[4819] - 101

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

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

Instructions to the candidates:

   1)   *All questions are compulsory.*

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

   3)   *Draw neat labelled diagram wherever necessary.*

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

   a)   What are F^1 plasmids?

   b)   Difference between Transition and Transversion.

   c)   Define Karyotype?

   d)   What is aporepressor?

   e)   Define Expressivity?

   f)   What are lethal genes?

   g)   Describe characteristics of klinefilter syndrome.

   h)   Define Linkage?

   i)   What is polyploidy?

   j)   What is autosomal recessive inheritance?

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

   a)   What is an epitope?

   b)   Give role of Antigen Presenting Cells.

   c)   What is Isotype?

   d)   Significance of IgA.

   e)   Define type II Hypersensitivity. Give an example.

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

   a)   What are mutagens? Explain mechanism of mutation caused by any two chemical mutagens.

   b)   Explain complementary genes with a suitable example.

   c)   What is transposon? Explain transposons in maize and humans.

   d)   State Hardy Weinberg's Principle. Give its applications.

Q4) Attempt any Three: [3 × 5 = 15]

   a)   Explain inversion and its types.

   b)   Write a note on Sexduction.

   c)   Explain three point cross. How it is used to determine gene - order.

   d)   What is a plasmid? Enlist and explain various properties of bacterial plasmids.

Q5) Attempt any one :   [1× 10 = 10]

   a)   Discuss in detail the structure and mechanism of Lac operon. Add a note on catabolite repression.

   b)   With a neat labelled diagram explain the process of conjugation in bacteria.

Q6) Attempt any two :   [2 × 5 = 10]

   a)   Differentiate between Innate and Acquired Immunity.

   b)   Explain the structure and function of lymph node ?

   c)   Write advantages and disadvantages of attenuated live and killed vaccines.

   d)   Give an account of Rocket immunoelectrophoresis.

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[4819] - 102

S.Y. B.Sc.

BIOTECHNOLOGY (Semester - I)

Bb - 212 : Cell Biology

(2013 Pattern)

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

Instructions to the candidates:

    1)   *All questions are compulsory.*

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

    3)   *Draw neat labelled diagrams wherever necessary.*

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

    a)   What is restriction point in cell cycle?

    b)   Mention major lipid components in plasma membrane.

    c)   Justify role of chromosome condensation prior to metaphase.

    d)   Enlist functions of plant vacuoles.

    e)   What are integrins?

    f)   Explain the role of gap junction.

    g)   Define facilitated diffusion.

    h)   What are proto oncogenes?

    i)   Explain 'neoplasia'.

    j)   Membrane depolarization in neurons.

Q2) Short notes (Any Three)   **[3 × 5 = 15]**

    a)   'Fluid Mosaic Model' of plasma membrane.

    b)   How anaphase - I of meiosis is different from anaphase of mitosis.

    c)   ATP synthase complex.

    d)   'Plant Cell Wall'.

Q3) Attempt Any Three: [3 × 5 = 15]

    a)   Write structure & function of glyoxysomes.

    b)   What is Glycocalyx.

    c)   Write a note on endocytosis.

    d)   What are clathrin - coated vesicles.

Q4) a)   Describe electron transport chain in mitochondria.   **[7]**

    b)   Describe the role of cyclins & cdks in regulation of cell cycle.   **[8]**

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

    a)   Explain chemiosmotic theory of ATP synthesis.

    b)   Give a detailed account on plasma membrane receptors.

Q5) a)   Write a note on protein targetting to nucleus.   **[7]**

    b)   Detail the process of meiosis.   **[8]**

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

    a)   Describe the intrinsic pathway of apoptosis.

    b)   Ultrastructure of nucleus.

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

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

Instructions to the candidates:

   1)   *All questions are compulsory.*

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

   3)   *Draw neat labelled diagrams wherever necessary*

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

   a)   Define the term synecology.

   b)   What is biogeography?

   c)   Write reactions involved in ozone depletion.

   d)   Define the term pedology.

   e)   What is phycoremediation?

   f)   Red data book.

   g)   Write any two applications of remote sensing.

   h)   Define Hydrosere.

   i)   What is integrated waste management?

   j)   Define the term biosphere.

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

   a)   Food chain and Food web.

   b)   Biomedical waste.

   c)   Structure of Atmosphere.

   d)   Bioactivation.

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

    a)   Explain carbon cycle with neat labelled diagram.

    b)   What is biosensor? Describe use of biosensors in environmental monitoring.

    c)   With suitable exmple explain evolution of terrestrial ecosystem.

    d)   What is Hazardous waste? Write threats caused by it to the ecosystem.

Q4) a)   Elaborate inter and intra community factors affecting ecosystem. **[8]**

    b)   Explain Forest conservation Act (1980). Add note on merits and demerits of it. **[7]**

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

    a)   Discuss various methods involved in <u>in - Situ</u> Conservation.

    b)   What is climax community? Give a review of various theories of climax.

Q5) a)   Enumerate in detail the causes and effects of water pollution. **[8]**

    b)   What is EIA? Explain EIA with case study. **[7]**

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

    a)   Define the term 'bioremediation'. Give an account of bioremediation technique.

    b)   Give an account of biogeographic regions of India.

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[4819] - 201

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

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

Instructions to the candidates:

1) *All questions are compulsory.*

2) *Draw neat labelled diagrams wherever necessary*

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

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

a) What is r RNA?

b) Comment on role of Enhancer.

c) Write exceptions to Central Dogma.

d) Give any two examples of inhibitors of translation and their mode of action.

e) Define signal peptide.

f) Write the role of gyrase and RNA polymerase.

g) What is a DNA tautomer.

h) Comment on the concept of pseudogene.

i) What is a telomere.

j) Write the conclusion of experiment performed by Hershey and chase.

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

a) Base excision repair.

b) Degenaracy of codon.

c) Viral Genome organization.

d) Salient features of watson and crick model.

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

    a)   Write a note on structure and function of ribosomes in eukaryotes.

    b)   Explain the process of post translational protein translocation.

    c)   Write a note on glycosylation.

    d)   Explain Clover leaf model of tRNA.

Q4) Answer any one　　　　　　　　　　　　　　　　　　　　　　　**[1 × 15 = 15]**

    a)   Describe in detail the process of translation in prokaryotes.

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

    b)   Comment on various models of DNA replication. Elaborate Meoselson and stahl experiment.

Q5) Answer any one　　　　　　　　　　　　　　　　　　　　　　　**[1 × 15 = 15]**

    a)   Give a comparative account of transcription in prokaryotes and eukaryotes.

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

    b)   Explain in detail the organization of Genome from DNA to chromosomes.

<div align="center">❀ ❀ ❀</div>

[4819] - 202

S.Y. B.Sc. (Semester - II)
BIOTECHNOLOGY
Bb 222 - Plant and Animal Development
(2013 Pattern)

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

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

Section I : Plant Development

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

   a)   What is orthotropous ovule?

   b)   Define programmed cell death.

   c)   What is determination?

   d)   Define endothecium

   e)   What is tapetum?

Q2) Attempt any <u>four</u> of the following: **[4 × 5 = 20]**
   a)   Explain plant development at organ level.

   b)   What is double fertilization and triple fusion in angiosperms? Give its significance.

   c)   Enlist and explain genes involved in embryo development.

   d)   Write a note on direct and indirect organogenesis.

   e)   What is aging? Describe aging as a developmental process.

   f)   Enlist and explain various external stimuli that bring about transition from vegetative to reproductive phase.

Q3) Attempt <u>any one</u> :   [1 × 10 = 10]

   a)   Justify use of <u>Arabidopsis</u> <u>thaliana</u> as a model system to study plant development

   b)   Give a detailed comparitive account of RAM and SAM.

Section - II Animal Development

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

   a)   Define terms: invagination, delamination.

   b)   Explain any two theories of ageing.

   c)   Differentiate between spiral & rotational cleavage.

   d)   What is the role of Hensen's node formation during chick embryo development?

   e)   Write the effect of any two teratogens.

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

   a)   Programmed cell death plays significant role in digit formation. Justify.

   b)   Liver has capacity to regenerate. Explain.

   c)   Explain the mechanism of slow block during fertilization and comment on its consequences.

   d)   What are primordial germ cells? How does their differentiation differ during oogenesis and spermatogenesis?

   e)   What are segmentation genes? Add a note on their role during pattern formation in <u>Drosophila.</u>

   f)   Explain the term cell lineage with any one suitable example.

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

    a) Explain various events of development to form three different germ layers in case of <u>Amphioxus.</u>

    b) Write short notes on:

        i) Capacitation of sperms

        ii) Importance of chemoattraction during fertilization in sea urchin.

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S.Y. B.Sc.

BIOTECHNOLOGY

Bb - 223: Scientific Writing and Communication

(Semester - II) (2013 Pattern)

ﾟ*Time : 2 Hours]*

[Max. Marks : 40

Instructions to the candidates:

1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q1) Answer in brief: **[5 × 2 = 10]**

  a) Define 'Theory'.

  b) What is the meaning of inductive reasoning?

  c) Write any sources for literature survey.

  d) Use the correct form of verb that agrees with the subject

   i) Police (was, were)/ Spectator.

   ii) Casettes (is, are) on the table

  e) Rewrite the following sentences using appropriate tense.

   i) It will be funny to think of it now

   ii) I shall be getting an apron for you, sir.

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

  a) What is the importance of clarity in writing results in a research article?

  b) What are the likely sources of error in writing results interpretation in a research article?

  c) What are the different aspects which should be considered while giving a talk before an audience with scientific back ground?

d) How is eye contact important in oral presentation?

e) What is intonation? Illustrate types of tones/pitches

f) What is pronunciation? How one can improve english pronunciation?

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

a) Give an account of the basic statistical techniques and their importance in presentation of scientific data.

OR

b) What is the role of clarity in oral presentation? How can clarity be improved?

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S.Y. B.Sc.

BIOTECHNOLOGY

Bb - 224 : Metabolic Pathways

(Semester - II) (2013 Pattern)

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

Instructions to the candidates:

    1)   All questions are compulsory.

    2)   Figures to the right indicate full marks.

    3)   Draw neat diagrams wherever necessary.

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

    a)   Define entropy.

    b)   Enlist types of electron transfer.

    c)   Give significance of phospholipids.

    d)   Define specific activity of enzyme.

    e)   What is anabolism?

Q2) Attempt <u>any four</u>:   **[4 × 5 = 20]**

    a)   With a suitable example, explain competitive inhibition.

    b)   Write a note on ketone bodies.

    c)   What is gluconeogenesis ? Explain the reactions.

    d)   How nitrogen is fixed by nitrogenase enzyme?

    e)   Describe β - oxidation of fatty acids with even numbers.

    f)   Explain in detail enzyme classification.

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

    a)   Explain in detail TCA cycle. Add a note on total ATP formation from one glucose molecule.

    b)   Describe C3 pathway of photosynthesis. How it differs from C4 pathway?

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[4819] - 301

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

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

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

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

   a)   Give two contributions of louis pasteur in development of Microbial biotechnology.

   b)   E-coli was cultured in a production medium containing 15 g/L of glucose as substrate. After 24 hours 3 g/ L of glucose was left in the broth and 2 g/L lysine was produced. Calculate $Y_{p/s}$

   c)   What is wasserman's test? Give its significance.

   d)   What is TDT and Z value?

   e)   Give the names of microorganisms responsible for ropiness of milk.

   f)   'Eijk man's test can be used to differentiate between faecal and non-faecal coliforms' Justify.

   g)   Define BOD and give its significance.

   h)   Give two advantages of using Biofertilizers over chemical fertilizers.

   i)   What are Aflatoxins?

   j)   Elist two commercial applications of immobilized enzyme.

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

a) Discuss the role of compatible solutes in adaptations of Halophiles.

b) What are microbial polysaccharides? Give their applications.

c) Compare and contrast Batch and continuous fermenter.

d) With the help of a well labelled diagram describe the construction and working of Imhoff tank.

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

a) Covalent bonding method of enzyme immobilization.

b) Methods used for gradation of milk.

c) Added and developed preservatives

d) Microbial are leaching.

Q4) a) Give the significance of indicators of faecal pollution in determining potability of water. Give the outline of routine bacteriological analysis of drinking water potability mentioning the media used at each stage.[8]

OR

With the help of a well labelled diagram discuss the principle and working of Activated sludge treatment of waste water. [8]

b) What is continuous culture? Discuss continuous culture with respect to: [7]

i) Role of limiting nutrient and dilution rate.

ii) Relation ship between μ and D at steady state.

iii) Duit.

OR

Define fed batch culture. Discuss different modes of establishing fed batch culture. How is the steady state in fed batch culture different from that in continuous culture. **[7]**

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

a) Discuss the disease Tuberculosis with respect to:

i) Causative agent

ii) Symptoms

iii) Pathogenesis and

iv) Treatment.

b) Enlist different methods of food preservation and discuss the process of canning in detail. Add a note on HACCP (Hazard Analysis and Critical Control Points).

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[4819] - 302

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

)*Time : 3 Hours]*

[Max. Marks : 80

Instructions to candidates:
1) *All questions are compulsory.*
2) *Draw neat labelled diagrams wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Answer to each section should be written in separate answer book.*

SECTION - I

Plant tissue culture

Q1) Answer in brief

[5 × 2 = 10]

a) Write two applications and embryo culture.

b) What is the use of activated charcoal in plant tissue culture.

c) Distinguish between dedifferentation and rudifferentation.

d) Enlist vitamins used in ms medium.

e) Write importance of colchine in development of homogygous plants from haploids.

Q2) Answer any four :

[4 × 5 = 20]

a) Describe different sterilization techniques.

b) Explain the methods of protoplast isolation.

c) Explain the methodology involved in production of artificial seeds.

d) Discuss the various factors affecting shoot and root tip culture.

e) Give the applications of triploids in plant breeding

f) Elobrate how somaclonal variants are selected.

Q3) Answer any one : $[1 \times 10 = 10]$

    a)   What is suspension culture. Discuss various methods and parameters used for measurement of cell growth and cell viability in suspension cultures.

    b)   Define organogenesis. Explain the methods for direct and indirect organogenesis. Give applications of direct organogenesis.

SECTION - II

Animal Tissue Culture

Q4) Answer in brief: $[5 \times 2 = 10]$

    a)   Write the principle of laminar air flow.

    b)   How to detect yeast comtamination animal cell culture?

    c)   Write any 4 applications of ATC.

    d)   Define: Generation time.

    e)   Define: Hayflick's limit.

Q5) Answer any four. $[4 \times 5 = 20]$

    a)   Explain in detail any one biochemical method of characterization of cell line.

    b)   Write a note on advantages of serom free media.

    c)   Write the advantages of histotypic culture over organ culture.

    d)   Explain the role and function of cell repositories.

    e)   What are the characteristics of transformed cell lines.

    f)   Explain why CO_2 incubators are required for $NOHCO_3$ based. buffering system.

Q6) Answer any one.   [1 × 10 = 10]

    a)   Write a note on organic and inorganic. components in ATC medium and mention their role.

    b)   Explain in detail any one method to establish and maintain a cell line.

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[4819] - 303

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

)*Time : 3 Hours]*   *[Max. Marks : 80*
Instructions to the candidates:
   1)   *All questions are compulsory.*
   2)   *Figures to the right indicate full marks.*

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

   a)   Define with example ecosystem diversity.

   b)   Define with example niche.

   c)   Compare and contrast fecundity and notolity.

   d)   What is agonism?

   e)   Enlist any four negative interspecies interaction.

   f)   Define In-situ conservation.

   g)   Enlist types of speciation.

   h)   Compare and contrast systamatics and taxonomy.

   i)   What is fluroscence In-situ Hybridization state its application in classification.

   j)   What is embryo transfer How is it used for Biodiversity conservation.

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

   a)   Aquatic Biomes.

   b)   Development of Behaviour in animals.

   c)   Attribute of population dispersal.

   d)   Types of Biodiversity.

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

   a)   Give importance of Biodiversity as industrial raw material.

   b)   Discuss proceedings of Earth summit.

   c)   Explain need for Biodiversity conservation.

   d)   Write a note on domesticated animal diversity of India.

Q4) Answer in brief:

   a)   Define circadian rhydham? Explain its control in organism with appropriate examples.   **[8]**

   b)   How microbial population growth is studied in Biotechnology laboratory? Explain logistic growth curve.   **[7]**

                                    OR

   a)   Explain use of mathamatical models in biodiversity study, with suitable example.   **[8]**

   b)   Discuss current issue related to loss of biodiversity in India.   **[7]**

Q5) Write short notes on (any three)   **[3 × 5 = 15]**

   a)   Importance of databases in conservational studies

   b)   Five kingdom classification of Biodiversity.

   c)   16s eRNA technique in Systematics.

   d)   Embryology and anatomy studies for classification?

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