

 i) 0.2 μ m

 ii) 0.45 μ m

 iii) 0.22 μ m

 iv) 0.3 μ m

d) The nitrogen source used in lymphocyte culture medium is _____
   i) Phytohaemaggluttinin
   ii) Trypsin
   iii) PBS
   iv) Glycerol
e) _____ is used as solvent for cytokinin.
   i) dil.NaOH
   ii) dil.HCL
   iii) dil.KOH
   iv) Ethanol

Q2) Attempt any FIVE of the following: **[10]**
   a) Define cellular totipotency & mention how it is expressed.
   b) What is primary culture? Give an example?
   c) What is dry heat sterilization?
   d) What are the types and subtypes of suspension culture?
   e) Define organogenesis and caulogenesis.
   f) How the cell viability is tested?
   g) What is a cell line? Give an example?

Q3) Answer any THREE in details: **[15]**
   a) Give an account of insect cell line and its application.
   b) What are factors affecting organogenesis.
   c) Elaborate on the characteristics of callus.
   d) Give an account of equipments required in ATC laboratory with their applications.
   e) Discuss the chemical factors affecting cytodifferentiation.

☛ ☛ ☛

P302

[3819-A]-26

B.Sc. (Applied) (Sem. - II)

BIOTECHNOLOGY

P-26/M-26: Use of Computers

(2008 Pattern)

Time : 1$\frac{1}{2}$ Hours]   *[Max. Marks : 30*

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *Neat labelled diagrams must be drawn wherever necessary.*

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

Q1) Select the correct option: **[5]**

   a)   _____ computer generation uses large scale integrated circuits

      i)   First

      ii)   Second

      iii) Third

      iv) Fourth

   b)   MS-Excel is a _____ based spreadsheet

      i)   Row

      ii)   Column

      iii) GUI

      iv) (i) and (ii)

   c)   Topology means _____

      i)   Arrangement of computer in a network.

      ii)   Study of network.

      iii) Study of LAN.

      iv) None of the above.

d) _____ is used to locate website on the internet
  i) Internet explorer
  ii) URL
  iii) Mozilla Firefox
  iv) Google chrome

e) Modem works on the principle of
  i) Caching
  ii) Modulation & demodulation
  iii) Paging
  iv) Routing

Q2) Attempt any FIVE of the following   **[10]**
  a) Explain the terms
    i) CPU
    ii) Primary Memory
  b) Summarize the features of MS-Word.
  c) What are search engines?
  d) What is a database? Why is it used?
  e) Describe essential properties of an algorithm.
  f) What are the components of LAN?
  g) Explain mouse an input device.

Q3) Attempt any THREE of the following:-   **[15]**
  a) What is a computer network? What are its goals?
  b) What is multimedia? Explain the applications of multimedia.
  c) What is Bioinformatics? Give an account of bioinformatics tools.
  d) Write a note on menubar and formatting toolbar in MS-Word.
  e) Explain UNIX with reference to its features & advantages.

☞ ☞ ☞

P303

[3819-A]-27

B.Sc. (Applied) (Sem. - II)

BIOTECHNOLOGY

M-27/P-27:Bioinformatics

(2008 Pattern)

Time : 1$\frac{1}{2}$ Hours]   *[Max. Marks : 30*

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) Multiple choice questions.   *(5 × 1 = 5)*

a)   _____ event gives rise to orthologs.

   i)   Speciation

   ii)   Duplication

   iii) Mutation

   iv) Divergence

b)   Swiss-Prot was created by _____.

   i)   Margaret Dayhoff

   ii)   Altscul

   iii) Amos Bairos

   iv)   None of these

c)   _____ provides an automated Web Server for basic homology modeling.

   i)   Rasmol

   ii)   Swiss-model

   iii) PDB

   iv)   Cn3D

d) Clustal W is the most used alignment algorithm for multiple sequence alignments built on a _____.

   i)   Iterative alignment
   ii) Progressive alignment
   iii) Both i and ii
   iv) None of these

e) In Ramchandran plot sterically allowed amino acid is _____.

   i)   Alanine
   ii) Valine
   iii) Glycine
   iv) Leueine

Q2) Attempt any FIVE of the following: *(5 × 2 = 10)*

   a) State Hidden Markov Model Applications.
   b) Enlist 2 databases which are secondary in nature.
   c) Differentiate PAM and BLOSUM Matrix.
   d) Give significance of Ramchandran plot.
   e) What does an E-value indicate?
   f) What is meaning of ORF?
   g) Define 'Molecular Clock'

Q3) Answer any THREE of the following: *(3 × 5 = 15)*

   a) Explain in brief Maximum Parsimony.
   b) Elaborate on the areas where bioinformatics can be implied.
   c) What is Gene Bank? Explain structure of Gene Bank entries.
   d) Explain secondary structure prediction of a protein.
   e) Write a note on BLAST.

☜ ☜ ☜

P304

[3819-A]-28

B.Sc. (Applied) (Sem. - II)
BIOTECHNOLOGY
P-21:Plant Tissue Culture - II
(2008 Pattern)

Time : 1$\frac{1}{2}$ Hours] [*Max. Marks : 30*

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Draw Neat and labelled diagrams must be drawn wherever necessary.*

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

Q1) Multiple choise questions. (5 × 1 = 5)

   a) Shikonin is produced by cell cultures of _____.

      i) <u>C.roseus</u>

      ii) <u>P.ginseng</u>

      iii) L.erythrorhizon

      iv) <u>D.purpurea</u>

   b) Embryo rescue technique was developed by _____.

      i) F.Laibach

      ii) C.Khudson

      iii) G.Morel

      iv) E.Cocking

   c) For cryopreservation _____ is used as cryoprotectant.

      i) Mannitol

      ii) DMSO

      iii) PEG

      iv) Glucose

d) The most potent viral vector is _____.
   i) PSV
   ii) PLRV
   iii) TMV
   iv) CaMv

e) _____ is the commonly used fusogen during somatic hybridization.
   i) Electric current
   ii) $NaNO_3$
   iii) PEG
   iv) $CaCl_2$

Q2) Attempt any FIVE of the following   *(5 × 2 = 10)*
   a) Define elicitor and give 2 examples.
   b) Draw a neat & labelled diagram of Tiplasmid.
   c) Why meristem is used as explant for production of disease free plants?
   d) Enlist the methods of induced protoplast fusion.
   e) What is the role of suspensor in embryo culture?
   f) Which enzymes are used for protoplast isolation? What is their mode of action?
   g) Why diplodization is required by haploid plants?

Q3) Attempt any THREE questions in details: *(3 × 5 = 15)*
   a) Comment on nutritional requirements of an embryo.
   b) What is biotransformation? Discuss with suitable examples.
   c) Comment on the origin of somaclonal variations.
   d) What are the applications of haploid plant production?
   e) Discuss the prefreezing treatments used during cryopreservation.

☛ ☛ ☛

P305

[3819-A]-29

B.Sc. (Applied) (Sem. - II)
BIOTECHNOLOGY
P-25: Techniques in Microbiology
(2008 Pattern)

Time : $1\frac{1}{2}$ Hours]   *[Max. Marks : 30*

Instructions to the candidates:

   1)   All questions are compulsory.

   2)   Neat labelled diagrams must be drawn wherever necessary.

   3)   Figures to the right indicate full marks.

Q1) Select the correct option: **[5]**

   a)   Identification of the three lines of descent Bacteria, Archaea and Eukarya has come about as a result of

      i)   Advanced methods of morphological examination.

      ii)   Biochemical assay.

      iii)   Analysis of metabolic pathways.

      iv)   Nucleic acid sequencing studies.

   b)   Which of the following is used in the production of buttermilk and cheese

      i)   Streptococcus mutans

      ii)   Streptococcus faecalis

      iii)   Lactococcus lactis

      iv)   Both (i) and (ii)

   c)   _____ are the smallest bacteria capable of self reproduction.

      i)   Mycoplasma

      ii)   Actino mycetes

      iii)   Rickettsia

      iv)   Mycobacteria

d) Secondary metabolites are formed during which phase of bacterial growth
   i) Stationary phase
   ii) Logarithmic phase
   iii) Lag phase
   iv) Both (i) and (ii)

e) Maclonkey's agar is an example of
   i) Differential medium
   ii) Enriched medium
   iii) Selective medium
   iv) Both (i) and (iii)

Q2) Attempt any <u>FIVE</u> of the following: **[10]**
   a) Describe the four nutritional types of organisms in terms of their carbon and energy source.
   b) Differentiate between negative and positive staining.
   c) Explain the principle of working of an auto clave.
   d) How are fungal growth media different from bacterial growth media?
   e) Write the cell wall constituents of Archaebacteria.
   f) Give the importance of IMVIC test.
   g) Explain the role of yeasts in brewing.

Q3) Attempt any <u>THREE</u> of the following: **[15]**
   a) Describe the growth cycle of bacteria. Add a note on industrially important phases of growth.
   b) How are bacteria classified? Comment on chemotaxonomy for classification of bacteria.
   c) Describe in detail plating techniques for enumeration of bacteria.
   d) State characteristic differences between gram positive and gram negative bacteria.
   e) Describe different components used for preparation of bacteriological media.

P241

[3819] - 1
F.Y. B.Sc.
BIOTECHNOLOGY
Bb - 101 : Fundamentals of Chemistry
(New) (2008 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.*
4) *Use of logarithmic tables and calculator is allowed.*

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

a) Why do gases fails to obey ideal gas equation at high pressure and low temperature?

b) 50% of a first order reaction is completed in 23 minutes. Find the values of the rate constant.

c) Define vapour pressure. What is effect of temperature on vapour pressure of liquid?

d) The decomposition of $MgCO_3$ in a closed vessel is represented by the equation.

$MgCO_3$ (s) $\rightleftharpoons$ MgO (s) + CO_2 (g)
find the number of phases and component in it.

e) Why does the equivalent conductance of an electrolyte increases with dilutions?

f) Represent electrode for the following reaction and write the expression for its potential.

AgBr (s) + e^- $\longrightarrow$ Ag (s) + Br^-.

g) Explain the term 'plane of symmetry'.

h) What is QSAR?

Q2) Attempt <u>any four</u> of the following : **[16]**

a) State and explain Dalton's law of partial pressure.

b) What is energy of activation? How it is determined graphically?

c) What is Van't Hoff factor? How is it related to the number of ions and degree of dissociation?

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

e) What is meant by transport number of ions? Describe moving boundary method for the measurement of transport number of ions.

f) Balance the following redox reaction by oxidation number method.

$$S + HNO_3 \longrightarrow SO_2 + NO_2 + H_2O$$
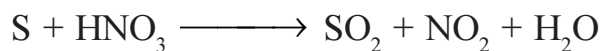
Q3) Attempt <u>any four</u> of the following : **[16]**

a) Describe Arrhenius theory of electrolytic dissociation.

b) What is eutectic point? Explain phase diagram of two component system.

c) Explain construction and working of glass electrode.

d) A second order reaction in which the initial concentration of both reactant is same, 50% of the reaction is completed in 400 sec. How long will it take for the reaction to go to 65% completion?

e) A solution of glycol containing 1.821gms per lit. has osmotic pressure of 0.6815 atms. at 10°C. Calculate the mol.wt. of glycol. [R = 0.082 lit. atms]

f) Find the number of phases and number of components for the following equilibria.

i) A binary azeotrope.

ii) N_2O_4 (g) $\rightleftharpoons$ $2NO_2$ (g)

Q4) Attempt <u>any four</u> of the following : **[16]**

a) Comment on the stability of the conformation of n-propane with the help of energy profile diagram.

b) Write a note on 'optical isomerism'.

c) What are alkanes? How they are named?

d) Discuss the formation of sigma and pi bonds on the basis of concept of atomic orbital overlap.

e) The equivalent conductance of ammonium chloride at infinite dilution is 149.7 mhos and ionic conductance of OH⁻ and Cl⁻ ions are 198 and 76.3 mhos respectively. Calculate the equivalent conductance of ammonium hydroxide at infinite dilution.

f) Calculate ΔH and ΔS for the following reaction at 25°C.

Hg_2Cl_2 (s) + H_2 (1 atms) $\longrightarrow$ 2 Hg (l) + 2H⁺ (a = 1) the emf of cell at

25°C is 0.2676 volts and $\left[\dfrac{dE}{dT}\right]_p$ = – 31.9 × 10⁻⁴ volts-deg⁻¹. [F = 96500

coulombs].

Q5) Attempt any two of the following : [16]

a) What is half cell potential? Discuss the gas electrode with respect to formation of electrode and expression for electrode potential.

b) What are chemical cell? Derive an expression for e.m.f. of chemical cell without transference.

c) State and explain Kohlrausch's law of independent migration of ions. How will you determine the ionic product of water by conductance measurement?

⊠⊠⊠⊠

P244

[3819]-4

F.Y. B.Sc.

BIOTECHNOLOGY

Bb - 104 : Mathematics and Statistical Methods for Biologists

(New Course) (2008 Pattern)

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

Instructions to the candidates:

　　1)　All questions are compulsory.

　　2)　Use separate answer books for each section.

　　3)　Use of scientific calculator and statistical table is allowed.

　　4)　Figures to the right indicate full marks.

SECTION - I

(Mathematics)

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

　　a)　Find the principal argument of the complex number $\dfrac{1+i+i^2}{1-i}$.

　　b)　Evaluate $\lim\limits_{n \to \infty} \left[\sqrt{n^2 + n} - n \right]$

　　c)　Find rank of matrix $A = \begin{bmatrix} 3 & 6 & -3 \\ 6 & 6 & 3 \end{bmatrix}$.

　　d)　If $z = x^y + y^x$ then find $\dfrac{\partial z}{\partial x}$ and $\dfrac{\partial z}{\partial y}$.

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

　　a)　Solve the following differential equation.

　　　　$(x + 2y)\, dx + (2x + y)\, dy = 0$.

　　b)　Show that the following sequence is convergent.

　　　　$\sqrt{5}\,,\ \sqrt{5\sqrt{5}}\,,\ \sqrt{5\sqrt{5\sqrt{5}}}\,,.....$

　　c)　Find five 5ᵗʰ-roots of the complex number $- i$.

　　d)　If $z = f(x,y)$, $u = e^x$ and $v = e^y$ then show that, $\dfrac{\partial^2 z}{\partial x . \partial y} = u.v.\dfrac{\partial^2 z}{\partial u . \partial v}$.

P.T.O.

e) Test the convergence of the series $\displaystyle\sum_{n=1}^{\infty}\left(\frac{3n+4}{4n+7}\right)^{n}$.

f) Find all eigenvalues for the following matrix and find the eigenvector corresponding to the largest eigenvalue.

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

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

a) Verify Cayley-Hamilton's theorem for the matrix $B = \begin{bmatrix} 2 & 4 \\ 1 & 5 \end{bmatrix}$.

b) Solve the following system of linear equations.
$x - y + 2z - w = 1$
$2x + y - 2z - 2w = -2$
$-x + 2y - 4z + w = 1$

c) Find the stationary points and examine for maximum and minimum value for the function $f(x,y) = x^2 + y^2 - xy - 2x + y$.

d) Solve the following differential equation.
$$\frac{dy}{dx} = \frac{-x + y + 1}{x + y - 5}$$

SECTION - II
(Statistics)

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

a) Define the different types of correlation between two variables.

b) Following data give the number of seeds germinated out of 12 sown seeds, far 10 quadrates.
2, 5, 3, 7, 8, 3, 9, 3, 10, 4.
Find the average number of seeds germinated.

c) Define 'skewness'. State its types.

d) Average weight of a group of 10 fish is 5.75kg and that of another group of 15 fish is 6.25kg. Find average weight of a fish if the groups are combined together.

e) The number of larvae observed on a leaf of a pitcher plant in a random sample of 8 leaves were 1, 3, 4, 2, 5, 6, 7, 9. Calculate the standard deviation of the above data.

Q5) Attempt any four : [4 × 2½ = 10]

a) Calculate median of the following data related to the number of flowers present in 21 twigs.

No. of flowers	5-10	10-15	15-20	20-25	25-30
No. of twigs	3	5	6	4	3

b) Following data give dry weights (in mg) of a chemical substance observed in 12 samples :

4.25, 4.20, 4.15, 3.25, 3.35, 4.70, 3.25, 4.75, 3.26, 3.75, 3.70, 4.90.

Calculate mode of the data.

c) Define the sample space with an illustration.

d) Write sample space of a random experiment of sowing 3 seeds and recording the outcome after a few days as germinated or not.

e) A discrete random variable X has the following probability distribution. Find E (X).

X	0	1	2	3
P[X = x]	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{8}$

Q6) Attempt any two : [2 × 5 = 10]

a) The incidence of a disease in an industry is such that the workers have a 20% chance of suffering from it. What is the probability that out of six workers selected at random (i) at least 4, (ii) at most 4 will suffer from this disease.

b) State properties of normal distribution.

c) The following table gives ages and blood pressures of 5 women :

Age (X) :   56   42   36   47   49

B. P (Y) :   147   125   118   128   145

Calculate correlation coefficient between X and Y.

Q7) Attempt <u>any one</u> :   [1 × 10 = 10]

a)   Calculate mode, Q_1 and Q_3 from the following distribution :

Age	15-19	20-24	25-29	30-34	35-39	40-44
No. of person	4	20	38	24	10	4

b)   The simple correlation coefficients between temperature (X_1), yield (X_2) and rainfall (X_3) are $r_{12} = 0.59$, $r_{13} = 0.46$, $r_{23} = 0.77$. Calculate the values of $r_{12.3}$, $r_{23.1}$, $R_{1.23}$, $R_{2.13}$.

☒☒☒☒

P245

[3819]-5

F.Y. B.Sc.

BIOTECHNOLOGY

Bb-105 : Fundamentals of Biological Chemistry

(2008 Pattern)

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

Instructions to the candidates:

1)   *All questions are compulsory.*
2)   *All questions carry equal marks.*

Q1) Attempt the following :   **[16]**

a)   Write the structure of Adenosine and ATP.

b)   Why sucrose is a non reducing sugar while Lactose is a reducing sugar?

c)   Differentiate between salt precipitation and organic solvent precipitation of proteins.

d)   List out the forces that stabilize the structure of proteins.

e)   Draw the structure of a tripeptide made of Alanine, Glutamic acid and Serine.

f)   Name the coenzymes of Riboflavin and Niacin.

g)   List out four features of enzyme active site.

h)   Why is the carboxyl group of alanine more acidic than the carboxyl group of acetic acid?

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

a)   Give the structural and functional features of tRNA with the help of a neat diagram.

b)   Write nucleophilic addition reaction with suitable example.

c)   Define amphipathic Lipids. How do they behave when exposed to water?

d)   Write short note on PLP as coenzyme.

e)   Give two methods to determine the N Terminal amino acid in a protein.

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

   a) Explain the role of cell membrane in transport of molecules with a suitable example.

   b) Write short note on Ramachandram plot.

   c) Describe the desalting of proteins using Dialysis technique.

   d) Give the biological significance of carbohydrates.

   e) Differentiate between unicellular and multicellular organisms.

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

   a) Classify lipids with suitable examples.

   b) Explain the separation of proteins by gel electrophoresis?

   c) Explain the structural features of A, B and Z DNA forms.

Q5) Attempt any two of the following :   **[16]**

   a) Discuss the importance of storage and structural polysaccharides.

   b) Classify Amino acids based on their R group.

   c) Elaborate on the action of competitive and noncompetitive inhibitor on enzyme activity.

✸ ✸ ✸

P246

[3819]-6

F.Y. B.Sc.

BIOTECHNOLOGY

Bb-106 : Biophysics and Instrumentation

(2008 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Draw neat diagrams where required.*

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

a) Using Rydberg's formula calculate wavelength of first and second spectral line of hydrogen spectrum. (Given $R = 1.09678 \times 10^7$ m^{-1})

b) What are radiowaves? Where they are used?

c) State two importance of IR spectroscopy.

d) Find radius of carbon by using imperical formula. (Given $r_0 = 1.3 \times 10^{-15}$m)

e) Give advantages of RIA method.

f) What is difference between enthalpy and entropy?

g) Define :
   i) Reductant potential.
   ii) Chemical potential.

h) State two difference between optical microscope and electron microscope.

Q2) Attempt any four :   **[16]**

a) Explain in short
   i) Principle quantum number (n).
   ii) Orbital quantum number (ℓ).
   iii) Spin quantum number (s).
   iv) Orbital magnetic quantum number (m_ℓ).

b) Describe Hertz experiment to demonstrate electromagnetic waves.

c) State and explain first and second law of thermodynamics.

d) Write short note on resting potential.

e) The resistance of a platinum wire is $5\,\Omega$ at $0°C$ & $6\,\Omega$ at $100°C$ calculate temperature coefficient of resistance.

f) Write short note on Atomic Absorption spectroscopy.

Q3) Attempt any four : **[16]**

a) The series limit wavelength for Balmer series of hydrogen spectrum is $3645\,A°$ calculate value of Rydberg constant.

b) State Lambert-Beer's law and explain use of colourimetry.

c) State limitation of first law of thermodynamics.

d) State principle and construction of platinum resistance thermometers.

e) Explain method to calculate Gibbs free energy change, from equilibrium constant.

f) Explain term spinning electron in vector atomic model.

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

a) What do you meant by non-rigid rotator? Hence obtain expression for energy of non rigid rotator.

b) Describe the construction and working of scintillation counter and describe how it may be utilized in study of nuclear reaction.

c) What is pH? Explain construction and working of pH meter.

Q5) a) Discuss vibrational spectra of diatomic molecules. **[8]**

b) Write short note on : **[8]**
   i) Shell model of nucleus.
   ii) Liquid drop model of nucleus.

OR

a) Write note on : **[8]**
   i) ECG.
   ii) EEG.

b) Discuss scanning electron microscope in brief. **[8]**

✳ ✳ ✳

P247

[3819]-7

F.Y. B.Sc.

BIOTECHNOLOGY

Bb-107 : Microbiology

(New) (2008 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)   Answer the following :   **[16]**

    a)   State two characteristics of fimbriae.

    b)   What are diatoms?

    c)   State two contributions of Antony Van Leuwenhook.

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

    e)   Define: chemoautotrophs. Give suitable example.

    f)   What is meant by lag phase of growth.

    g)   State two examples of sporulating bacteria.

    h)   Enlist two characteristics of yeasts.

Q2)   Attempt any four :   **[16]**

    a)   Write a note on 'negative staining'.

    b)   State the various morphological features of bacteria used in classification.

    c)   Describe the structure of spore with a neat and labelled diagram.

    d)   State the principle and uses of an Autoclave.

    e)   What is a differential medium? Give suitable example.

    f)   Explain 'run' and 'tumble' with respect to bacterial motility.

Q3)   Attempt any four :   **[16]**

    a)   Describe in brief the working of a pH meter.

    b)   Describe the use of very low temperature in preservation of bacteria.

c) State the role of sodium chloride in bacterial media.

d) Describe the fungal spores used in asexual reproduction.

e) Classify bacteria based on their temperature requirement for growth.

f) Describe in brief some viral plant pathogens.

Q4) Attempt any two : **[16]**

a) Describe the use of Petroff Hausser counting chamber for enumeration of bacteria.

b) Explain the mechanism of Lysogeny in λ phage.

c) Explain the mechanism of Gram staining.

Q5) Attempt any one : **[16]**

a) Give a detailed account of Bacterial Flagella with respect to :
    i)   Ultrastructure.
    ii) Composition.
    iii) Location in the cell wall.
    iv) Arrangement.

b) Describe in detail numerical taxonomy in bacterial classification.

✳ ✳ ✳

P248

[3819]-8
F.Y. B.Sc.
BIOTECHNOLOGY
Bb-108 : Uses of Computers
(New) (2008 Pattern)

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

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Figures to the right indicate full marks.*

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

    a)   State the applications of O.S.

    b)   Define the following terms :
        i)   ROM.
        ii)   Software.

    c)   Write the characteristics of computer.

    d)   What is WAN?

    e)   State the term icon.

    f)   State true or false :
        i)   Time sharing system allows to perform multiple applications at a time.
        ii)   All Database softwares supports to provide security.

    g)   Write note on menubar.

    h)   What is Multimedia?

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

    a)   Explain the different objectives of computer in Biotechnology.

    b)   Write note on input devices.

    c)   Explain ISO-OSI model.

    d)   Write note on Server and Workstation.

    e)   Explain mail-merge feature of MS-Word.

    f)   Describe the applications of internet.

Q3) Attempt any four of the following :   **[4 × 4 = 16]**
   a) What are the components of LAN?
   b) Write note on virus with their types?
   c) State the differences between HLL and LLL.
   d) Write note on toolbar.
   e) List the names of storage devices. Explain any one in detail.
   f) Write note on generation of computer.

Q4) Attempt any two of the following :   **[2 × 8 = 16]**
   a) Write note on E-R model with suitable examples of E-R diagram.
   b) Explain the layout of MS-Word.
   c) State the types of graphs in MS-Excel. Explain any one type in detail.

Q5) Attempt the following :   **[16]**
   a) What is an algorithm? Explain the characteristics of algorithm.

                        OR

   Draw a flowchart to find out maximum and minimum of *n* numbers.
   b) Write an algorithm and draw flowchart to find LCM of Z numbers.

                        OR

   Write note on NCBI.

                        ✳ ✳ ✳

P253

[3819] - 202

S.Y. B.Sc.

BIOTECHNOLOGY - II

Bb - 222 : Plant and Animal Tissue Culture

(2008 Pattern) (Sem. - II)

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

Instructions to the candidates:

1)   All questions are compulsory.

2)   Answers to both the sections should be written on separate answer sheets.

3)   Figures to the right indicate full marks.

SECTION - I

Q1) Answer <u>any six</u> in brief :   **[12]**

    a)   Explain the principle of laminar air flow cabinet.

    b)   Differentiate between embryo and embryoid.

    c)   Why are haploids sexually sterile?

    d)   What is habituation?

    e)   Differentiate between hybrids and cybrids.

    f)   Define micropropagation.

    g)   What are cryoprotectants?

    h)   Give important contribution of Haberlandt to plant tissue culture.

Q2) Attempt <u>any three</u> of the following :   **[12]**

    a)   Enlist the growth retardants used in PTC. Add a note on their action.

    b)   Describe the methods for estimation of cell growth in suspension culture.

    c)   Write a note on limitations of micropropagation.

    d)   What are elicitors? How they help increase the production of secondary metabolites?

    e)   What is organogenesis? Explain various factors affecting organogenesis.

P.T.O.

Q3) a) Define biotransformation and discuss its commercial aspects. **[8]**

OR

Describe in detail various methods of protoplast fusion.

b) Give an account of fungal resistance through transgenic plants. **[8]**

SECTION - II

Q4) Answer the following: **[12]**

a) What do you understand by vented and sealed culture vessels? Give one significance of each.

b) Due to load-shedding, the CO_2 incubator experiences changes in temperature, what is effect of temperature variation on cell growth.

c) Enlist the names and benefits of attachment factors and biosubstrates used in cell culture.

d) What are class II biosafety cabinets?

e) Give two significances of balanced salt solutions.

f) What do you mean by low density culture?

Q5) Answer any three of the following : **[12]**

a) Write a note on 'sterilization of liquid by membrane filtration'.

b) Explain the term cGLP.

c) Why do we use serum in ATC?

d) Describe animal protein free media.

e) How can one use Hollow-fibre systems for culturing animal cells?

Q6) a) What are cell repositories? Explain their functioning. **[8]**

OR

Differentiate between batch or perfusion culture verses stirred suspension culture.

b) How will you characterize the given cell line by using : **[8]**
i) Phenotype.
ii) Karyotype.

❖ ❖ ❖ ❖

P254

[3819] - 203

S.Y. B.Sc. (Sem. - II)

BIOTECHNOLOGY

Bb - 223 : English

(Old & New Course) (2008 Pattern)

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

Instructions to the candidates:

   1)   All questions are compulsory.

   2)   Figures to the right indicate full marks.

Q1) a)   We are living in a time of great and continuing changes. The most
obvious feature of the modern world is the enormous development of
science and technology. This has given man a deeper understanding
of Nature, so that there is a possibility of providing a good life to
every human being.

   These great changes have resulted from a number of factors which
are characteristic of the modern age. The first is tremendous growth of
science due the emphasis placed on it in education, and due to the
immense investment that all modern nations are making in scientific
research. Secondly, this development of science is being continuously
applied to improve technology which, in its turn, has revolutionised
agriculture, created modern industry, and transformed all services like
transport, communication, education, health and housing. The wealth,
power and standard of living of a nation therefore now depend directly
on its command over science and technology.

   Thirdly the new technology is itself leading to progress, where
advances in thus there is now a 'circle of progress', where advances in
science lead to improvements in technology, which, in their turn, lead
to still further advances in science. Scientific knowledge is therefore

growing at a tremendous rate at present and is being doubled about every ten years. The obsolescence of knowledge is now so rapid that, in the opinion of Dr. D.S. Kothari, a modern university degree, like a passport, should be valid only for a period of the five years.

     i)   What is the opinion of Dr. D.S. Kothari? Why does he say so?**[2]**

     ii)   Which is the most obvious feature of the modern world? What has it given to mankind?   **[2]**

     iii)   Why there is tremendous growth of science?   **[2]**

     iv)   What do you understand by 'circle of progress'?   **[2]**

  b)   Write a paragraph on 'a true friend'.   **[8]**

<center>OR</center>

My Institution

Q2) a)   Choose the correct form of verb and rewrite the sentence (any four): **[4]**

     i)   John (have) breakfast at the moment.

     ii)   It (rain) a lot in this part of the country.

     iii)   Vinod generally (sit) at the back.

     iv)   The students (enjoy) his speech the other day.

     v)   Leena (learn) French since 2009.

  b)   Put 'the', 'a/an' and complete the sentence (any four). If no article is required put 'X'.

    [4]

     i)   Mr. Smith is ____ honest man.

     ii)   ____ Indian ocean is to the south of India.

     iii)   God created ____ man.

     iv)   Seema took ____ inkpot from the drawer.

     v)   Dharma can ride on ____ bicycle.

  c)   Use the following pairs of words and make sentences (any four) : **[4]**

     i)   cite / site

     ii)   brake / break

     iii)   affect / effect

     iv)   beside / besides

   v) foul / fowl

 d) Express the followings in one word (any four) :   **[4]**

   i) A cup board in which one hangs clothes.

   ii) A wide road with trees on each side.

   iii) A judge in a lower court.

   iv) One who studies the weather.

   v) One who leaves his own country to settle in another.

Q3) a) Write a precis of the following paragraph.   **[8]**

   Individuals constitute society which has certain ideas, models & norms in general in respect of behaviour, conduct duties & responsibilities towards one another. Love to humanity, universal brother hood, sincerely, honesty & integrity of character, firm attitude of rendering help & doing actions & works in general benefit etc. are some of the constituents of healthy social life. True education aims at developing individuals into social beings having these virtues. Schooling is a preparatory stage for cultivating the sense of social values. For example in the laboratories where students work in cooperative way develop scientific attitude towards social life.

   In libraries while sitting together for study by self they practice patience. In the hostel students while leading a corporate life imbibe the spirit of living together like brothers, behave harmoniously sinking their differences & experience what the members of the society do for adhesion to human & humane feelings. Activities correlated with academic aspects afford them opportunities for bringing about their physical & intellectual development, strengthening common bonds of spirit. Activities like N.C.C. & N.S.S. Boys Scout & Girls Guide help the students to develop themselves physically & include in them the patriotic virtues & enthuses in them preparedness for safety & security of the country at the time we need.

Thus we impart social values to the students in our school systems.

b) Write experimental record of Beta oxidation of fatty acids. **[8]**

Q4) a) Look at the following graph and answer the questions given below. (Draw the graph neatly and then answer in full sentence) **[8]**
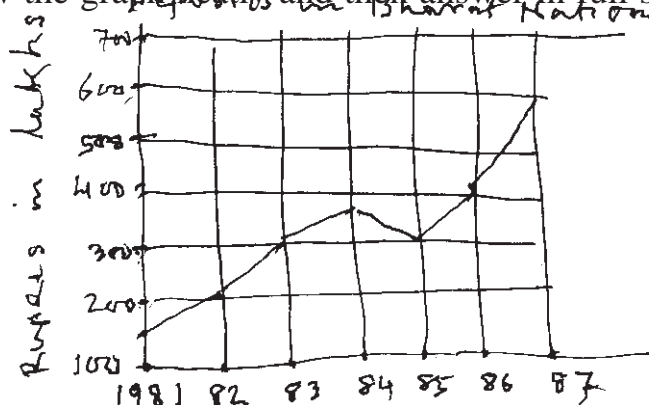
i) In which year the deposits in the bank were highest.
ii) Which year shows the downward trend and by how much.
iii) What were the deposits in 1981?
iv) By what amount did deposits increase from 1983 to 1984.

b) Write the experimental records of onion root tips in studying mitosis. **[8]**

Q5) a) Write a letter to the Head of your Institution requesting him/her to give your class a permission to attend the seminar which will be held at Malegnon, Tal Baramati on 'the role of Bio technology on sugar cane farming'. **[8]**

OR

You are staying in a hostel. Write a letter to your parents about the coming exam.

b) Form new words from prefixes and suffixes **[8]**

Prefixes	Suffixes
extro _____	_____ age
mal _____	_____ ry
vice _____	_____ wise
counter _____	_____ some

P255

[3819] - 204

S.Y. B.Sc. (Sem. - II)
BIOTECHNOLOGY
Bb - 224 : Metabolic Pathways
(New Course) (2008 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 diagram wherever necessary.
　　4)　Use of color pensils restricted to diagrams.
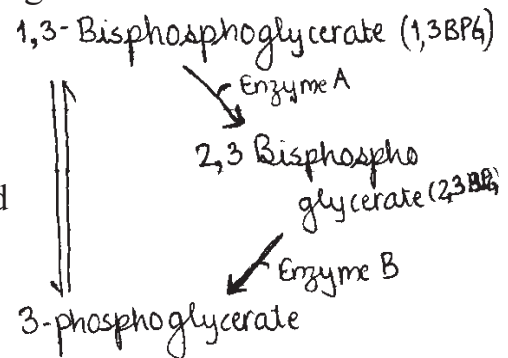
Q1) Attempt the following as directed :　　　　　　　　　　　**[20]**

　　a)　Match the enzymes that degrade glycogen in the left column with appropriate properties from right column

　　　　i)　Phosphorylase　　　　　　A)　Is part of a single polypeptide with 2 activities.

　　　　ii)　α-1, 6 glycosidase　　　　B)　Cleaves α,-1, 4 glycosidic bond

　　　　iii)　Transferase　　　　　　　C)　Releases glucose

　　　　　　　　　　　　　　　　　　　D)　Releases glucose-1phosphate

　　　　　　　　　　　　　　　　　　　E)　Moves 3 sugars from 1 chain to other

　　　　　　　　　　　　　　　　　　　F)　Requires ATP.

　　b)　What two properties make triacylglycerols more efficient than glycogen for storage of metabolic energy?

　　c)　Galactose metabolism involves following reactions :

　　　　i)　Galactose + ATP $\longrightarrow$ Galactose-1phosphate + ADP + H$^+$

　　　　ii)　?

　　　　iii)　UDP-galactose $\rightleftharpoons$ UDP-glucose

　　　　　　A)　Write reaction for step (ii)

　　　　　　B)　Which step is defective in galactosemia?

　　　　　　C)　Which enzymes catalyze steps (i), (ii) and (iii)?

　　　　　　D)　How is NAD$^+$ involved in the reaction in step (iii)?

d) Examine the reaction scheme in the margin :
   i) Name the enzyme A and B
   ii) The two phosphate groups on 1,3-BPG appear on 2,3-BPG, after reaction catalyzed by enzyme A, true or false? Give reasons.

1,3- Bisphosphoglycerate (1,3BPG)

↳ Enzyme A

2,3 Bisphospho glycerate (2,3BPG)

↳ Enzyme B

3-phosphoglycerate

Q2) Write notes on (Any 3) :   **[15]**
   a) Major Biochemical roles of nucleotides.
   b) Significance of pentose phosphate pathway.
   c) Peter Mitchell's chemiosmotic hypothesis.
   d) Boyer's binding change mechanism.

Q3) Attempt as instructed :   **[15]**

Pyruvate ⇌ⓐ Oxaloacetate ⇌ⓑ Malate ⇌ⓒ Oxaloacetate ⇌ⓓ Phosphoenol pyruvate

Match capital letters indicating the reactions of glyconeogenic pathway with following statements
   a) Occurs in the mitochondria _____
   b) Occurs in cylosol _____
   c) Produces CO_2 _____
   d) Consumes CO_2 _____
   e) Requires ATP _____
   f) Requires GTP _____
   g) Requires Biotin cofactor _____
   h) Is an anaplerotic reaction _____

OR

Explain in detail, the β-oxidation of 16:0, give its energetics.

Q4) a) How urea cycle is connected to TCA cycle? Explain.   **[7]**
   b) What are transamination reactions? Explain with the help of SGOT & SGPT.   **[8]**

OR

Explain Z-scheme of photosynthesis.

Q5) a) Illustrate role of NAD^+ and FAD^+ in biological oxidation reduction reaction. **[7]**

b) How fatty acids are synthesized in cells? **[8]**

OR

Explain the following regulatory mechanisms that control enzyme activity.

a) Allosteric interactions.

b) Phosphorylations.

c) Proteolytic activations.

❖ ❖ ❖ ❖

P256

[3819] - 301
T.Y. B.Sc. (Sem. - III)
BIOTECHNOLOGY
Bb - 331: Microbial Biotechnology
(2008 Pattern & 2004 Pattern/Common) (Old & New Course)

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

Instruction to the candidates:

1) *Question No.1 is compulsory.*
2) *Attempt any four out of the remaining questions.*
3) *Draw neat diagrams wherever necessary.*
4) *Figures to the right indicate full marks.*

Q1) Answer all questions in 2-4 lines.   **[20]**
   a) Define yield coefficient.
   b) Name four pathogens that cause gastroenteritis.
   c) Define auxotroph with suitable example.
   d) Define pasteurization.
   e) Enlist four advantages of intestinal flora.
   f) What is the significance of nutrient removal in tertiary treatment of waste water?
   g) State the use of Baculoviruses in Agriculture.
   h) A HIV positive patient's blood may contain thousands of different variants of HIV-explain.
   i) Enlist four extrinsic factors affecting growth.
   j) What is substrate level phosphorylation?

Q2) Answer all questions:
   a) Justify-the growth rate in chemostat is always below μmax value.   **[7]**
   b) Compare and contrast-fed batch and continuous culture.   **[8]**

Q3) a) Define lithotrophy and explain in brief physiological groups of lithotrophs.   **[7]**
   b) Describe regulation of tryptophan operon with suitable diagram.   **[8]**

Q4) a) Enlist sexually transmitted diseases and explain any one in detail. **[7]**

b) Describe the mode of action of antiviral agents acting on DNA synthesis.
[8]

Q5) a) Describe activated sludge process for waste-water treatment with suitable diagram. **[7]**

b) Explain spoilage of milk with respect to colour and flavour defects. **[8]**

Q6) a) Justify-Microbes can be used to meet the rising demand of food requirement of the world. **[5]**

b) Describe with the help of a flow diagram a sewage treatment plant and describe it in brief. **[10]**

Q7) Write short notes on. **[15]**

a) Specialized transduction.

b) Normal flora of the vagina.

c) YATP.

❦ ❦ ❦

P257

[3819] - 302
T.Y. B.Sc. (Sem. - III)
BIOTECHNOLOGY
Bb - 332: Animal & Plant Development
(New Course) (2008 Pattern)

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

Instructions to the candidates:

    1)   Answers to each section should be written in separate answer books.

    2)   Question No.1 & Q.No.5 are compulsory. From remaining questions attempt <u>any two</u> from <u>each</u> section.

<u>SECTION - I</u>
(Plant Development)

Q1) Explain the term with respect to plant development.   **[10]**
    a)   Dedifferentiation.
    b)   Promeristem.
    c)   Megasporogenesis.
    d)   Anatropousovule.
    e)   Plant hormone.

Q2) a)   Define transgenic plant? Explain any two techniques in detail with suitable diagram.   **[8]**

    b)   What is somatic embryogenesis? Explain different stages of somatic embryogenesis with suitable diagram.   **[7]**

Q3) a)   Write in detail the role of floral identity genes in floral patterening in <u>Arabidopsis</u> <u>thaliama.</u>   **[8]**

    b)   Comment on "Meristem development is dependent on signals from other parts of the plant".   **[7]**

Q4) Write notes on: **[15]**
    a)   Role of Cytokinin & Absissic acid in plant development.
    b)   Distinguish the growth pattern in animal & plant development.
    c)   Abnormal development in plant.

SECTION-II
(Animal Development)

Q5) Explain the terms.   **[10]**
  a) Determination.
  b) Competence.
  c) Transgenic animals.
  d) Progenitor cells.
  e) Apoptosis.

Q6) a) Describe the process of Gastrulation in frog and add a note on fate of the three germinal layers.   **[8]**

  b) Explain the terms - Differentiation, De-differentiation, Re-differentiation and Trans-differentiation with the help of limb regeneration system.   **[7]**

Q7) a) Describe in detail the process and significance of "Fertilization of Ovum".   **[8]**

  b) What is ageing? Describe ageing as a developmental process, with suitable example.   **[7]**

Q8) a) Compare and contrast monoclonal and polyclonal antibodies.   **[7]**

  b) Describe in detail the "Immunoglobulin Genes".   **[8]**

P258

[3819] - 303
T.Y. B.Sc
BIOTECHNOLOGY
Bb - 333: Biodiversity & Systematics
(Sem. - III) (New Course) (2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 80*
Instructions to the candidates:

1) *Question No.1 is compulsory.*

2) *Answer any four out of remaining questions.*

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

Q1) Attempt the following.   **[20]**

a) Define commensalism. Give one example.

b) Explain transect method of sampling.

c) What is home range.

d) Define T_m value.

e) Explain geographical isolation.

f) Mention the mathematical formula used to calculate the Jaccards similarity coefficient.

g) What is bioprospecting.

h) Explain Binomial Nomenclature.

i) Define National park. Give two examples.

j) What is Niche.

Q2) a) Explain the concept that "Taxonomy today is multi disciplinary synthetic discipline of biological sciences.   **[8]**

b) Write the role of various organization in conservation.   **[7]**

Q3) a) Explain basic behavioral pattern in plants. **[8]**

b) "Chemistry as a tool, is more effective for classification of microbes then plants or animals" Justify. **[7]**

Q4) a) What are various ways to recover population of a particular species on the verge of extinction? **[8]**

b) What is age structure of population? Describe characteristics of decling population **[7]**

Q5) a) Define Biome. Describe grassland & tundra biomes in detail. **[8]**

b) Describe acts/laws implemented for conservation of nature. **[7]**

Q6) Write short notes on. **[15]**

a) Territory.

b) Beta diversity.

c) Artificial classification.

✈ ✈ ✈

P259

[3819] - 601
S.Y. B.Sc
BIOTECHNOLOGY
Bb - 221: Molecular Biology
(Sem. - I) (2004)

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.*

   4)   *Use of color pensils restricted to diagrams.*

Q1) Attempt the following in 2 - 3 sentences.   **[10 x 2 = 20]**

   a)   What are nucleosomes?

   b)   Define genetic code, enlist its properties.

   c)   Distinguish between ER bound ribosomes & free ribosomes.

   d)   How attenuation regulates tryptophan operon?

   e)   What are N-linked and O-linked glycoproteins?

   f)   Illustrate -10 & -35 sequences in transcription.

   g)   Give the roles of topoisomerases and gyrases in DNA replication.

   h)   Write the mechanism of alkylating agents causing transversion mutation.

   i)   Enlist four distinguishing features of A and B forms of DNA.

   j)   What is rho independent termination of transcription?

Q2) Give reasons for the following (any five)   **[5 x 3 = 15]**

   a)   SOS repair is the last source of repair.

   b)   H1 histone acts as linker molecule in DNA packaging.

   c)   Viruses can be classified on the bases of their genomes.

d) DNA replication of eukaryotes has multiple ori of replication.

e) Caperones help in protein folding.

f) LINEs and SINEs are repetative mammalian DNA.

Q3) Write short notes on any three of the following. **[3 x 5 = 15]**

a) Overview of the arabinose operon.

b) Polytene chromosome.

c) Junk DNA.

d) Site specific recombination.

e) Rec A dependent repair.

Q4) a) Describe the function of stop-transfer sequences. **[8]**

OR

a) Sketch the SRP cycle and relate it to ribosome cycle.

b) Outline the distinguishing properties of class I and class II amino acyl tRNA synthases. **[7]**

OR

b) Discuss the role of 5 Bromouracil as base analog & a candidate for mutating DNA.

Q5) Attempt the following in 8 - 10 sentences. **[15]**

a) List the substrates and reaction mechanism of ligases.

b) Distinctive features of DNA pol III holoenzyme.

c) β clamp increases processivity of replication.

P260

[3819] - 602
S.Y. B.Sc
BIOTECHNOLOGY-II
Bb - 222: Plant and Animal Tissue Culture
(24082) (Sem. - II) (2004)

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

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Answers to both the sections should be written on separate answer sheets.*

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

SECTION-I

Q1) Answer <u>any six</u> in brief.   **[12]**

   a) Give contribution of Guha and Maheshwari to PTC.

   b) Differentiate between direct and indirect embryogenesis.

   c) Explain totipotency of plant cells.

   d) Enlist the controlled environmental conditions maintained in PTC laboratory.

   e) Enumerate applications of suspension culture.

   f) Differentiate between a chemostat and a turbidostat.

   g) Enlist advantages of micropropagation.

   h) Define biotransformation.

Q2) Attempt <u>any three</u> of the following.   **[12]**

   a) Describe the protocol for haploid production in PTC.

   b) What is a subculture? Why it is so important?

   c) Comment on growth of cells in suspension cultures.

d)   Write a note on habituation of cultures.

e)   Explain the significance of somaclonal variations.

Q3) What do you understand by long term storage of germplasm? Describe different methods used for it.   **[8]**

<div align="center">OR</div>

a)   Give a detailed account of herbicide resistance through transgenic plants.

b)   Give an account of production of symmetrical & asymmetrical hybrids.

                                                                        [8]

<div align="center">

SECTION-II

</div>

Q4) Answer <u>any six</u> of the following.

What do you understand by_   **[12]**

   a)   Aberrations, in light microscopy.

   b)   Adherent cells.

   c)   Ageing of cells in culture.

   d)   Aggregate culture.

   e)   Balanced salt solution.

   f)   Batch culture.

   g)   Cytogenetic analysis.

   h)   Cyropreservation.

Q5) Write notes on <u>any three</u> of the following.   **[12]**

a)   Laminar Airflow cabinets.

b)   Suspension cultures.

c)   DMSO-as cryoprotectant.

d)   Un differentiate cell lines.

e)   Significance of cell fusion.

Q6) a)   Explain in detail 'organ culture'. Give its applications advantages of 'serum free media'.   **[8]**

b)   Give the design concept, layout and maintenance of ATC lab.   **[8]**

<div align="center">✈ ✈ ✈</div>

P261

[3819] - 603

S.Y. B.Sc. (Sem. - II)

BIOTECHNOLOGY

Bb - 223 : English

(Old & New Course) (2004 Pattern)

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

Instructions to the candidates:

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

Q1) a) Socrates taught that "the man who is master of himself is truly free". By being master of oneself he meant first knowing oneself. One's faults and weaknesses and one's good points, without making any pretence and without being vain, and then being able to control oneself. This knowledge of himself was what helped a man to be courageous, and the courageous man has very important sort of freedom from fear. Socrates himself, because he was not afraid of the consequences, always felt free to teach what he thought was right, however unpopular this might make him with the powerful people in Athens.

No wonder all his pupils loved Socrates. But he made some dangerous enemies by his strange ways of teaching and asking questions. Some of the rulers in Athens did not like people to be encouraged to ask questions for fear they would begin asking questions about what their rulers were doing. So they accused Socrates of teaching young men wicked things and leading them to throw off their religion. This was false for in fact Socrates was a very religious man. At last his enemies had him arrested, and he was condemned to death. **[8]**

   i) According to Socrates, what type of man is truly free? and why?

   ii) What was Socrates accused of ?

   iii) How did Socrates have enemies?

   iv) Why did some rulers dislike people to be encouraged to ask questions?

b) Expand the following ideas **[8]**

   i) A true citizen.

   ii) Where there is will there is a way.

P.T.O.

Q2) a) Fill in the blank and complete the following table (any four) : **[4]**

Noun	Verb	Adjective
____	excel	____
____	____	civilian
mad	____	____
____	____	nobility
____	harden	____

b) Fill in the blanks with 'the', 'a | an' wherever necessary. (Where no article is needed put 'X'). **[4]**

____ Calcutta is one of biggest city in ____ India. ____ city is always crowded. I live here and go to ____ office by ____ bus. I have to wait ____ long time at ____ bus stop. I have ____ son.

c) Rewrite the following sentences in simple language (any four) : **[4]**
   i) Fuel tank deformation was present.
   ii) Accident frequency depends on the adequacy of roadway visibility.
   iii) There is adequate access for men and material.
   iv) The police were asked to make an investigation in that matter.
   v) Will you please terminate the illumination.

d) Mention the parts of speech of the underlined words (any four) : **[4]**
   i) We flew <u>above</u> the clouds.
      Will you please see <u>above</u>?
   ii) I have a pain in the <u>back</u>.
      I will come <u>back</u> in five minutes.
   iii) The little girl fell <u>down</u>
      While she was running <u>down</u> the hill.
   iv) The earth is <u>round</u>.
      We won the first <u>round</u> of cricket match.
   v) Stand <u>up</u> when the teacher enters.
      We climbed <u>up</u> the hill.

Q3) a) Draw Pie graph showing rendership of four magazines : **[8]**
   i) Pictorial weekly 15%
   ii) Illustrated weekly 40%
   iii) Life magazine 25%
   iv) Saptahik sukal 20%

b) Write the experimental record of separation of cell-organelle using centrifugation. **[8]**

Q4) a) Write a letter to your friend and mention why you preferred 'Bio-technology' as your subject for graduation. **[8]**

OR

What do you understand by 'editing' and what is its importance?

b) Mention the parts of speech of the underlined words in the following sentences (any four) **[8]**
   i) Last month, <u>we</u> had a continual <u>round</u> of parties.
   ii) <u>What</u> time is the next <u>up</u> train?
   iii) Let us book <u>five</u> sents <u>for</u> sunday's matinee.
   iv) Gopal <u>climbs</u> <u>like</u> a cat.
   v) <u>Sunita</u> worked by the <u>light</u> of a candle.

Q5) a) Make a note of the following passage : **[8]**
Morality is social. All our actions are subject to the judgement of the community in which welive. We are held accountable for what we do morality is considered as social because other people by their responses may approve our behaviour or may disapprove it. Both what we do & the reaction of the society are social facts. Hence morality is social. It deals with what is good & what is evil. What is right & what is wrong. It (morality) deals with rights, duties & virtues of the people living in a society. Moral consciousness is the self awareness of the character of an action as right or wrong. Moral consciousness leads an individual towards spiritualisation. Spiritualism, therefore, is an inner realization of spirit. Morality helps mankind to understand the difference between good & evil & respect the diginity of other people. Spiritualism on the other hand helps people to enter more & more fully into the spiritual realm. Spiritual values are eternal & unchanging. To realize these eternal values man takes the help of moral values. Which refines his behaviour & conduct.

b) Write a report on 'Laboratories' in your college. **[8]**

OR

Write a summary of the 'social service camp' you attended recently.

❖ ❖ ❖ ❖

P262

[3819] - 702

T.Y. B.Sc. (Sem. - III)
BIOTECHNOLOGY
Bb - 332: Recombinant DNA Technology
(Old Course) (2004 Pattern)

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

Instructions to the candidates:

   1)   *Question No.1 is compulsory.*

   2)   *Attempt any four from the remaining.*

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

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

   a)   Mention any two characters of an ideal host for cloning.

   b)   State the role of polylinker in genetic engineering.

   c)   Write the full forms of the following:

       i)   RAPD   ii)   MAC

   d) $\dfrac{A[260]}{A[280]}$ is used in checking the DNA purity. Justify.

   e)   What is the role of S_1 nuclease in r-DNA technology?

   f)   What is insertional inactivation?

   g)   Write the functions of the following in DNA extraction.

       i)   Chloroform.   ii)   SDS.

   h)   Enlist the radioactive & non-radioactive probes used in nucleic acid labelling.

   i)   Define phagemid.

   j)   What is an expression vector?

Q2) a) Explain the role of restriction enzymes in genetic engineering. **[7]**

b) Explain the applications of PCR technology. **[8]**

Q3) a) Explain the western blotting technique. **[7]**

b) Elaborate on any one method of clone screening. **[8]**

Q4) a) Explain the production of any one recombinant vaccine. **[8]**

b) Describe the factors affecting the efficiency of PCR technique. **[7]**

Q5) a) Explain the construction of a genomic library. **[10]**

b) How is the molecular weight of plasmids determined. **[5]**

Q6) Write short notes: **[15]**

a) cDNA.

b) Colony hybridization.

c) Application of genetic engineering in plants.

P263

[3819] - 703
T.Y. B.Sc. (Sem. - III)
BIOTECHNOLOGY
Bb - 333: Biodiversity and Systematics
(Old Course) (2004 Pattern)

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

Instruction to the candidates:

1)   *Question No.1 is compulsory.*

2)   *Answer any 4 out of the remaining questions.*

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

Q1) Attempt the following.   **[20]**

a)   What is ecological equivalence?

b)   Define 'Autecology'.

c)   Enlist any two markers used for chemotaxonomy.

d)   Explain the term 'Ecotone'.

e)   Mention the mathematical formula used to calculate the 'Shannon index' with appropriate explanation of the terms used in it.

f)   What is carrying capacity?

g)   Define community.

h)   Define Ecosystem.

i)   Explain the concept of sanctuary.

j)   What is mutualism? Mention an example.

Q2) a) Explain 5 kingdom classification system. **[8]**

b) Describe various methods to assess species diversity. **[7]**

Q3) a) What is 'In-Situ' conservation? Describe various methods used to achieve it. **[8]**

b) Elaborate different growth forms for a population. **[7]**

Q4) a) Describe the role of 'Morphological keys' in Taxonomy. Add a note on their limitations. **[8]**

b) Describe the concept of Biological clock with suitable examples. **[7]**

Q5) a) What are Biomes? Explain desert and forest biomes in detail. **[8]**

b) What is age structure? Describe the characteristics of expanding population. **[7]**

Q6) Write short notes on: **[15]**

a) Role of cell wall in Bacterial classification.

b) Biogeographic regions.

c) Various levels of Biodiversity.

P264

[3819] - 801

T.Y. B.Sc. (Sem. - IV)

BIOTECHNOLOGY

Bb - 341: Large Scale Manufacturing Processes

(Old 2006 & 2004 Pattern) (Back log)

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

Instructions to the candidates:

  1)   *Q.1 is compulsory. Attempt any four out of the remaining questions.*

  2)   *Draw well labelled diagrams wherever necessary.*

  3)   *Answers to the sub questions are to be written together.*

  4)   *Figures to the right indicate full marks.*

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

  a)   What are high value - low volume products? State the role they play in economy with an example.

  b)   Enlist the various materials used in bioreactor construction. Mention any two surface treatment procedures used in designing of the fermenter.

  c)   'Multiple filters are used in air sterilization'. Justify with reasons.

  d)   What is biotransformation? State the use of immobilized cells in biotransformation.

  e)   State the principle of the foam sensing & control unit of a bioreactor.

  f)   Mention the various methods of cell disruption used in a bioprocess.

  g)   'Penicillin production involves precursor addition in media'. State the reasons with an example.

  h)   Enlist the vitamins produced by bioprocesses. Mention the production strains used.

  i)   Mention the tests to be conducted for the quality assurance of a novel antibiotic produced by a bioprocess.

  j)   What are the factors contributing to the pricing of a product?

P.T.O.

Q2) a) What is solid state fermention? Explain the media used, factors affecting the process and use of selective strains with examples. **[7]**

b) Explain the various strategies of running a fed-batch process. **[8]**

Q3) a) Explain the design & working of a computer controlled fermenter with the help of a diagram. **[10]**

b) 'Del factor as a sterilization criterion'. Justify. **[5]**

Q4) a) State the role of chromatography in downstream processing. Explain the principle of affinity and ion-exchange chromatographic seperations with examples. **[8]**

b) Explain the role of impellers in a bioreactor. Write an account of their specifications in designing & the factors influencing their design. **[7]**

Q5) a) Explain the large scale production of any one amino acid as a flow sheet only with a note on the role of auxotrophic mutants in these productions using an example. **[8]**

b) Explain the various strategies used in making a bioprocess, an economically viable process. **[7]**

Q6) a) Describe the production of FMD vaccine. **[5]**

b) Diagrammatically represent the counter-current solvent extraction method. **[5]**

c) Explain the fixed and variable costs in a bioprocess. **[5]**

Q7) Write short notes on. **[15]**

a) Cell immobilization by covalent binding.

b) SOPs of a bioprocess.

c) Mass & energy balances of a bioprocess.

❧ ❧ ❧

P265

[3819] - 802

T.Y. B.Sc. (Back log)

BIOTECHNOLOGY

Bb - 342: Applications of Biotechnology in Agriculture & Health

(Sem. - IV) (Old 2006 Course) (2004 Pattern)

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

Instructions to the candidates:

1) *Q.1 from each section is compulsory.*

2) *Attempt any two questions out Q.2, Q.3 and Q.4 from each section.*

3) *Answer to each section should be written on separate answer books.*

4) *Figures to the right indicate full marks.*

5) *Draw neat and labelled diagrams if necessary.*

SECTION - I

(Agriculture)

Q1) Explain the terms: **[10]**

     a)   Ti plasmid.

     b)   Clonal propagation.

     c)   QTL.

     d)   Green house technology.

     e)   GM Food.

Q2) a)   Explain the steps involved in cryopreservation of germ plasm. Give note on its application.   **[8]**

     b)   List methodologies of gene transfer in crop plants & explain any two of them.   **[7]**

Q3) a) What is patent? Explain the procedure of patent with example. **[8]**

b) Justify "Risk assessment while introducing genetically modified products is essential. **[7]**

Q4) a) What are molecular markers? Explain their application in RFLP analysis. **[8]**

b) Explain use of micropropagation in Agriculture. **[7]**

SECTION-II

(Health)

Q1) Attempt the following : **[10]**

a) Enlist the applications of animal cell cloning.

b) Define molecular marker.

c) Give the names of any four human diseases for which RFLP based diagnostic tools are available in market.

d) Enlist any four advantages of serum free animal cell culture.

e) What are edible vaccines.

Q2) a) What are monoclonal antibodies? Explain how they are produced by hybridoma technology. **[8]**

b) What are recombinant vaccines? Explain the steps involved in production of any one recombinant vaccine. **[7]**

Q3) a) What is RFLP? Write the steps involved in preparation of RFLP maps. **[8]**

b) Explain the role of PCR in diagnostics. Write its limitations as a diagnostic tools. **[7]**

Q4) Write Short Notes on: **[15]**

    a)   Micromanipulation.

    b)   Distinguish between serum containing medium and serum free medium.

    c)   Distinguish between conventional vaccines and recombinant vaccines.

❦ ❦ ❦

P266

[3819] - 803

T.Y. B.Sc. (Sem. - IV)
BIOTECHNOLOGY
Bb - 343: Animal and Plant Development
(Back log) (2006 Old Course)

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

Instructions to the candidates:

1) *Q.1 from each section is compulsory.*
2) *Attempt any two questions out of Q.2, Q.3 and Q.4 from each section.*
3) *Answers to each section should be written on separate answer books.*
4) *Figures to the right indicate full marks.*
5) *Draw neat and labelled diagrams if necessary.*

SECTION - I
(Animal Development)

Q1) Explain the terms: **[10]**
   a) Trans determination.
   b) Teratogenesis.
   c) Organiser.
   d) Polyspermy.
   e) Competence.

Q2) a) Describe the process of spermatogenesis.   **[7]**
   b) Describe different types of egg on the basis of quantity and distribution of yolk.   **[8]**

Q3) a) Describe the technique of animal cloning with reference to "Dolly". **[7]**
   b) Write a note on genetic basis of antibody diversity.   **[8]**

Q4) a) Describe the process__Dedifferentiation__Transdifferentiation/ Redifferentiation, using Regeneration system as a model.   **[8]**
   b) Describe the process of ageing.   **[7]**

Q1) Explain the following terms with reference to plant development. **[10]**
   a) Organogenesis.
   b) Competence.
   c) Protoderm.
   d) Cytokinins.
   e) Quiescent centre.

Q2) a) What are homeotic mutants? How are they useful in understanding reproductive development in plants. **[8]**

   b) Describe the steps involved in regeneration of protoplasts in plants. Explain factors involved in it. **[7]**

Q3) a) Give the name of different plant hormone. Explain the role of two of them during developmental processes. **[8]**

   b) What is somatic embryogenesis? Compare the somatic embryogenesis between Monocotyledons & Dicotyledons. **[7]**

Q4) Write notes on: **[15]**
   a) Apoptosis in plant cells.
   b) Shoot patterning.
   c) Dedifferentiation.

❧ ❧ ❧