Total No. of Questions : 5]

SEAT No. :

P1315

[Total No. of Pages : 2

[6056]-101
S.Y.B.Sc. (Biotechnology)
BBt - 301 : CELL BIOLOGY - I
(2019 Pattern) (CBCS) (Semester - III)

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

Instructions to the candidates:

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

Q1) Solve any five of the following. **[5 × 1 = 5]**

a) What is cell theory.

b) Name the important structure missing in prokaryotic cell.

c) Define antiport.

d) Define cell coat.

e) State the role of nucleolus.

f) Which cell organelle are known as "Suicidal bags'?

Q2) a) Explain the prokaryotic cell organization with the help of suitable diagram. **[6]**

OR

Elaborate the process of phagocytosis. **[6]**

b) Discuss the structure & function of nucleus. **[4]**

Q3) a) Explain the role and working of Na^{+}– k^{+} ATPase pumps. **[6]**

OR

Discuss the structure and function of Golgi apparatus. **[6]**

b) Write short note on ion channel proteins. **[4]**

Q4) a) Discuss fluid mosaic model of plasma membrane with a neat labelled diagram. **[6]**

OR

Describe various components of ECM. **[6]**

b) Give a detailed account on structure & function of Mitochondria. **[4]**

P.T.O.

Q5) Write short notes on any Four. **[4 × 2.5 = 10]**

a) Passive transport.

b) Cell adhesion molecules.

c) Difference between plant & animal cell.

d) Rough endoplasmic reticulum.

e) Lysosomes.

f) Role of cytoskeleton.

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Total No. of Questions : 5]

SEAT No. : ____

P1316

[Total No. of Pages : 2

[6056] - 102

S.Y.B.Sc. (Biotechnology)

BBt - 302 : MOLECULAR BIOLOGY - I

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

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. **[5×1=5]**

a) What is central dogma of molecular biology?

b) Comment on nudeoside.

c) State the role of primase enzyme.

d) Define origin of replication.

e) What are introns?

f) Name the scientist who discovered double helical structure of DNA.

Q2) a) Explain salient features of double helical model of DNA. **[6]**

OR

Elaborate on eukaryotic genome organization in detail. **[6]**

b) Discuss mitochondrial DNA in brief **[4]**

Q3) a) Write a note on prokaryotic DNA replication. **[6]**

OR

Write a note on genetic code. **[6]**

b) What is RNA ? Describe structure, types & functions of RNAS. **[4]**

P.T.O.

Q4) a) Explain the Griffith's experiment showing transformation. **[6]**

OR

Enlist different requlatory sequences present onto the genome Mention role of each sequence. **[6]**

b) Describe the structure & role of telomerase enzyme in replicating ends of eukaryotic DNA **[4]**

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

a) Chargaff's rule

b) Helicase

c) Hyperchromic effect

d) Sliding clamp

e) Wobble hypothesis

f) Histones

Total No. of Questions : 5] SEAT No. :

P-1317 [Total No. of Pages : 2

[6056]-103
S.Y.B.Sc.
BIOTECHONOLOGY
BBt-303: Genetics
(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) Define Heterozyosity.

b) What is pleiotropism?

c) What is barr body?

d) Define Expressivity.

e) What is genetic counselling?

f) Define map unit.

Q2) a) Why did Mendel choose pea plant for its genetic studies. What made Mendel successful. **[6]**

OR

Write a detail note on various mutagens.

b) Explain different modified dihybrid ratios. **[4]**

Q3) a) State the law of Independent assortment with ratio of phenotypic characters in F2 generation. **[6]**

OR

Define complementary genes with ratio of phenotypic characters in F2 generation.

b) What is sex linked inheritance explain with suitable examples. **[4]**

P.T.O.

Q4) a) What are base analogues? Explain mechanism of mutation with suitable examples. **[6]**

OR

What are frame shift mutations? Explain insertion and deletion of bases with their effects.

b) Describe the characters of klinefelters syndrome. **[4]**

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

a) Epistasis.

b) Hot Spot of mutation.

c) Incomplete linkage.

d) Recombination frequency.

e) Dosage compensation.

f) Chromosomal aberrations.

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Total No. of Questions : 5]

SEAT No. : ____

P-1318

[Total No. of Pages : 2

[6056]-104
S.Y.B.Sc.
BIOTECHNOLOGY
BBt-304 : Metabolism
(2019 Pattern) (Semester - III) (CBCS)

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

Instructions to the candidates :

1) ***Q.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) Define de novo pathway.

b) Name any four regulatory enzymes of nucleotide synthesis.

c) Write the reaction that couples urea and TCA cycle.

d) ATP is energy currency of cell, justify.

e) Differentiate between essential and non essential aminoacids.

f) Draw the structure of $18:1^{\Delta 9}$.

Q2) a) Explain β-oxidation of 18:0, write its energetics. **[6]**

OR

Describe transamination reaction with any two examples.

b) Explain role of PFK-II in glycolysis. **[4]**

Q3) a) Explain fates of pyruvate. **[6]**

OR

Describe mode of excretion in ureotelic organism.

b) Name giving reasons the positive and negative modulators of TCA. **[4]**

P.T.O.

Q4) a) Explain reciprocal regulation of glycogen synthesis & breakdown. **[6]**

OR

Describe HMP in detail.

b) Write the names of ketone bodies, write their significance. **[4]**

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

a) Oxidation - reduction.

b) Enzymes of cholesterol catabolism.

c) Energy yield of anerobic glycolysis.

d) Role of carnitine in fatty acid oxidation.

e) Breakdown of non essential aminoacids.

f) Co-oxidation.

Total No. of Questions : 5]

SEAT No. : ____

P-1319

[Total No. of Pages : 2

[6056]-105

S.Y. B.Sc.

BIOTECHNOLOGY

BBt - 305 : Environmental Biotechnology

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

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) What is ecological energetics?

b) Enlist greenhouse gases responsible for global warming.

c) What is humification?

d) Define biomagnification.

e) Significance of BOD.

f) TRAFFIC.

Q2) a) Which air pollutants responsible for acid rain and ozone layer depletion. Discuss the possible reaction involve in this two cases. **[6]**

OR

What is bioremediation? Describe the process of bioremediation.

b) Explain Integrated waste management. **[4]**

P.T.O.

Q3) a) What is climax community? Give a review of various theories of climax. **[6]**

OR

Define pesticides? Describe the threat posed by chemical pesticides to environmental health and possible control measure.

b) Discuss about the biotechnological approaches for pollution. **[4]**

Q4) a) What is ecological indicator? Enlist various types of indicators and explain in brief. **[6]**

OR

Define ecological succession? Explain general process of succession.

b) Discuss the procedure of EIA. **[4]**

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

a) Soil horizon

b) Photochemical products

c) '*y*' shaped energy model

d) Types of recycled plastics

e) Montreal protocol

f) Biomedical waste management

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Total No. of Questions : 5]

SEAT No. : ____

P-1320

[Total No. of Pages : 2

[6056]-106

S.Y. B.Sc. (Biotechnology)

BBt-306 : BIO ANALYTICAL TECHNIQUES

(2019 Pattern) (Semester - III)

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

Instructions to the candidates:

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

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

a) Define extinctions coefficient.

b) What do you mean by hyprochromic shift.

c) Give role of centripetal force.

d) Mention the role of SDS in electrophoresis.

e) Significance of mobile system in chromatography.

f) Comment on sample holder in spectrophotometer.

Q2) a) Discuss the process of density gradient centrifugation with an appropriate example. **[6]**

OR

Explain the process of packing of column, application of sample and elution of sample. **[6]**

b) Enumerate the scientific rotation and units used in laboratory calculations. **[4]**

Q3) a) Describe the process and principle of separation of proteins using ion exchange chromatography. **[6]**

OR

Explain the use of Native PAGE for separation of proteins. **[6]**

b) Comment on the concept of monochromator used in spectrophotometer. **[4]**.

P.T.O.

Q4) a) Explain the construction and working of Analytical ultracentrifuge. **[6]**

OR

Give the principle of spectroscopy comment on limitations of Beers - hamberts law. **[6]**

b) Discuss the application of electrophoresis. **[4]**.

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

a) Planar chromatography

b) Agarose gel electrophoresis

c) Rate zonal centrifugation

d) Callibration of pipettes

e) Electromagnetic spectrum

f) Mechanism of separation in gel filtration chromatography.

Total No. of Questions : 5]

SEAT No. :

P-1321

[Total No. of Pages : 2

[6056]-201

S.Y. B.Sc.

BIOTECHNOLOGY

BBt-401 : Cell Biology - II

(2019 Pattern) (CBCS) (Semester - IV)

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

Instructions to the candidates:

1) ***Question one is compulsory.***
2) ***Solve any 3 questions from Q2 to Q5.***
3) ***Question 2 to 5 carries equal marks.***

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

a) What is signaling molecule?

b) State the importance of G_2 phase.

c) What are CDKs?

d) Enlist the phases of prophase - I.

e) State the significance of cell division.

f) Define 'Apoptosis'.

Q2) a) Explain in brief check points of cell cycle. **[6]**

OR

Explain apoptosis with intrinsic and extrinsic path ways. **[6]**

b) Explain in detail process of aging. **[4]**

.

Q3) a) Explain G protein signaling with apropriate examples. **[6]**

OR

What is signal transduction? Explain molecular machanism of signal transduction. **[6]**

b) Describe in detail various cell surface receptors. **[4]**

P.T.O.

Q4) a) What is mitosis? Explain its phases with the help of neat labelled diagram. **[6]**

OR

Describe different modes of cell signaling. **[6]**

b) Elaborate on recepter tyrosine kinase signaling. **[4]**

Q5) Solve any four of the following : **[10]**

a) Significance of meiosis.

b) Ferroptosis

c) Synaptonomal complex

d) Oncogenes

e) Calcium as a secondary messenger

f) Phases of cell cycle

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Total No. of Questions : 5]

SEAT No. :

P1322

[Total No. of Pages : 2

[6056]-202
S.Y.B.Sc. (Biotechnology)
BBt - 402 : MOLECULAR BIOLOGY - II
(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) ***Question 2 to 5 carry equal marks.***

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

a) Define TATA box.

b) Enlist inhibitors of transcription.

c) What is Negative regulation?

d) State the role of general transcription. Factors in the process of transcription.

e) Define 'Activator'.

f) What is mutation?

Q2) a) Describe initiation of eukaryotic transcription. **[6]**

OR

What do you mean by post translational modifications? Add a note on Glycosylation. **[6]**

b) Discuss the photoreactivation mechanism of DNA repair. **[4]**

Q3) a) Write a note on components involved in the process of general translation mechanism with their significance. **[6]**

OR

Discuss Rho independent & Rho dependent termination of transcription in prokaryotes. **[6]**

b) What is Mutation? Discuss different types of it. **[4]**

P.T.O.

Q4) a) Discuss the regulation of tryptophan operon in detail. **[6]**

OR

Describe the mechanism of mismatch repair. **[6]**

b) Explain the process of splicing for removal of introns. **[4]**

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

a) Sigma factor.

b) Promoter clearance.

c) Amino-acyl t. RNA synthatase.

d) Causes of DNA damage.

e) Release factors.

f) 70S Ribosomes.

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Total No. of Questions : 5]

SEAT No. : ____

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[Total No. of Pages : 2

[6056]-203

S.Y. B.Sc.

BIOTECHNOLOGY

BBt-403: Immunology

(2019 Pattern) (Semester - IV) (CBCS)

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

Instructions to the candidates :

1) ***Q1 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) Define 'chimeric antibody'.

b) Enlist any two names of adjuvants.

c) Name any four autoimmune disorders.

d) What are PRRS and PAMP?

e) Distinguish between agglutination & precipitation reaction.

f) Write the isotypes of IgG and IgA.

Q2) a) Draw the structures of : **[6]**

i) MHC-I
ii) MHC-II and
iii) TCR-CDZ complex

OR

Explain 'Covaxin (BBY-152)' as a whole inactivated virus based covid-19 vaccine.

b) Discuss the concept of 'subunit vaccine'. **[4]**

P.T.O.

Q3) a) Draw the structures of **[6]**

i) IgM
ii) CD-4 and
iii) CD-8

OR

With the help of neat labelled diagram, explain lymphnode.

b) Explain 'Immunofluorescence. **[4]**

Q4) a) Draw the structures of : **[6]**

i) Thymus
ii) Bone marrow

OR

Explain type-I hypersensitivity.

b) Discuss 'phagocytosis'. **[4]**

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

a) ELISA.

b) Complement system.

c) Western blotting.

d) SRID.

e) Quchterlony's patterns.

f) Coomb's test.

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Total No. of Questions : 5]

SEAT No. :

P-1324

[Total No. of Pages : 2

[6056]-204

S.Y. B.Sc.

BIOTECHNOLOGY

BBt-404: Animal Development

(2019 Pattern) (Semester - IV) (CBCS)

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) ***Q.2 to Q.5 carries equal marks.***

Q1) Solve any five of the following : **[5 × 1 = 5]**

a) What is neural induction?

b) State the contribution of Christiane Nusslein-Volhard in developmental biology.

c) Mention structural features of coeloblastula.

d) Give the composition of yolk.

e) What is cellular determination during embryonic development.

f) Define fate map.

Q2) a) Discuss the role of maternal effect genes in pattern formation in Drosophila. Comment on morphogenetic gradient of those gene products during the development. **[6]**

OR

P.T.O.

Hydra can regenerate lost or cut body parts. Justify & describe the process in detail. Comment on its unique features in comparison to other mechanism of regeneration.

b) Describe the earliest response of an egg to prevent polyspermy. **[4]**

Q3) a) Discuss in detail the process of spermato genesis. Draw a neat labelled diagram of a sperm. **[6]**

OR

Give in detail sequential events in mammalian fertilization.

b) Describe the process of primary neurulation. **[4]**

Q4) a) Explain in detail the process of gastrulation in Drosophila. Give the fates of three germ layers. **[6]**

OR

Describe the formation of three germ layers in frog. Comment on an organizer of frog embryo.

b) Discuss the concept of cell lineage using an appropriate example. Comment on cell lineage tracing methods. **[4]**

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

a) Holoblastic cleavage.

b) Progenitor cells.

c) Alcohol as a feratogen.

d) Apoptosis in development.

e) Genetic basis of aging.

f) C. elegans as a model in development.

Total No. of Questions : 5]

SEAT No. :

P1325

[Total No. of Pages : 2

[6056]-205
S.Y.B.Sc.
BIOTECHNOLOGY
BBT - 405 : Plant Development
(CBCS 2019 Pattern) (Semester - IV)

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

Instructions to the candidates:

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

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

a) Define redifferentiation.

b) What are homeotic genes?

c) Define competence.

d) What is tapetum?

e) Define microsporogenesis.

f) Define coleoptile.

Q2) a) Explain in detail, Floral patterning in plants. **[6]**

OR

Give a detailed comparative account on RAM and SAM. **[6]**

b) Enlist and explain genes involved in embryo development. **[4]**

Q3) a) Explain megasporogenesis and development of female gametophyte. **[6]**

OR

Applications of plant development in biotechnology. **[6]**

b) Explain tissue systems in plants. **[4]**

Q4) a) With the help of neat, labeled diagrams, explain development of embryo. in monocotyledons. **[6]**

OR

What is double fertilization and triple fusion in angiosperms. Give it's significance. **[6]**

b) Write a note on vegetative patterning. **[4]**

P.T.O.

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

a) Endosperm development.

b) ABC model in plant.

c) Parthenocarpy.

d) Types of seed dispersal.

e) Structure of flower.

f) Plant development at organ level.

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Total No. of Questions : 5]

SEAT No. : ____

P-1326

[Total No. of Pages :2

[6056]-206
S.Y. B.Sc. BIOTECHNOLOGY
BBt - 406 : MICROBIAL BIOTECHNOLOGY
(2019 Pattern) (Semester - IV) (CBCS)

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) Slove any five of the following: **[5]**

a) Define : Rancidity

b) State any two applications of GMO.

c) What is normal flora?

d) Give significance of rijkman test.

e) Define: sweet curdling.

f) State reason of false presumptive test.

Q2) a) Describe methods of food preservation by killing principle. **[6]**

OR

a) Describe staphylococcal food intoxication in detail.

b) Explain a method used to check efficiency of pasteurization. **[4]**

Q3) a) Describe etiolagy of syphilis w.r.t. **[6]**

i) Causitive agent

ii) Pathogenesis

iii) Symptoms

iv) Diagnosis and treatment

P.T.O.

OR

a) With neat labeled diagram describe construction and working principle of trickling filter.

b) What are developed preservatives? Explain mechanism of action with example. **[4]**

Q4) a) Explain MPN test used to check water potability. **[6]**

OR

a) Explain the process of canning in detail and add its significance in food preservation.

b) Justify: Reduction of BOD is main objective of waste water treatment process. **[4]**

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

a) Curd

b) Bioweapons

c) Microbial toxins

d) Biopesticides

e) Polio vacine

f) Membrane filter technique

Total No. of Questions : 5]

SEAT No. :

P-1327

[Total No. of Pages :2

[6056]-301
T.Y. B.Sc. Biotechnology
BBt - 501 : INDUSTRIAL MICROBIOLOGY
(2019 Pattern) (Semester - V) (CBCS)

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

Instructions to the candidates :

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

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

a) What is secondary screening?

b) Write role of disengagement zone in air lift reactor.

c) What is inducer? Give examples.

d) What is designed criteria for steam sterilization?

e) Enlist any four carbon sources used in large scale media.

f) Name the substrates used in SSF.

Q2) a) Describe process of large scale production of vitamin B_{12} w.r.t producing strain, media, optimum conditions and recovery. **[6]**

OR

a) Ellaborate on use of spiral heat exchangers in media sterilization.

b) Explain in detail various valves used in a bioreactor. **[4]**

Q3) a) State importance of floculating agents in recovery of fermentation product. With neat labelled diagram describe plate and frame filter. **[6]**

OR

a) What are analague resistant mutant? Justify grdient plate technique is useful in isolation of analague resistant mutant.

P.T.O.

b) Explain measurement and control of p^H in a fermentation process. **[4]**

Q4) a) Give an account on chemical methods of cell disruption. **[6]**

OR

a) What is media optimization? Explain plackett - Burman design of media optimization.

b) Justify:strain improvement is necessary at industrial scale. **[4]**

Q5) Write short note on (Any four) **[10]**

a) Scale down

b) Significance of giant colony technique

c) Precursor

d) Polyetectrolyte

e) Spray drying

f) Application of alcohol

Total No. of Questions : 5]

SEAT No. :

P-1328

[Total No. of Pages :2

[6056]-302
T.Y. B.Sc. BIOTECHNOLOGY
BBt - 502 : RECOMBINANT DNA TECHNOLOGY
(2019 Pattern) (Semester - V) (CBCS)

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 2 to 5 carry equal marks.***

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

a) Define plasmid.

b) Enlist any two phage vectors and their capacity.

c) Name the cofactors used by E.Coli & T-4 DNA ligase.

d) What is α - complementation?

e) Write the names of enzymes used in 'pyrosequencing'.

f) Define polylinker or multiple cloning site and write its significance.

Q2) a) Explain neo isoschizomerases with examples. **[6]**

OR

Describe the reporter enzymes in R-DT, write its application.

b) Explain 'phagemid' vectors. **[4]**

Q3) a) Explain maxam - gilbert method of DNA sequencing. **[6]**

OR

Describe sanger's method of automated DNA sequencing.

b) Explain the steps involved in c-DNA library construction. **[4]**

P.T.O.

Q4) a) Explain the making of recombinant insulin. **[6]**

OR

Describe 'Gene therapy' giving examples.

b) Name any two types of gene transformation methods. **[4]**

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

a) CRISPER - CAS.

b) Polynucleotide kinase

c) High capacity vectors

d) Steps in molecular cloning

e) Selectable markers

f) Shuttle vectors

Total No. of Questions: 5]

SEAT No. : ____

P1329

[Total No. of Pages :2

[6056]-303
T.Y. B.Sc.
BIOTECHNOLOGY
BBt-503 : Plant Tissue culture
(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) ***Questionn no. 2 to 5 carry equal marks.***

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

a) Define the term totipotency

b) What is meant by aseptic transfer?

c) Write principle and working of horizontal laminar airflow

d) What is explant?

e) Define artificial seeds?

f) Define sector inoculum

Q2) a) Discuss organ culture w.r.t. root and leaf culture Add a note on their applications. **[6]**

OR

What is the importance of embryo and endosperm culture? Describe factors affecting these culture alongwith advantages and disadvantages. **[6]**

b) Describe techniques of testing cell viability and assesing growth measurement in cell suspension culture **[4]**

Q3) a) Define callus. Describe protocol to raise callus culture. Add a note on types of callus. and methods used for maintenance of callus culture **[6]**

OR

Enlist various PGR's used in PTC. Describe their role in growth and development in PTC. **[6]**

b) Describe various stages of micropropagation in details **[4]**

P.T.O.

Q4) a) What is somatic embryogenesis? Describe induction, development and maturation stages of somatic embryogenesis Add a note on applications. **[6]**

OR

Comment on isolated microspore culture write protocol for raising pollen culture. Describe it's benefits over anther culture **[6]**

b) Describe the role of various media components in PTC. **[4]**

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

a) Cytodifferentiation

b) Direct and indirect organogenesis.

c) Sterilization methods

d) Applications of plant tissue culture

e) Methods of protoplast fusion

f) Scientist's contribution in the field of PTC.

Total No. of Questions : 5]

SEAT No. : ____

P1330

[Total No. of Pages : 2

[6056] - 304

T.Y.B.Sc.

BIOTECHNOLOGY

BBt - 504 : Animal Tissue Culture

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

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 carries equal marks.***

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

a) Define contact inhibition.

b) Write role of TPVG in animal tissue culture.

c) Give any two examples of synthetic media.

d) Give contribution of Hayflick & Moorhead in ATC.

e) What is passage number?

f) Name any one cell repository.

Q2) a) What is a primary cell culture? Describe primary culture establishment of lymphocytes. **[6]**

OR

Define cross contamination. Describe different sources of cross - contanination. Also add a note on measures to prevent the same.

b) Enlist different properties of infinite cells in vitro. **[4]**

Q3) a) What is the need for characterization of cell lines? Describe different cytogenetic methods of cell line characterization. **[6]**

OR

Explain the concept of cryopreservation. Also write about cryoprotectants with suitable examples.

b) Mention disadvantagens of serum containing media. **[4]**

P.T.O.

Q4) a) What are organotypic cultures ? Describe different methods to establish these cultures. **[6]**

OR

Elaborate on working principle & uses of Co_2 incubator & inverted microscope.

b) Describe layout of animal tissue culture laboratory. **[4]**

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

a) Insect cell lines.

b) Subculture of suspension cells.

c) Applications of animal tissue culture.

d) Any two physico-chemical parameters of cell cultures.

e) Determination of viable cell count.

f) Balanced salt solution.

Total No. of Questions : 5]

SEAT No. : ____

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T.Y. B.Sc.

BIOTECHNOLOGY

BBt-505: Applied Biotechnology - I

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

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

Instructions to the candidates :

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

Q1) Attempt any Five of the following : **[5 × 1 = 5]**

a) Define 'Bottom up' method.

b) Name two applications of Chitosan.

c) Write an example of cellular diagnostics.

d) Enlist any two types of Briquetting.

e) RFP.

f) Give any four conditions for vermicomposting.

Q2) a) Explain role of sea weeds in metal removal. **[6]**

OR

Describe characterization of Nanoparticles.

b) Liposomes as medicine carriers, explain. **[4]**

P.T.O.

Q3) a) Describe 'composting' in detail. **[6]**

OR

Role of PCR in detection of Covid-19.

b) Explain 'Biochip'. **[4]**

Q4) a) Describe Marine actinobacteria, give its significance. **[6]**

OR

Explain factors involved in solid waste management (any one type).

b) 1L-19 as a biomarker for Covid-19, Justify. **[4]**

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

a) Secondary metabolites of marine organisms.

b) Microalgae.

c) Nanotubes.

d) DNA-reporters.

e) Dendrimers.

f) Nanobots.

Total No. of Questions : 5]

SEAT No. :

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[Total No. of Pages : 2

[6056]-306

T.Y. B.Sc. (Biotechnology)

BBt-506 : BIODIVERSITY & SYSTEMATICS

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

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

Instructions to the candidates:

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

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

a) Define species richness.

b) Enlist the types of biodiversity.

c) Enlist the importance of RED Data book.

d) What is carrying capacity of an ecosystem?

e) Define opportunistic species.

f) Enlist the importance of biodiversity.

Q2) a) Explain the following biodiversity conservation methods : **[6]**

i) In situ conservation methods

ii) Ex situ conservation methods

OR

Explain important molecular tools in taxonomy & add a note on classification systems. **[6]**

b) Explain the major causes of extinction of species. **[4]**

Q3) a) Explain the indices used to calculate biodiversity & add a note on ecological equivalence of a species. **[6]**

OR

Explain important NGO movements & their role in biodiversity conservation.

b) Write a note on biodiversity hotspots. **[4]**.

P.T.O.

Q4) a) Discuss various institutions & their role in biodiversity conservation. **[6]**

OR

Discuss the uses of biodiversity & add a note on methods for sustainable exploitation of biodiversity.

b) Explain the survivorship curves. **[4]**.

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

a) Explain the principles of taxonomy.

b) Wildlife protection act of India.

c) Explain population age structure.

d) Explain the types of Habitat with their flora & falha.

e) Species adapted to human environment explain.

f) Major biodiversity areas of the World.

Total No. of Questions: 5]

SEAT No. : ____

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[6056]-401
T.Y. B.Sc.
BIOTECHNOLOGY
BBt 601: Enzyme and Enzyme Technology
(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 Q.2 to Q.5***
3) ***Q.2 to Q.5 carries equal marks.***

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

a) Purity of enzyme

b) Kcat

c) Zymogen

d) Catabolism

e) Apoenzyme

f) DNA zymes

Q2) a) Give an account on Feedback regulation. **[6]**

OR

Write Michallis-menten equation and add a note on its significance. **[6]**

b) Describe ISO zymes with suitable example. **[4]**

Q3) a) Explain mechanism of lysosomal enzyme degradation pathway. **[6]**

OR

Define immobilization of enzyme. Describe any one method of enzyme immobilization. **[6]**

b) Discuss the mechanism of action of serine protease with suitable example. **[4]**

P.T.O.

Q4) a) Explain Acid-Base catalysis with suitable example. **[6]**

OR

Discuss the effect of Temperature on enzyme activity.

b) Commenton industrial applications of enzymes. **[4]**

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

a) Principle of biosenser.

b) Carrier matrices used in enzyme immobilization.

c) Whole all immobilization.

d) Compartmentation of metabolic pathway.

e) Double reciprocal plot.

f) Clinical applications of enzyme with suitable examples.

Total No. of Questions : 5]

SEAT No. :

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T.Y. B.Sc.

BIOTECHNOLOGY

BBT-602 : Agriculture Biotechnology

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

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

Instructions to the candidates:

1) ***Questions No. 1 is compulsory.***
2) ***Solve any 3 questions from Q2 to Q5.***
3) ***Questions 2 to 5 carries equal marks.***

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

a) Define Agribiotechnology.

b) What is vertical farming?

c) Elaborate the concept of terminator technology.

d) What is meant by hyperplastic deformation?

e) What is phytosanitation?

f) Define aquaponics.

Q2) a) Describe environment & ecological issues associated with the use of biotechnology tools in Agriculture. **[6]**

OR

Describe ventilation system in green house. **[6]**

b) Write short note on transgenic plant development for biotic disease resistance. **[4]**

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Q3) a) What are biopesticides? Describe new techniques of microbial control of plant species for pest control. **[6]**

OR

Describe PCR based molecular market technology. **[6]**

b) Enlist various gene transfer techniques in plants. Describe any two in detail. **[4]**

P.T.O.

Q4) a) Describe the scope and importance of agribiotechnology in India and worldwide. **[6]**

OR

Write necessity for variety purity testing. Describe any two methods to do so. **[6]**

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

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

a) Urban agriculture.

b) Koch's postulates.

c) Recycling of horticultural and animal waste.

d) Use of ICT in agriculture.

e) High-tech green house.

f) None conventional biofertilizers.

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Total No. of Questions : 5]

SEAT No. : ____

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T.Y.B.Sc. (Biotechnology)

BBt-603 : APPLIED BIOTECHNOLOGY-II

(2019 Pattern) (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) ***Questions 2 to 5 carry equal marks.***

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

a) Define omics technology.

b) Define Green technology.

c) What is metabolic network.

d) What is syngas.

e) Name any two classes of marine oils.

f) Define pressure compaction.

Q2) a) Explain in detail second generation of bio fuels. **[6]**

OR

b) Write in detail ethics and policies related to stem cell technology. **[6]**

c) Discuss the impacts of genetically modified crops and foods on human health. **[4]**

P.T.O.

Q3) a) Describe in detail stem cell types and mention therapeutic application of stem cells. **[6]**

OR

b) Write a detailed note on bioactive compounds from various sources. **[6]**

c) Discuss human genome project and its outcome. **[4]**

Q4) a) Describe synthetic biology and its applications. **[6]**

OR

b) Write a note on system biology in detail. **[6]**

c) Give an account of rice 3k project. **[4]**

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

a) Application of chitosans.

b) Third generation bio fuels.

c) Use of biomarkers in disease diagnosis.

d) DNA finger printing.

e) Cord blood banking.

f) In silico models.

Total No. of Questions : 5]

SEAT No. :

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T.Y. B.Sc.

BIOTECHNOLOGY

BBt-604: Food and Pharmaceutical Biotechnology

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

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 2 to 5 carry equal marks.***

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

a) Write any two functions of Macronutrients.

b) Define Nutraceuticals.

c) What are food contaminants?

d) What is pre clinical trial?

e) Explain the term ED50.

f) What is GMP?

Q2) a) What are food adulterants? Discuss their effects on human health. **[6]**

OR

Define non-alcoholic beverages and with suitable examples discuss their health benefits.

b) Give an account on estimation of LD-50. **[4]**

P.T.O.

Q3) a) Explain concept of Rational Drug Discovery. **[6]**

OR

Describe steroid formulation as per IP.

b) Give an account on TQM. **[4]**

Q4) a) Discuss HACCP principle with suitable example. **[6]**

OR

Give an account on edible packaging.

b) Describe WHO guidelines for quality control. **[4]**

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

a) Food allergen.

b) Botulism.

c) QC and QA.

d) Applications of biotechnology in pharma industry.

e) Clinical trials.

f) Role of FDA.

Total No. of Questions : 5]

SEAT No. :

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[6056]-405
T.Y. B.Sc.
BIOTECHNOLOGY
BBt - 605 : Bioinformatics
(2019 Pattern) (Semester - VI) (CBCS)

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) Slove any five of the following: **[5]**

a) Give two examples of protein databases.

b) Write the uses of Dot plot in bioinformatics

c) What is FASTA tool?

d) What is pairwise sequence alignment? Write the types of pairwise alignment.

e) Define microarray.

f) Write any 2 historical development of Bioinformatics.

Q2) a) What are protein classification databases. Explain CATH database in detail **[6]**

OR

a) What is PDB sum. Explain PDB sum in detail.

b) Describe Edman degradation method of protein sequencing. **[4]**

Q3) a) What is dynamic programming? Explain Needleman - wunch algorithm in detail. **[6]**

OR

a) Explain BLAST in detail.

b) What are structure visualization tools? Explain spdbviewer in brief. **[4]**

P.T.O.

Q4) a) Explain PDB file format in detail. **[6]**

OR

a) What is MSA? Explain methods of MSA.

b) What are the data types in bioinformatics? Describe classification & presentation of data in bioinformatics. **[4]**

Q5) Short notes : (Any four) **[4 × 2.5 = 10]**

a) Boolean operaters

b) NMR spectroscopy

c) Applications of Bioinformatics in biotechnology

d) Primary databases

e) Pubmed

f) NGS

Total No. of Questions : 4]

SEAT No. : ____

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T.Y. B.Sc. (Biotechnology)

BBt - 606 : BIOSAFETY & BIOETHICS & IPR

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

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

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three quetions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***
4) ***Figures to right indicate full marks.***
5) ***Draw neat labelled diagram wherever necessary.***

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

a) What is the purpose of Trademark?

b) Enlist any two laws on Biosafety?

c) Write the main objective of world Trade organization.

d) Name the organisms used for research in BSL-z facility.

e) Give the objective behind Indian patent Law.

f) What do you mean by Bioethics.

Q2) a) What is TRIPS Agreement? Outline the issues and features of TRIPS Agreement. **[6]**

OR

Explain role of World Trade Organization in solving IP issues. **[6]**

b) Discuss the autonomy is Bioethics. **[4]**

Q3) a) Explain 'Beneficence' giving examples. **[6]**

OR

Describe biosafety cabinets in details. **[6]**

b) Compare and contrast between patent, Copyright, Trademark and Tradesecret. **[4]**

P.T.O.

Q4) a) Explain the set of rules followed in BSL - 3 lab. **[6]**

OR

Describe ICH-GCP formulation in ethics. **[6]**

b) Explain role of IP protection in progress of Biotechnology research. **[4]**

Q5) Write short note on any FOUR of the following.

a) Features of WIPO. **[10]**

b) Principles of National Treatment.

c) IRB in college for ethics in research.

d) Maleficence.

e) Budapest Treaty.

f) Geographical Indication.

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