Total No. of Questions : 5]

SEAT No. :

PC-1594

[Total No. of Pages : 2

[6329]-31

S.Y. B.Sc.

BIOTECHNOLOGY

BBt - 301 : Cell Biology - I

(Revised 2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to Question 5 carry equal marks.***
4) ***Figures to the right indicate full marks.***

Q1) **Solve Any Five of the following:** **[5]**

a) State the principle of cell theory.

b) Define active transport.

c) Mention any two functions of nucleus.

d) Give an example of light junctions.

e) Mention the role of microfilaments.

f) Give any two functions of membrane proteins.

Q2) a) Illustrate with a diagram, the Fluid Mosaic model of cell membrane. **[6]**

OR

Explain the structure of mitochondria and add a note on its functions.

b) Compare and contrast between prokaryote and Eukaryotic cell. **[4]**

P.T.O.

Q3) a) Describe the composition of ECM. **[6]**

OR

Explain the process of carrier-mediated transport.

b) Comment on intermediate filaments. **[4]**

Q4) a) Explain structure and functions of golgi bodies. **[6]**

OR

Enlist different types of cell junctions. Explain any one in detail.

b) Differentiate between plant cell and animal cell. **[4]**

Q5) **Write a short note on Any Four of the following:** **[10]**

a) Facilitated diffusion.

b) Desmosomes.

c) Nuclear pores.

d) Fibronectin.

e) Anchoring junctions.

f) Basal bodies.

Total No. of Questions : 5]

SEAT No. : ____

PC-1595

[Total No. of Pages : 2

[6329]-32
S.Y. B.Sc.
BIOTECHNOLOGY
BBt - 302 : Molecular Biology - I
(Revised 2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to Question 5 carry equal marks.***

Q1) **Solve Any Five of the following:** **[5]**

a) Define nuclein.

b) Give the structure of Adenine.

c) What is polycistronic mRNA.

d) Define Okazaki fragments.

e) Give role of α DNA polymerase.

f) Define Heterochromatin.

Q2) a) Explain Messelson & Stahl experiment with help of diagram. **[6]**

OR

Explain genome organization in viruses & bacteria.

b) Differentiate between Nucleotide & Nucleoside. **[4]**

P.T.O.

Q3) a) 'Histones are highly conserved proteins'. Justify. **[6]**

OR

Give the experiment that proved DNA as a genetic material in brief.

b) Draw & explain structure of t RNA. **[4]**

Q4) a) Compare A, B & Z forms of DNA. **[6]**

OR

Write in detail Eukaryotic DNA replication.

b) Explain genome organization in mitochondria. **[4]**

Q5) **Write a short note on Any Four of the following:** **[10]**

a) Centromere

b) Initiation of prokaryotic DNA replication

c) Regulatory sequences

d) 'Genetic code is degenerate'. Explain

e) mi RNA

f) 30nm fiber of DNA

Total No. of Questions : 5]

SEAT No. : ____

PC-1596

[Total No. of Pages : 2

[6329] - 33
S.Y. B.Sc.
BIOTECHNOLOGY
BBt-303: Genetics
(Revised 2019 Pattern) (Semester-III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to Q.5 carry equal marks***

Q1) **Solve any five of the following :** **[5]**

a) Define Hot spot mutation.

b) Identify the disorders i) 44A + XXY ii) 44A + XO

c) Define Epistasis

d) Write significance of Amniocentesis

e) Write formula to calculate recombination frequency.

f) What is maternal effect?

Q2) a) State Mendel's law of dominance. Elaborate incomplete dominance & Co-dominance using suitable examples. **[6]**

OR

State Lyon's hypothesis of x-inactivation How is it brought about in organisms having heterogametic males?

b) What is Genetic Counselling? Mention the conditions in which it should be done. **[4]**

P.T.O.

Q3) a) Define translocation. Diagrammatically explain Robertsonian translocation and Philadelphia chromosome. **[6]**

OR

Define spontaneous and induced mutations. Add a note on mutations brought about by Physical mutagens.

b) Write a note on Environmental sex determination. **[4]**

Q4) a) State the examples of autosomal dominant & recessive disorders describe their characteristic features using representative pedigree charts. **[6]**

OR

Describe duplicate and complementary gene interactions with suitable examples.

b) Write a note on hyperploidy. **[4]**

Q5) **Write short notes on any four of the following :** **[10]**

a) Crossing over.

b) Y - linked inheritance

c) Multiple alleles

d) Modifiers and supressors.

e) Morphological & Biochemical mutations

f) Polygenic Inheritance.

Total No. of Questions : 5]

SEAT No. :

PC-1597

[Total No. of Pages : 2

[6329] - 34
S.Y. B.Sc. (Biotechnology)
BBt-304: Metabolism
(Rev. 2019 Pattern) (Semester-III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to Q.5 carry equal marks***

Q1) **Attempt any five of the following :** **[5]**

a) Role of carnitine

b) Define catabolism

c) What is junction point in metabolism

d) ATP energy cycle

e) Define salvage pathway

f) Define entropy

Q2) a) Explain the mechanism of oxidation of an odd chain fatty acid **[6]**

OR

Discuss the reactions involved in glycogen synthesis **[6]**

b) Comment on transamenation reaction. **[4]**

P.T.O.

Q3) a) Explain the anaerobic mode of oxidation of glucose **[6]**

OR

Discuss the do novo process for the synthesis of purines **[6]**

b) Comment on the attosteric regulation of glutamine synthase **[4]**

Q4) a) Describe the hormonal regulation of glucose metabolism **[6]**

OR

Explain the metabolic reactions involved in conversion of amino group of amino acid to urea **[6]**

b) Comment on central role of glutamate and glutamine in amino acid metabolism. **[4]**

Q5) **Write short notes on any four of the following :** **[10]**

a) Phosphoribosyl pyrophosphate

b) Significance of pentose phosphate pathway

c) Essential and non essential amino acids

d) Fatty acid synthase

e) Dehydrogenase reaction of TCA cycle

f) Regulation of glycogenolysis

Total No. of Questions : 5]

SEAT No. :

PC-1598

[Total No. of Pages : 2

[6329]-35
S.Y.B.Sc.
BIOTECHNOLOGY
BBt - 305 : Environmental Biotechnology
(Revised 2019 Pattern) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any Three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any Five of the following. **[5 x 1 = 5]**

a) Define Acid Rain.

b) Define Trophiclevel.

c) Define Ecological Niche.

d) What is meant by climax community.

e) Write down the full form of TRAFIC.

f) Define Ecosystem.

Q2) a) What are Bioindicators? Describe use of Bioindicators in environment monitoring. **[6]**

OR

Describe how greenhouse gas affect Environment.

b) Describe Biotechnological approaches for pollution control. **[4]**

Q3) a) Discuss the ECA and the stages involved in the EIA Procedure. **[6]**

OR

Define Ecological succession & give its general processes for the succession.

b) Explain the microbial degradation of plastic. **[4]**

P.T.O.

Q4) a) Describe in detail proper disposal of biomedical Waste. **[6]**

OR

Discuss the process of phytoremediation and its importance.

b) Hydro sphere is an important Abiotic factor. Discuss. **[4]**

Q5) Write short notes on any four of the following. **[10]**

a) Consequences of Air Pollution.

b) 5 R'S for reducing solid waste.

c) Red data book

d) BOD

e) Energy efficiency

f) Write down the effect of global warming on marine ecosystem.

Total No. of Questions : 5]

SEAT No. :

PC-1599

[Total No. of Pages : 2

[6329]-36
S.Y.B.Sc.
BIOTECHNOLOGY
BBt - 306 : Bio-Analytical Techniques
(Revised 2019) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any Three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any Five of the following: **[5]**

a) Enlist any two applications of UV-visible spectroscopy.
b) Define sedimentation rate.
c) State the purpose of mobile phase in chromatography.
d) What is role of separating buffer in SDS - PAGE.
e) Enlist the applications of TLC.
f) Define molar extinction coefficient.

Q2)a) Explain the principle, process and applications of Native PAGE. **[6]**

OR

Describe in detail, construction and cooking of UV-Visible spectroscopy with neat labelled diagram.

b) Explain the density gradient technique with suitable example. **[4]**

Q3) a) Explain the principle of agarose gel electrophoresis . Add a note on factors affecting to electrophoresis. **[6]**

OR

Explain principle, process & applications of Ion Exchange chromatography in detail.

b) Describe Random & systematic errors in Experimentation. **[4]**

P.T.O.

Q4) a) Discuss in detail, mechanism and significance of size exclusion chromatography. **[6]**

OR

Write the principle and applications of centrifuge in biology. Add a note on preparative centrifugation.

b) Explain Beer's Lambert's law & mention its limitations. **[4]**

Q5) Write short notes on any four of the following: **[10]**

a) Scientific notation

b) Paper chromatography

c) Role of different chemicals in SDS - PAGE

d) Analytical centrifugation.

e) Calibration of Pipettes.

f) Packing of column in Column chromatography.

Total No. of Questions : 5]

SEAT No. : ____

PC-1600

[Total No. of Pages : 2

[6329] - 41
S.Y. B.Sc. (Biotechnology)
BBT-401: Cell Biology - II
(Revised 2019 Pattern) (Semester-IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to Q.5 carry equal marks***

Q1) **Solve any five of the following :** **[5]**

a) Define signal transduction.

b) What are cyclins?

c) What are bivalent chromosomes?

d) Define necrosis

e) What is significance of Gap phase?

f) Give any two examples of signalling molecules.

Q2) a) Describe in detail, cytological & molecular events during cell cycle. **[6]**

OR

Describe the process of autophagy. its regulatory mechanism & significance.

b) Explain the anaphase & telophase stages with neat labelled diagram.**[4]**

P.T.O.

Q3) a) Compare & contrast between intrinsic & extrinsic pathway of apoptosis **[6]**

OR

What is cell signalling? Describe the syncrise & paracrine signalling.

b) Give an account of cell surface receptors. **[4]**

Q4) a) Describe different phases of meiosis I with neat labelled diagram. **[6]**

OR

Discuss in detail, process of cellular ageing with respect to telomerose, oxidative stress & DNA damage.

b) Elaborate on cell cycle checkpoints & its regulation. **[4]**

Q5) **Write short notes on any four of the following :** **[10]**

a) Pyroptosis

b) Small intracellular mediators.

c) Neoplasia.

d) G-protein associated receptors

e) Enzyme linked receptors

f) Significance of cell division

Total No. of Questions : 5]

SEAT No. :

PC-1601

[Total No. of Pages : 2

[6329]-42
S.Y. B.Sc.
BIOTECHNOLOGY
BBt - 402 : Molecular Biology - II
(Rev. 2019) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to Question 5 carry equal marks.***

Q1) **Solve Any Five of the following:** **[5]**

a) Define Promotor.

b) Give the names of structural genes of lactose operon.

c) Give any two inhibitors of translation.

d) Define mutation.

e) Give the name of cofactor of RNA polymerase in Prokaryotic transcription.

f) What is glycosylation?

Q2) a) Explain transcription in Eukaryotes in detail. **[6]**

OR

Explain in detail transcription in prokaryotes.

b) Give an account of processing of mRNA. **[4]**

P.T.O.

Q3) a) What are induced mutations? Explain base Excision Repair Mechanism. **[6]**

OR

What are the spontaneous mutations? Explain Mismatch Repair mechanism.

b) What are the post translational modifications? Explain with examples.**[4]**

Q4) a) Give an account on Tryptophan operon. Comment on regulation by attenuation. **[6]**

OR

Give an account of arabinose operon. Explain positive and negative regulation of ara operon.

b) Explain in brief lactose operon and catabolite repression. **[4]**

Q5) **Write short notes on any Four of the following:** **[10]**

a) Ribosome

b) Initiation of translation in prokaryotes

c) SOS repair

d) Rho-dependent termination of transcription

e) t-RNA charging

f) Ubiquitination

Total No. of Questions : 5]

SEAT No. : ____

PC-1602

[Total No. of Pages : 2

[6329]-43
S.Y. B.Sc.
BIOTECHNOLOGY
BBt - 403 : Immunology
(Revised 2019 Pattern) (CBCS) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Attempt any three of Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) **Attempt any Five of the following:** **[5]**

a) Draw the structure of TCR.

b) Differentiate between MHC-I and MHC-II.

c) Enlist the names of cells that perform phagocytosis.

d) Name any four types of vaccines.

e) Define chimeric antibody.

f) What is Hapten?

Q2) a) Explain adjwants with suitable examples. **[6]**

OR

a) Describe lattice hypothesis and zone of equivalence . **[6]**

b) Draw the structure of immunoglobulin produced in primary infections. **[4]**

P.T.O.

Q3) a) Describe the monoclonal antibodies and its applications. **[6]**

OR

a) Write an essay on 'clonal selection theory'. **[6]**

b) Draw the structure of antibody that crosses placenta, also state its isotypes. **[4]**

Q4) a) Explain thymus with suitable diagram, add a note on maturation of T-lymphocytes. **[6]**

OR

a) Describe classical pathway of complement activation. **[6]**

b) Draw the structure of antibody in secretions, write its isotypes. **[4]**

Q5) **Write short notes on (Any Four):** **[10]**

a) Ouchterlony's method

b) ELISA

c) Lymph node

d) Inflammation

e) CFT (Wassermann's test)

f) Hypersensitivity

Total No. of Questions : 5]

SEAT No. : ____

PC-1603

[Total No. of Pages : 2

[6329]-44
S.Y. B.Sc.
BIOTECHNOLOGY
BBT-404: Animal Development
(Rev. 2019 Pattern) (CBCS) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to Question 5 carry equal marks.***

Q1) **Solve Any Five of the following:** **[5 × 1 = 5]**

a) Define Differentiation.

b) What is Hensen's node.

c) What is Blastema.

d) Write any 2 characteristics of stemcells.

e) Define stereoblastula.

f) Define spermiogenesis

Q2) a) Describe the process of oogenesis. With neat labelled diagram explain the structure of ovum. **[6]**

OR

Describe fertilization in sea urchin.

b) What are progenitor cells. Explain their role during development. **[4]**

P.T.O.

Q3) a) Describe the process of gastrulation in frog. **[6]**

OR

Describe the process of gastrulation in drosophila.

b) Elaborate on different patterns of cleavages with examples. **[4]**

Q4) a) Explain Antero-Posterior patterning in Drosophila. **[6]**

OR

Describe any one mechanism to prevent polyspermy. Give its significance.

b) Explain Secondary Neuralation. **[4]**

Q5) **Write a short note on Any Four of the following:** **[10]**

a) Extrinsic pathway

b) Any Two theories of ageing

c) Morphollaxis

d) Cell lineage

e) Zebrafish as a model system in developmental biology

f) Alcohol as Teratogen

Total No. of Questions : 5]

SEAT No. : ____

PC-1604

[Total No. of Pages : 2

[6329] - 45
S.Y. B.Sc.
BIOTECHNOLOGY
BBt-405: Plant Development
(Rev. 2019) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to Q.5 carry equal marks.***

Q1) **Solve any five of the following :** **[5]**

a) What are homeotic genes?

b) Define dedifferentiation.

c) Explain the term microsporogenesis.

d) What is pro-embryo?

e) Give two applications of plant development in biotechnology.

f) Explain the term coleoptile.

Q2) a) Write note on floral patterning in plant development. **[6]**

OR

Explain megasporogenesis and development of female gametophyte.

b) What is parthenocarpy? Explain it's types. **[4]**

P.T.O.

Q3) a) What is double fertilization and triple fusion? Give it's significance. **[6]**

OR

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

b) What is seed? Explain seed dispersal in detail. **[4]**

Q4) a) What is endosperm? Give modes of development of endosperm in detail. **[6]**

OR

Describe the root patterning (Radial patterning) in plants and also mention some of the genes playing important role during the process.

b) Explain the concept of embryogenesis in plant. **[4]**

Q5) **Write short notes on any four of the following :** **[10]**

a) Molecular regulation of Arabidopsis plant.

b) Explain dedifferentiation in vivo with one example.

c) Explain plant development at organ level.

d) Write principles and unique features of plant development.

e) Give importance of seed.

f) Write a note on flower structure.

Total No. of Questions : 5]

SEAT No. : ____

PC-1605

[Total No. of Pages : 2

[6329] - 46
S.Y. B.Sc.
BIOTECHNOLOGY
BBt-406: Microbial biotechnology
(Revised 2019 Pattern) (CBCS) (Semester-IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to Q.5 carry equal marks***
4) ***Figures to the right indicate full marks.***

Q1) **Solve any five of the following :** **[5]**

a) What is food spoilage?

b) What is significance of BOD determination in waste water treatment?

c) Define: Biofertilizer

d) State importance of normal flora in human health.

e) Give any two applications of microbial toxins.

f) What is VDRL test?

Q2) a) Enlist various tests used for grading of milk. Explain MBRT test in detail. **[6]**

OR

a) Draw a neat labelled diagram of overview of sewage treatment process and add a note on Activated sludge process **[6]**

b) Justify: E.coli is indicator of faecal pollution of water. **[4]**

P.T.O.

Q3) a) Explain disease Tuberculosis w.r.t **[6]**

i) Causitive agent

ii) Pathogenesis

iii) Symptoms

iv) Diagnosis

v) Treatment

OR

a) Describe MPN test to check potability of water. **[6]**

b) Explain use of Genetically Modified Organisms (GMO) in industry/ agriculture with at least the examples. **[4]**

Q4) a) Enlist various extrinsic factors affecting food spoilage. Explain process of canning in detail. **[6]**

OR

a) Elaborate on Bioleaching with following points **[6]**

i) Micro organisms used

ii) Method

iii) Advantages and Disadvantages.

b) What is food preservation? Explain chemical preservation with any two examples. **[4]**

Q5) **Write short notes on any four of the following :** **[10]**

a) Pasteurization

b) MEOR.

c) Cheese

d) Membrane filter Techniques

e) Ropiness

f) Microbial polysaccharides

Total No. of Questions : 5]

SEAT No. :

PC-1606

[Total No. of Pages : 2

[6329]-51

T.Y. B.Sc.

BIOTECHNOLOGY

BBt-501 : Industrial Microbiology

(2019 Revised) (CBCS) (Semester - V)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates :

1) ***Question. 1 is compulsory.***
2) ***Attempt any Three questions from Q 2 to Q 5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Figures to right indicate full marks.***
5) ***Draw neat labelled diagram whenever necessary.***

Q1) **Attempt any five of the following :** **[5]**

a) Define fermentation.

b) How to prevent Vortex in bioreactor?

c) What is duel culture fermentation?

d) Give the role of filter aids in filtration.

e) What will be the consequences of foaming?

f) What is inhibitor? Give one example.

Q2) a) Describe the process of large scale production of alcohol. **[6]**

OR

a) Explain plate heat exchanger used in media sterilization.

b) What is impeller? Describe different type of impleller. **[4]**

P.T.O.

Q3) a) Enlist different types of centrifuge used in recovery of formentation products. Describe construction, working of disc bowl centrifuge. **[6]**

OR

a) Give on account on permeability modification as a method of strain improvement.

b) Explain measurement and control of foam in fermentation process. **[4]**

Q4) a) Enlist mechanical methods of cell disruption. With neat labelled diagram Explain any one method. **[6]**

OR

a) Describe Plackett-Burman model for media designing.

b) Describe packed bed reactor with example. **[4]**

Q5) Write a note on (any four) : **[10]**

a) Scale up

b) Indicator dye technique

c) Isolectric precipitation in recovery

d) Fixed and non fixed pore filters.

e) Inducer

f) Bakers yeast

⌘⌘⌘

Total No. of Questions : 5]

SEAT No. :

PC1607

[Total No. of Pages : 2

[6329]-52

T.Y. B.Sc. (Biotechnology)

BBl - 502 : RECOMBINANT DNA TECHNOLOGY

(Revised 2019 Pattern) (CBCS) (Semester - V)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions no.2 to 5 carry equal marks.***

Q1) Solve any five of the following: **[5]**

a) What is Vector?

b) Define Recombinant DNA technology.

c) Mention role of polynucleotide kinases.

d) Enlist any two applications of recombinant DNA technology.

e) What do you mean by transformation process in recombinant DNA technology.

f) What is Host organism.

Q2) a) Explain type II restriction endonucleases Add a note on their types and applications. **[6]**

OR

a) Describe the construction and applications of cDNA libraries. **[6]**

b) Give significance of alkaline phosphatases. **[4]**

P.T.O.

Q3) a) What is PCR? Describe the steps involved and applications of PCR. **[6]**

OR

a) Comment on the steps involved in construction of recombinant DNA technology. **[6]**

b) Mention role of biotechnology in production of recombinant insulin. **[4]**

Q4) a) Elaborate on Agrobacterium mediated gene transfer. **[6]**

OR

a) Explain plasmids as a gene carrying vehicle. Add a note on any one plasmid vector. **[6]**

b) Elaborate on Automated DNA sequencing method in brief **[4]**

Q5) Write short notes on any four of the following: **[10]**

a) Linkers and adapters.

b) Blue - White screening.

c) Role of Gene therapy in treating various diseases.

d) Cosmid vectors.

e) Production of biotherapeutics using recombinant DNA technology.

f) Real time PCR.

Total No. of Questions : 5]

SEAT No. :

PC1608

[Total No. of Pages : 2

[6329]-53

T.Y. B.Sc. (Biotechnology)

BBt - 503 : PLANT TISSUE CULTURE

(Revised 2019 Pattern) (Semester - V)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question No. 2 to 5 carray equal marks.***

Q1) Solve any Five of the following : **[5]**

a) Define caulogenesis.

b) What is sunchronized culture?

c) What is cybrid?

d) Differentiate between hard & Soft callus.

e) Define - indirect organogenelis .

f) How rooting & shooting response is regulated by auxin concentration?

Q2) a) Define suspension culture. Discuss suspension culture with respect to.**[6]**

i) Types & sunchronization.

ii) Assessment of growth measurements & viability.

OR

a) Give various criterias applied for designing plant tissue culture laboratory. Describe various rooms in PTC lab. **[6]**

b) What is embryo culture? Comment on factors affecting embruo culture.**[4]**

Q3) a) Define micropropagation. Describe various stages of micropropagation & add a note on its application. **[6]**

OR

a) Define tissue culture media. Enlist various types of PTC media & comment on MS media composition along with role of components.**[6]**

b) Which culture technique is used to raise virus free plant? Give protocol of the same. **[4]**

P.T.O.

Q4) a) What is androgenesis? Diagramatically represent pathways of androgenesis & describe factors influencing androgenesis. **[6]**

OR

a) Define protoplast. Give different methods for protoplast islolation & fusion & explain any one method in detail from each. **[6]**

b) Define Organ culture. Give importance of organ culture. **[4]**

Q5) Write short notes on any Four of the following. **[10]**

a) Principal and working of Laminar air flow.

b) Surface sterilization of explant.

c) PGR & its role in PTC.

d) Morphology & internal structure of callus.

e) Commercial application of plant tissue Culture.

f) Leaf Culture.

■■■■

Total No. of Questions : 5]

SEAT No. :

PC-1609

[Total No. of Pages : 2

[6329]-54
T.Y. B.Sc.
BIOTECHNOLOGY
BBt - 504 : Animal Tissue Culture
(Revised 2019) (CBCS) (Semester - V)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Define confluency.

b) Write a role of trypsin in animal tissue culture.

c) Give any two examples of natural media in ATC.

d) Who is a father of animal tissue culture?

e) What is population doubling time?

f) Name any two cell banks to procure animal cell lines.

Q2) a) Explain in detail primary culture of fibroblast cells with emphasis on sources, selection and methodology. **[6]**

OR

Microbial contamination is a major issue in ATC. Write in detail different types of microbial contaminants. Add a note on how to overcome those contaminations?

b) Enlist properties of finite cell line. **[4]**

Q3) a) How do you characterize the cell line on the basis of enzymes? Enlist any two enzyme markers associated with specific cell lines. **[6]**

OR

What is significance of cryopreservation? Explain in detail components of cryopreservation facility.

b) Write down various advantages of serum containing media in ATC. **[4]**

P.T.O.

Q4) a) Explain in detail methods of organ culture. Add a note on merits and demerits of organ culture. **[6]**

OR

Write down working principle and uses of laminar air flow and CO_2 incubator.

b) Describe the purpose and design of ATC laboratory. **[4]**

Q5) Write short notes on any four. **[10]**

a) Mammalian cell culture

b) Balanced salt solution

c) Criteria for subculture

d) Applications of animal cell culture

e) Determination of viable cell count

f) Sterilization of ATC media

▽▽▽▽

Total No. of Questions : 5]

SEAT No. :

PC-1610

[Total No. of Pages : 2

[6329]-55
T.Y. B.Sc.
BIOTECHNOLOGY
BBt-505 : Applied Biotechnology - I
(2019 Pattern) (CBCS) (Semester - V)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Attempt any three questions of Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Attempt any five of the following : **[5]**

a) Define Biochip

b) Dendrimers

c) Enlist two Biomarkers of disease

d) Distinguish between Top down & Bottom up method.

e) Name any two barophilic organisms.

f) Enlist two methods of characterization of nanoparticles.

Q2) a) Write an assay on composting. **[6]**

OR

Explain molecular diagnostics.

b) Describe use of living organisms in nanoparticle synthesis? **[4]**

Q3) a) Explain the infrastructure requirement for vermicomposting. **[6]**

OR

Describe secondary metabolites of marine organisms.

b) Microalgae as a potential source of energy in future, justify. **[4]**

P.T.O.

Q4) a) Liposome based nanomedicine and its application, write a note. **[6]**

OR

Describe use of PCR in Covid-19.

b) Explain 'Marine actinobacteria' in detail. **[4]**

Q5) Write short notes on any four of following : **[10]**

a) Cellular diagnostics

b) Nanotubes

c) Conditions for composting

d) GFP and RFP

e) Genomies in diagnostics

f) Marine bioresources

Total No. of Questions : 5]

SEAT No. :

PC-1611

[Total No. of Pages : 2

[6329]-56
T.Y. B.Sc.
BIOTECHNOLOGY
BBt - 506 : Biodiversity and Systematics
(Revised 2019 Pattern) (CBCS) (Semester - V)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question No. 2 to 5 carry equal marks.***

Q1) **Solve any Five of the following.** **[5]**

a) Define genetic diversity.

b) What is Population density.

c) Define 'Niche'

d) Define Adaptation

e) What is species extinction?

f) What is classification system?

Q2) a) Describe "Population density and relative abundance" with one method for estimating abundance. **[6]**

OR

Comment on "Biodiversity in cities and towns" and explain "Opportunistic species".

b) Describe applications of Biodiversity studies. **[4]**

Q3) a) Define carrying capacity and add a note on growth forms of population. **[6]**

OR

Explain morphological and molecular tools in taxonomy.

b) Explain chipko movement and panipanchayat movement. **[4]**

P.T.O.

Q4) a) Write a note on methods used in insitu conservation and justify its significance over ex-situ conservation. **[6]**

OR

Explain wildlife protection act of India & add a note on CITES and TRAFFIC.

b) Role of ZSI and BSI. **[4]**

Q5) **Write short notes on any four of the following.** **[10]**

a) Simpson's index of Biodiversity

b) Concept Ecological equivalance of species.

c) Biodiversity Hotspots.

d) Survivorship curves of population.

e) Explain the need of taxonomy

f) Types of Biodiversity.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. :

PC1612

[Total No. of Pages :2

[6329]-61

T.Y.B.Sc.

BIOTECHNOLOGY

BBT-601 : Enzyme and Enzyme Technology

(Revised 2019 Pattern) (CBCS) (Semester- VI)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q1 is compulsory.***
2) ***Solve any 3 questions from Q2 to Q5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following: **[5]**

a) Active site

b) Maximum velocity

c) Steady state assumption

d) Zymogens

e) Transition state

f) Optimum pH

Q2) a) Discuss the effect of substrate concentration on enzyme activity. **[6]**

OR

Describe the process of Lysosomal degradation of enzymes. **[6]**

b) Enlist carries of matrices used for enzyme immobilization. Explain any one. **[4]**

Q3) a) Discuss the covalent catalysis mechanism of enzyme action. **[6]**

OR

Give an account on multi enzyme complex with appropriate example. **[6]**

b) Explain the importance of transaminases in clinical diagnosis. **[4]**

P.T.O.

Q4) a) Explain the need of transformations of MM equation/Plot to study enzyme kinetics. **[6]**

OR

Discuss the construction of glucose oxidase biosensor. **[6]**

b) Explain the mechanism of covalent modification for enzyme regulation. **[4]**

Q5) Write short notes on any four of the following. **[10]**

a) Cellulose degrading enzymes.

b) Cell immobilization.

c) Significance of Km.

d) Enzyme commission for classification of enzymes.

e) Turnover number.

f) Enzymes in membrane.

Total No. of Questions : 5]

SEAT No. :

PC1613

[Total No. of Pages : 2

[6329]-62

T.Y. B.Sc. (Biotechnology)

BBt - 602 : AGRICULTURE BIOTECHNOLOGY

(Revised 2019 Pattern) (CBCS) (Semester - VI)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) *Q.1 is compulsory*
2) *Solve any three questions from Q.2 to Q.5*
3) *Question no.2 to 5 carry equal marks.*

Q1) Solve any Five of the following : **[5]**

a) Define Abiotic stress.

b) Define e-Agriculture.

c) What is biocontrol?

d) What is Pathogen diagnosis?

e) Define classical Agriculture biotechnology.

f) Enlist two important biofertilizer manufacturing industries.

Q2) a) What are molecular markers? How is molecular marker assisted breeding done? Write the significance. **[6]**

OR

Explain Various modes of gene transfer in plants with suitable examples. **[6]**

b) Write a note on quality control and various parameters of the biofertilizers. **[4]**

Q3) a) Describe in detail types, importance and scope of Green house technology. **[6]**

OR

Write in detail role of transgenic plants against diseases. **[6]**

b) Write a note on herbicide resistant plants. **[4]**

P.T.O.

Q4) a) Discuss important criteria to develop drought resistant plants. **[6]**

OR

Write the role of biotechnology in recycling of horticulture waste as live stock and green manures. **[6]**

b) Compare and contrast classical and modern agriculture biotechnology. **[4]**

Q5) Write short notes on any Four of the following : **[10]**

a) Use of ICT in Agriculture biotechnology.

b) Detoxification of herbicides.

c) Genetically engineered microbes in biofertilizer.

d) Non Conventional fertilizers.

e) Phytosanitation.

f) Urban Agriculture.

Total No. of Questions : 5]

SEAT No. : ____

PC1614

[Total No. of Pages : 2

[6329]-63

T.Y. B.Sc. (Biotechnology)

BBl - 603 : APPLIED BIOTECHNOLOGY - II

(Revised 2019 Pattern) (Semester - VI)

Time : 3 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) What are 2nd generation biofuels.

b) Give importance of algal biomass.

c) What are GMO? Give one example of GM plant.

d) What is 'GUaRDIAN'?

e) List any four bioactive compound produced from system biology.

f) Define totipotent stem cells.

Q2) a) How can be microbe used to decrease the use of chemical Fertilizer and pesticide. **[6]**

OR

a) Explain various types of renewble energy technologies.

b) Xenobiotic compound may be recalcitrant: Justify. **[4]**

Q3) a) What is DNA figerprinting? DNA fingerprinting used in forensic to identify closely related relatives: Justify **[6]**

OR

a) Describe 'Personalised medicine' concept with example.

b) Describe various applications of synthetic biology. **[4]**

P.T.O.

Q4) a) Describe therapeutic applications of stem cells in human degenerative diseases. **[6]**

OR

a) Give an account of rice-3k project.

b) Write the various applications of 'Human genome project' in heath. **[4]**

Q5) Write a note on: (any four) **[10]**

a) Cord blood banking.

b) Ethical policy of Indian government on stem cell use.

c) Biodiesel.

d) Potential risk of GM food.

e) Directed graph in system biology.

f) RFLP.

Total No. of Questions : 5]

SEAT No. :

PC-1615

[Total No. of Pages : 2

[6329]-64

T.Y. B.Sc.

BIOTECHNOLOGY

BBt - 604: Food and Pharmaceutical Biotechnology

(Revised 2019 Pattern) (CBCS) (Semester - VI)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates :

1) ***Q. 1 is Compulsory.***
2) ***Solve any three questions.***
3) ***Question no 2 to 5 carry equal marks.***

Q1) Solve any five from the following : **[5]**

a) What are food adultrants? Give its example.

b) What is TQM stand for?

c) Define ED50.

d) What is drug compendia? Give its classfication.

e) Write role of α amylase in food processing.

f) Write the food source for vit B_{12}.

Q2) a) What were the recommendations of drug enquiry commitree. **[6]**

OR

Describe the objectives of pharmacy Act 1948. **[6]**

b) Explain in detail about pre biotics and its role. **[4]**

Q3) a) Explain the principles of food safety management system (FSM5). **[6]**

OR

Describe the objectives of food packaging laws.

b) Discuss benefits of non alchoholic beverages. **[4]**

P.T.O.

Q4) a) Describe Aseptic packaging of food. **[6]**

OR

Write the selection criteria of probiotic organisms. **[6]**

b) What is therapetic modulation of gut microflora. **[4]**

Q5) Write short notes on any four of the following : **[10]**

a) Probiotic and cancer.

b) Allergy Vs intolerance.

c) Nutra ceuticals.

d) Food contaninants.

e) Give account on IP.

f) Rational drug discovery.

Total No. of Questions : 5]

SEAT No. :

PC-1616

[Total No. of Pages : 2

[6329]-65
T.Y. B.Sc.
BIOTECHNOLOGY
BBt-605 : Bioinformatics
(Revised 2019) (Semester - VI)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates :

1) ***Question. 1 is compulsory.***
2) ***Solve any three questions from Q 2 to Q 5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) **Solve any Five of the following:** **[5]**

a) What is Entrez?

b) Give significance of BLAST.

c) What is metadata search?

d) What do you mean by local alignment?

e) Enlist types of data used in bioinformatics.

f) What is orthologs?

Q2) a) What is Flat file? Explain in detail PDB file format. **[6]**

OR

Explain in detail Dot plot as a method for PSA.

b) Explain MEDLINE database. **[4]**

P.T.O.

Q3) a) How data is generated for bioinformatics? Discuss NGS sequencing as a data generation tool in detail. **[6]**

OR

Explain the concept of MSA with example.

b) Differentiate between CATH&SCOP. **[4]**

Q4) a) How Boolean operator ease the search? Explain different boolean operators in detail. **[6]**

OR

What is biological database? Explain EMBL & DDBJ database in detail.

b) Explain PyMOL as a protein structure visualization tool. **[4]**

Q5) Attempt any FOUR of the following: **[10]**

a) Explain role of bioinformatics.

b) Swissprot.

c) PSI - BLAST

d) Global alignment

e) Relational database.

f) Clustal - W

⌘⌘⌘

Total No. of Questions : 5]

SEAT No. : ____

PC-1617

[Total No. of Pages : 2

[6329]-66
T.Y.B.Sc.
BIOTECHNOLOGY
BBT-606 : Biosafety & Bioethics & IPR
(Revised 2019 Pattern) (CBCS) (Semester - VI)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates :

1) ***Question 1 is compulsory.***
2) ***Solve any Three questions from Q2 to Q5.***
3) ***Question 2 to 5 carry equal marks.***
4) ***Figure to the right indicate full marks.***
5) ***Draw neat labelled diagram wherever necessary.***

Q1) Solve any Five of the following: **[5]**

a) What can be protected under Copyright?

b) BSC - I, define.

c) Write the benefit of granting patent.

d) Define GCP.

e) Give the difference between invention and innovation.

f) What is ICM and its role?

Q2) a) Highlight the significance of types of Intellectual Property. **[6]**

OR

Write an explanatory note on TRIPS Agreement. **[6]**

b) With justification name the organisms that can be handled in BSL-3 facility. **[4]**

Q3) a) Explain Declaration of Melsinki as a statement of ethical principles. **[6]**

OR

Describe tuskegee syphilis study. **[6]**

b) Discuss the inventions that are patentable & non-patentable in India. **[4]**

P.T.O.

Q4) a) Explain concepts, symbols and significance in experimental biological science. **[6]**

OR

Regulatory bodies in India for Bioethics. **[6]**

b) Why do Geographical Indication needs protecion 3 Hours GI are protected? **[4]**

Q5) Write a short notes on any Four of the following: **[10]**

a) Patent of Addition.

b) Filters used in caminar air flow.

c) Objective & function of WTO.

d) Autonomy in research.

e) Indian Patent Law.

f) Beneficence in research in human subjects.