Total No. of Questions : 5]

SEAT No. : ____

PD-516

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[6469]-31

S.Y. B .Sc.

BIOTECHNOLOGY

BBt-301 : Cell Biology - I

(Rev. 2019) (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 carries equal marks.***

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

a) Which is the marker enzyme of lysosome?

b) State major functions of gap junctions.

c) Which is the smallest cell?

d) How is membrane fluidity maintained?

e) Enlist different types of plastids.

f) State the role of SER.

Q2) a) What is active transport? With the help of well-labelled diagram explain sodium-potassium pump. **[6]**

OR

Describe ultrastructure and functions of Golgi bodies. **[6]**

b) Describe ECM. State its functions. **[4]**

P.T.O.

Q3) a) Explain organisation of 'fluid mosaic' model. Comment on functions of plasma membrane. **[6]**

OR

What are cell junctions? Explain any two types of junctions in detail. **[6]**

b) Explain postulates of cell theory. **[4]**

Q4) a) With the help of well labelled diagram describe structure and function of nucleus comment on its role is heredity. **[6]**

OR

Give a brief account on different types of cyto skeleton. **[6]**

b) Explain the process of receptor mediated endocytosis. **[4]**

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

a) Cellular diversity

b) Endosymbiotic theory

c) Functions of E.R.

d) Faciliated diffusion

e) Role of membrane proteins

f) Uniport and Antiport

Total No. of Questions : 5]

SEAT No. :

PD-517

[Total No. of Pages : 2

[6469]-32

S.Y. B .Sc. BIOTECHNOLOGY

BBt-302 : Molecular Biology - I

(Rev.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 Q.2 to Q.5.***
3) ***Questions 2 to 5 carries equal marks.***

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

a) Define Gene.

b) What are the Promoters.

c) Explain Nucleotide.

d) What is Replicon.

e) Define Nucleosomes.

f) Mention the Non-coding RNA.

Q2) a) Enlist the salient features of DNA Double helix given by Watson & Click with diagram. **[6]**

OR

Describe Griffith Experiment in detail. **[6]**

b) Write the properties of Genetic code. **[4]**

P.T.O.

Q3) a) Explain the Beads on a string model of chromosome compaction. **[6]**

OR

Enlist and explain sequential steps involved in prokaryotic DNA replication. **[6]**

b) Write a short note on mitochondrial DNA and give its significance. **[4]**

Q4) a) Explain in detail about initiation of replication in Eukaryotes. with diagram. **[6]**

OR

Write a note on enzymes involved in DNA replication. **[6]**

b) Differentiate Euchromatin and Heterochromatin. **[4]**

Q5) **Wtire short notes on any Four :** **[10]**

a) Helicose Enzyme

b) Triplet hypothesis

c) Bidirectional replication

d) Primer

e) Okazaki Fragment

f) Chargaff's Rule

Total No. of Questions : 5]

SEAT No. :

PD-518

[Total No. of Pages : 2

[6469]-33

S.Y. B .Sc.

BIOTECHNOLOGY

BBt - 303 : Genetics

(Rev. 2019) (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) Define heredity.

b) What is mean by pleiotropy?

c) Name two types of chromosomal aberrations.

d) What is difference between homogametic and heterogametic sex determination.

e) What karyotype observed in klinefelter's syndrome?

f) What is recombination frequency?

Q2) a) Describe Mendel's experiments with pea plants, highlighting the key findings that led to the formation of the law of inheritance. **[6]**

OR

Discuss the concept of penetrance and expressivity with example of genetic traits showing variation.

b) Define Epistasis and describe how it alters mendelien ratior. **[4]**

P.T.O.

Q3) a) Explain the different classification of mutations and their molecular basis. **[6]**

OR

Explain the process of sex determination in different organisms, comparing the XY, ZW and haplo-diploidy systems.

b) Explain the inheritance of Hemophilia as an X-linked disorder. **[4]**

Q4) a) Define co-incidence and interference, their significance in genetic recombination and how they can affect crossing over events. **[6]**

OR

Describe the process of genetic counselling and how it aids in prevention and management of genetic disorder.

b) Elaborate on hot spot mutations with respect to genetic variability. **[4]**

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

a) Autosomal dominant disorder

b) Law of independent assortment

c) X-Inactivation

d) Sickle cell anemia

e) Barr bodies

f) Mutagens with two example

Total No. of Questions : 5]

SEAT No. :

PD-519

[Total No. of Pages : 2

[6469]-34

S.Y. B .Sc.

BIOTECHNOLOGY

BBt-304 : Metabolism

(Rev. 2019) (Semester - III)

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

Instructions to the candidates :

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

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

a) Glycogenin.

b) Anabolism-define.

c) Phosphoanhydride bond.

d) Define free energy change.

e) What is enthalpy?

f) Define essential amino acids.

Q2) a) Comment on the metabolic reactions for the de novo synthesis of pyrimidines. **[6]**

OR

Discuss the fats of glucose oxidation in aerobic conditions.

b) Explain the role of ketone bodies as a source of energy. **[4]**

P.T.O.

Q3) a) Discuss the mechanism of excretion of nitrogen in ureotalic organisms. **[6]**

OR

Explain the reactions involved in pentose phosphate pathway.

b) Comment on the significance of salvage pathway in nucleotide metabolism. **[4]**

Q4) a) Explain the reactions for β oxidation of an even chain fatty acid. **[6]**

OR

Discuss how the glycogen stored in hepatocyte cells metabolized for production of glucose.

b) Comment on fatty acid synthase as multi enzyme complex. **[4]**

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

a) Carnitins shuttle

b) Biosynthesis of cholesterol

c) Transdeamination.

d) Regulation of TCA cycle

e) High energy rich compounds

f) Harmonal regulation of metabolism.

Total No. of Questions : 5]

SEAT No. :

PD-520

[Total No. of Pages : 2

[6469]-35

S.Y. B .Sc.

BIOTECHNOLOGY

BBt-305 : Environmental Biotechnology

(Rev - 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 Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

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

a) Define Red data book.

b) Define Global warming.

c) Mention any two green house gases.

d) Define Homeostasis.

e) Significance of BOD.

f) What is meant by ELNINO?

Q2) a) What is ecological indicator? Enlist various types of indicators and explain in brief. **[6]**

OR

What is ecological energetics? Describe the energy flow in a typical ecosystem.

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

P.T.O.

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

OR

Give sources and consequences of water pollution.

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

Q4) a) Discuss the procedure for EIA with the help of case study. **[6]**

OR

Define ecological succession? Explain general process of succession.

b) Explain about different types of food chain and food web. **[4]**

Q5) **Wtire a short note on any Four of the following :** **[10]**

a) Biosphere

b) Write a short note on trophic level

c) Bioaugmentation

d) Energy Budget

e) Ozone layer Deplition

f) Integrated waste management

Total No. of Questions : 5]

SEAT No. : ____

PD-521

[Total No. of Pages : 2

[6469]-36

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 Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

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

a) Define Sedimentation coefficient.

b) What is the role of TEMED in SDS-PAGE.

c) Give any two limitations of Beer's Lamberts Law.

d) Write significance of stationary phase in chromatography.

e) Comment on chemical safety in laboratory.

f) What do you mean by maximum absorbance.

Q2) a) Describe in detail, double beam spectro photometer with the help of diagram and mention its significance. **[6]**

OR

Define centrifugation, Explain principle and process of differential centrifugation with suitable example. **[6]**

b) Give an account on accuracy and errors in biological experiments. **[4]**

P.T.O.

Q3) a) Write explantary note on column chromatography with respect to packing of column, sample application and column development and applications. **[6]**

OR

Explain SDS-PAGE in detail. **[6]**

b) Discuss the electromagnetic radiations and its functions. **[4]**

Q4) a) Describe in detail process and significance of Cation and Anion exchange chromatography. **[6]**

OR

What are the different factors influence the rate of migration of molecules in Agarose gel electrophoresis. **[6]**

b) Elaborate on Isopycnic centrifugation with suitable diagram. **[4]**

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

a) Absorbance and transmittance

b) Thin layer chromatography

c) Significance of buffers in Biology

d) Gel permeation chromatography

e) Swinging bucket rotors

f) Staining of gels in electrophoresis

Total No. of Questions : 5]

SEAT No. :

PD522

[Total No. of Pages : 2

[6469]-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) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions Q.2 to Q.5 carry equal marks.***

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

a) Define Interphase.

b) What is apoptosome?

c) Mention role of p^{53} and p^{Rb} gene.

d) Define signalling molecules.

e) What is hydrophobic ligands?

f) What is calmodulin?

Q2) a) Illustrate diagrammatically strages of mitosis and highlights its significance. **[6]**

OR

Explain in detail, G-protein receptors with example.

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

Q3) a) Define meiosis I and explain its phases with the help of neat labelled diagram. **[6]**

OR

Compare and contrast between ferroptosis and lysoptosis.

b) Illustrate with help of diagram, various types of cell signalling. **[4]**

P.T.O.

Q4) a) Describe the mechanism of calcium mediated cell signalling and add note on its significance. **[6]**

OR

Describe in detail, Ageing Theories.

b) Explain different check points of cell cycle. **[4]**

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

a) Secondary messenger.

b) Significance of meiosis.

c) Autophagy.

d) Syncrine signalling.

e) Neoplasia.

f) Cyclin dependent Kinases.

Total No. of Questions : 5]

SEAT No. : ____

PD523

[Total No. of Pages : 2

[6469]-42
S.Y.B.Sc.
BIOTECHNOLOGY
BBt-402 : Molecular Biology - II
(Revised 2019 Pattern) (Semester - IV)

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]**

a) Define exons.

b) Enlist transcription inhibitors.

c) State the role of sigma factor.

d) What is positive regulation?

e) Comment on TATA box

f) What is operon?

Q2) a) Write a note on transcription in prokaryotes. **[6]**

OR

What is post translation modification. Add a note on glycosylation of proteins. **[6]**

b) Justify - light activated repair mechanism. **[4]**

Q3) a) Elaborate protein synthesis in prokaryotes. **[6]**

OR

Discuss mechanism of splicing in detail. **[6]**

b) Describe the process of mismatch repair **[4]**

P.T.O.

Q4) a) Describe lac operon in detail. **[6]**

OR

What is excision repair mechanism. Add a note on Nucleotide excision repair. **[6]**

b) Give the details of 5'- capping process. **[4]**

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

a) Charging of t-RNA.

b) Promoter clearance.

c) Polyadenylation of mRNA.

d) Attenuation

e) Role of SRP.

f) Significance of enhancers and suppressors.

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Total No. of Questions : 5]

SEAT No. :

PD524

[Total No. of Pages : 2

[6469]-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) ***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 Adjuvant.

b) Write full form of MALT and RIA.

c) What is the difference between epitope and paratope?

d) What do you mean by Antigenicity?

e) Define opsonin.

f) What are Natural killer cells?

Q2) a) Differentiate between primary and secondary lymphoid organs. Illustrate structure and function of one organ of each type. **[6]**

OR

Draw a well labelled diagram of Immunoglobulin. Write functions of different types of Immunoglobulins.

b) Discuss components of Innate Immune System. **[4]**

Q3) a) What are Autoimmune diseases? Discuss any two Autoimmune diseases in detail. **[6]**

OR

Give principle of ELISA. Diagrammatically illustrate different types of ELISA.

b) Define adaptive immunity. Differentiate between Humoral and Cell-Mediated Immunity. **[4]**

P.T.O.

Q4) a) What are the components of complement system? Discuss Alternate pathway of complement system. **[6]**

OR

Give an account of

i) Combined Vaccine

ii) Live Attenuated Vaccine

iii) Sub unit Vaccine

b) Define Antigen-Antibody Interaction. Describe characteristics of Antigen-Antibody interaction with the help of an example. **[4]**

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

a) Significance of cytokines.

b) Type IV Hypersensitivity.

c) Monoclonal Antibody.

d) Chimeric Antibody.

e) Phagocytosis

f) Zone phenomenon.

Total No. of Questions : 5]

SEAT No. : ____

PD525

[Total No. of Pages : 2

[6469]-44
S.Y.B.Sc.
BIOTECHNOLOGY
BBt-404 : Animal Development
(Revised 2019 Pattern) (Semester - IV)

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 carry equal marks.***

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

a) Define committment of cells during development.

b) State the role of germ band in Drosophila embriyo.

c) Name the process of regeneration in hydra.

d) Give any one example of transdifferentiation.

e) Bindin plays important role in fertilization. Justify.

f) What is primary induction?

Q2) a) Describe the process of spermatogenesis in detail. Add a note on structure of sperm with neat labelled diagram. **[6]**

OR

Explain the process of fertilization in mammals. **[6]**

b) Stem cells are vital for embryogenesis. Explain features, role and pathway of differentiation of stem cells during embryogenesis. **[4]**

Q3) a) Describe the process of three germ layer formation in Amphioxus. Mention fates of those germ layers. **[6]**

OR

Describe the process of three germ layer formation in frog. Mention fates of those germ layers. **[6]**

b) Elaborate on different types of holoblastic cleavage. **[4]**

P.T.O.

Q4) a) What are maternal effect genes? Explain their role in Drosophila pattern formation. **[6]**

OR

Explain the cortical granule reaction in detail. Add a note on its significance. **[6]**

b) Give details of primary neurulation during the process of morphogenesis. **[4]**

Q5) Write short notes on any 4 of the following. **[10]**

a) Role of apoptosis in development

b) Ageing

c) Epimorphosis in animals

d) C. elegans as a model system in developmental biology

e) Types of eggs

f) Teratogenesis

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Total No. of Questions : 5]

SEAT No. :

PD526

[Total No. of Pages : 2

[6469]-45
S.Y.B.Sc.
BIOTECHNOLOGY
BBt - 405 : Plant Development
(Revised 2019 Pattern) (CBCS) (Semester - IV)

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) Explain the terms competance and determination.

b) Define developmental plasticity.

c) What is placentation? Enlist types of placentation.

d) What is meant by hydrophily? Give examples of it.

e) Write difference between chalazogamy & porogamy.

f) Define parthenocarpy & apomixis.

Q2) a) Describe the types of dicot embryogeny with suitable examples. **[6]**

OR

Describe the structure of root apex. Explain the developmental phases/stages occuring in RAM.

b) Compare animal and plant development. **[4]**

Q3) a) Comment on cellular and developmental changes occuring during senescence and ageing. **[6]**

OR

Explain phytochrome system of floral induction with appropriate diagrams.

b) With suitable diagram describe T.S. of mature anther. Comment on microspore tetrad types. **[4]**

P.T.O.

Q4) a) Describe ABC model of floral development. Add a note on importance of Arabidopsis as a model system to study flower development. **[6]**

OR

Define allogamy. Describe methods to ensure allogamy in angiosperms.

b) Write short note on photoperiodism and vernalisation. **[4]**

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

a) Structure of mature pollen grain and sperm in angiosperms.

b) Arithmatic and Geometric growth.

c) Types of female gametophyted development.

d) Double fertilization and triple fusion.

e) Types of seed germination.

f) Life cycle of angiosperms with suitable diagram.

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Total No. of Questions : 5]

SEAT No. :

PD527

[Total No. of Pages : 2

[6469]-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) ***Q.1 is compulsory.***
2) ***Solve any three questions from 2 to 5.***
3) ***Q.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 difference between exotoxin and endotoxin?

b) What is false presumptive test?

c) Enlist microorganisms used as biofertilizer.

d) Define : Canning

e) Write mode of action of chlorine.

f) Give significance of Eijkmann test.

Q2) a) Explain method of preservation of milk and add a note on test to check efficiency of Pasteurization. **[6]**

OR

Give a Detail description of any two aerobic treatment process used in waste water treatment.

b) What is food intoxication? Describe Botulism in detail. **[4]**

P.T.O.

Q3) a) Describe Polio in detail with following points. **[6]**

i) Causitive agent

ii) Pathogenesis

iii) Symptoms

iv) Treatment

OR

Write various principles of food preservation? Explain use of added and developed Preservatives in food Preservation.

b) Write a note on: Microbial sweetners. **[4]**

Q4) a) Explain presumptive test in detail. also add significance of use of lactose bile broth in presumptive test. **[6]**

OR

Enlist extrinsic and intrinsic factors affecting growth of microorganisms in food. Describe various biochemical reactions involved in spoilage of fruits & vegetables.

b) Take a brief account on opportunity and challenges of use of synthetic Biology for human welfare. **[4]**

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

a) Bioleaching

b) Colour defects in milk.

c) BOD & COD

d) Tuberculin Skin test

e) MBRT

f) DOT (Direct observation Therapy) for tuberculosis.

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Total No. of Questions : 5]

SEAT No. : ____

PD-528

[Total No. of Pages : 2

[6469] - 51
T.Y.B.Sc.
BIOTECHNOLOGY
BBt-501-Industrial Microbiology
(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) ***Questions 2 to 5 carry equal marks.***

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

a) Define Fermentation

b) Give role of steam trap

c) What is chelators in Fermentation media. Give 2 examples.

d) Enlist 2 carbon sources used in fermentation media.

e) Define scale down

f) Give role of filter aids during downstream processing.

Q2) a) Discuss methods of media sterilization **[6]**

OR

Explain the need of air sterilization and give its principle. **[6]**

b) Discuss physico-mechanical methods for cell disruption. **[4]**

P.T.O.

Q3) a) Define strain improvement and explain method of strain improvement for auxotrophic mutants. **[6]**

OR

Give an account on placket and Burman design **[6]**

b) Describe measurement and control of pH during fermentation. **[4]**

Q4) a) Describe the large scale manufacturing process of Vit B_{12} with respect to production strain fermentation media and conditions, recovery. **[6]**

OR

Give concept of unit operation and discuss following downstream processing. **[6]**

i) Precipitation ii) Drying

b) Explain construction and working of fluidized bed reactor. **[4]**

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

a) Objectives of primary screening

b) Solid state fermentation

c) Types of agitator

d) Construction material of fermenter

e) Rotary vacuum filter

f) Del factor.

Total No. of Questions : 5]

SEAT No. : ____

PD-529

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[6469] - 52
T.Y. B.Sc.
BIOTECHNOLOGY
BBt-502-Recombinant DNA Technology
(Revised 2019) (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 - Host

b) Mention role of DNA ligases.

c) What do you mean by 'Shuttle Vectors'

d) Enlist any 2 advantages of bacteriophage vectors over other vectors.

e) What are DNA or Genomic libraries?

f) Give any two examples of recombinant products available commercially.

Q2) a) Write a detailed note on principle, method & applications of "polymerase chain reaction". **[6]**

OR

a) Describe CRISPR/cas 9 as genome editing tool. **[6]**

b) How is alkaline phosphatases used in recombinant DNA technology. **[4]**

P.T.O.

Q3) a) What is cDNA? Mention how cDNA is synthesized & cDNA libraries are formed? **[6]**

OR

a) Explain principle, working & applications of 'automated DNA sequencing'. **[6]**

b) Elaborate on 'cosmid vectors'. **[4]**

Q4) a) Describe in detail about 'restriction endonucleases type II'. Add a note on use of Restriction enzymes in RDT. **[6]**

OR

a) Write a descriptive note on 'Gene therapy' **[6]**

b) Enlist names & applications of any four DNA modifying enzymes. **[4]**

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

a) Real time PCR

b) Production of recombinant insulin

c) Applications of genomic libraries

d) Ti - plasmid vectors

e) Advantages of Next. Generation sequencing method

f) M-13 phage vectors.

Total No. of Questions : 5]

SEAT No. : ____

PD-530

[Total No. of Pages : 2

[6469] - 53
T.Y.B.Sc.
BIOTECHNOLOGY
BBt-503: Plant Tissue Culture
(Rev. 2019) (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 cellular totipotency.

b) Explain the role of filter sterilization in PTC.

c) What is hyperhydration?

d) Define critical initial density.

e) Write definition of androgenesis.

f) What are somatic hybrids and cybrids.

Q2) a) Explain the ideal PTC laboratory setup in details. What are the major differences in research & commercial laboratory. **[6]**

OR

a) What is Micropropagation? Describe the stages of micropropagation. Add a note on advantages and disadvantages of this technique. **[6]**

b) Write a note on protoplast isolation and culture. **[4]**

P.T.O.

Q3) a) Describe somatic embryogenesis technique. Write difference between IEDC'S & PEDC'S. Add a note on factors affecting this technique. **[6]**

OR

a) What is embryo rescue? Write applications and limitations of embryo & endosperm culture. **[6]**

b) Describe callus culture technique. Add a note on types of callus & applications of callus culture. **[4]**

Q4) a) Enlist different methods to measure growth of cells in suspension culture. Describe any three in details. **[6]**

OR

a) What are the cultural requirements of anther and pollen culture. Write methods of diplodization of haploid plants. Add a note on advantages of androgenesis. **[6]**

b) Which PTC technique is used to raise virus free plants. Write importance of organ culture. **[4]**

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

a) Cytodifferentiation

b) Artificial seed production

c) Horizontal air flow cabinets.

d) History of plant Tissue culture.

e) Use of PGR's in PTC

f) Protoplast fusion techniques.

Total No. of Questions : 5]

SEAT No. : ____

PD-531

[Total No. of Pages : 2

[6469] - 54
T.Y.B.Sc.
BIOTECHNOLOGY
BBt - 504: Animal Tissue Culture
(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) ***Questions 2 to 5 carry equal marks.***

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

i) Define feeder layer.

ii) Give any two examples of insect cell line.

iii) Mention role of CO_2 in ATC culture system

iv) Write any two mechanical methods of tissue disaggregation

v) What is cell factory?

vi) Define split ratio.

Q2) a) Describe methodology of lymphocyte culture. Comment on its applications. **[6]**

OR

What is cross contamination? Write any one method to detect it. Suggest control measures to avoid cross contamination in culture. **[6]**

b) Write a note on laminar air flow. **[4]**

P.T.O.

Q3) a) A write down criteria to subculture the cell line comment on proper timing of subculture during the maintenance of cell line **[6]**

OR

Describe different methods of organ culture. Comment on its disadvantages over cell culture. **[6]**

b) Write down applications of ATC. **[4]**

Q4) a) A comment on importance of cell line characterization. Write in detail characterization of cell line using isoenzymes **[6]**

OR

Write in detail about composition of serum. Comment on advantages of serum containing media. **[6]**

b) Describe features of transformed cell lines. Give any two examples of such cell lines. **[4]**

Q5) Short notes on (any four) **[10]**

i) Cryoprotectants and their role in ATC.

ii) Cell passage number and its significance.

iii) Cell repository

iv) Growth conditions for mammalian cell culture.

v) Monolayer culture

vi) Culture vessels used in ATC.

Total No. of Questions : 5]

SEAT No. : ____

PD-532

[Total No. of Pages : 2

[6469] - 55
T.Y.B.Sc.
BIOTECHNOLOGY
BBt - 505: Applied Biotechnology - I
(Rev. 2019) (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 Q.5 carry equal marks.***

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

a) Write two applications of barophillic bacteria.

b) Enlist two applications of RFP.

c) Define Bioactive peptide.

d) Give two examples of secondary minerals.

e) Define top down approach.

f) Biomass briquetting.

Q2) a) What is Biochip, write its application. **[6]**

OR

a) Explain cellular diagnostics giving example. **[6]**

b) Describe the metabolites obtained from marine actinobacteria. **[4]**

P.T.O.

Q3) a) Attempt any two of the following : **[6]**

i) Biomarkers

ii) SNP

iii) Chemiluminance

b) Explain in detail microalgae and its uses. **[4]**

Q4) a) Describe fundamental aspects and technologies involved in briquetting. **[6]**

OR

a) Name different types of compost and the process involved in it. **[6]**

b) Explain production and importance of microalgae. **[4]**

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

a) Bottom up method

b) Fluorogenic reporters

c) Cellular diagnostics

d) Biochip

e) Nanomedicine

f) GFP

Total No. of Questions : 5]

SEAT No. : ____

PD-533

[Total No. of Pages : 2

[6469] - 56
T.Y. B.Sc.
BIOTECHNOLOGY
BBt-506-Biodiversity and Systematics
(Revised 2019) (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]**

i) Define biodiversity.

ii) Define niche.

iii) Enlist any two biodiversity hotspots.

iv) Enlist characteristics of r-selected species

v) What is chipko movement?

vi) Enlist importance of RED Data Book.

Q2) a) Explain the role of Zoological Survey of India (ZSI) and Botanical Survey of India (BSI) in biodiversity conservation. **[6]**

OR

a) Give an account of biodiversity indices. Give the significance of simpson's diversity index. **[6]**

b) Explain natural and phylogenetic system of classification. **[4]**

P.T.O.

Q3) a) Explain the importance of molecular and morphological tools used in systematics. **[6]**

OR

a) Define habitat. Explain in the types of habitat **[6]**

b) Justify the significance of in situ conservation methods over ex-sire conservation. **[4]**

Q4) a) Explain the growth curves of population. **[6]**

OR

a) Explain the uses of biodiversity. **[6]**

b) Explain the importance of taxonomy and nomenclature. **[4]**

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

i) Explain any two behaviour patterns of animals.

ii) Concept of opportunistic species.

iii) IUCN categories

iv) Genetic diversity

v) Principles & objectives of taxonomy.

vi) Age class distribution of population.

Total No. of Questions : 5]

SEAT No. :

PD534

[Total No. of Pages : 2

[6469]-61
T.Y. B.Sc.
BIOTECHNOLOGY
BBt-601 : Enzyme and Enzyme Technology
(Revised 2019 Pattern) (Semester - VI)

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

Instructions to the candidates:

1) ***Q1 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) Ribozymes

b) Kcat

c) Transaminases

d) Ubiquitinylation

e) Apoenzyme

f) Allosteric site

Q2) a) Define metal ion catalysis. Explain with an appropriate example. **[6]**

OR

Explain the behaviour of enzyme activity with change in pH of reaction mixture.

b) With representative example explain covalent modification. **[4]**

Q3) a) Explain non-lyzosomal pathway of Protein degradation. **[6]**

OR

Discuss the adsorption mechanism of enzyme immobilization with example.

b) Give the significance of Lineweaver Burk plot. **[4]**

P.T.O.

Q4) a) Discuss the components of enzyme biosensor mention an example. **[6]**

OR

Comment on organization of enzymes in cells and its role in enzyme regulation.

b) Explain the mechanism of action of chymotrypsin. **[4]**

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

a) Multienzyme complex

b) Clinical enzymes

c) Whole cell immobilization

d) Metal activated enzymes

e) Proteolytic enzymes in meat and leather industry

f) Induced bit mechanism

Total No. of Questions : 5]

SEAT No. :

PD535

[Total No. of Pages : 2

[6469]-62
T.Y.B.Sc.
BIOTECHNOLOGY
BBt-602 : Agriculture Biotechnology
(Revised 2019 Pattern) (Semester-VI)

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

Instructions to the candidates:

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

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

a) Define Urban Agriculture.

b) What is the role of genetically modified biofertilizers?

c) Define pathogen diagnosis.

d) Two examples of horticulture wastes used in Livestock.

e) Write the two roles of ICT in agriculture.

f) Write two techinques used for direct gene transfer in plants.

Q2) a) Write a detail note on development of draught resistance crop. **[6]**

OR

Describe the strategies to develop suitable biofertilizers. **[6]**

b) Detail out indirect gene transfer techniques in plants. **[4]**

P.T.O.

Q3) a) Write Any two: **[6]**

i) Targets of herbicide action. **[3]**

ii) Molecular marker assisted breeding. **[3]**

iii) Strategies to develop a suitable green house. **[3]**

b) Describe Methodologies involved in developing transgenic crop resistant against bacterial diseases. **[4]**

Q4) a) Elaborate role of biotechnology in recycling of horticulture waste and its various applications. **[6]**

OR

Detail out the process of developing transgenic crops against herbicides. **[6]**

b) Differentiate between conventional & Modern Agriculture Methods. **[4]**

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

a) Abiotic stress

b) Modern Agriculture Biotechnology

c) Industrial Biopesticides

d) Transgenic plant against insect diseases

e) Quality control in developing Biofertilizer

f) Gene gun/ Microprojectile

Total No. of Questions : 5]

SEAT No. :

PD536

[Total No. of Pages : 2

[6469]-63
T.Y. B.Sc.
BIOTECHNOLOGY
BBt-603 : Applied Biotechnology - II
(Revised 2019 Pattern) (Semester - VI)

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

Instructions to the candidates:

1) ***Q1 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 omics technology?

b) What is Insilico model?

c) Define biofuel.

d) Mention two applications of DNA profiling in forensic medicine.

e) Define stem cell.

f) What is metabolic network?

Q2) a) Explain ecological risk associated to GM food with respect to disruption of food web. **[6]**

OR

What is graph theory in biological networks? Explain directed graph in brief.

b) Enlist 10 essential public health services. **[4]**

Q3) a) Explain DNA profiling and give its application in Forensic. **[6]**

OR

How synthetic biology is used for production of Bioactive compounds? Explain with example.

b) Give the classification of stem cell on basis of potency. **[4]**

P.T.O.

Q4) a) What is green technology. Explain with respect to wind energy. **[6]**

OR

Explain rice 3k project in brief. Give its future aspect.

b) Explain molecular Interaction modelling and its types. **[4]**

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

a) Applications of DNA finger printing.

b) Cord blood banking

c) GUARDIAN

d) Sustainable development

e) Nitrogen cycle

f) Gene regulatory network

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

PD537 **[Total No. of Pages : 2**

[6469]-64
T.Y.B.Sc. (Biotechnology)
BBt - 604 : FOOD AND PHARMACEUTICAL BIOTECHNOLOGY
(Revised 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) What is preclinical evalution study?

b) What is microdosing?

c) What is NDA?

d) Define macronutrients.

e) Enlist names of two enzyme as food processing aids.

f) What is food infection?

Q2) a) Explain rational drug discovery. **[6]**

OR

Write the applications of pharmaceutical biotechnology.

b) Explain the role of microbes in pharmaceutical industry. **[4]**

Q3) a) What are nutraceuticals? Give its importance. **[6]**

OR

What are food adultrants? Discuss its harmful effect on human health.

b) Explain the role of quality assurane in Food industry. **[4]**

P.T.O.

Q4) a) What are probiotics? Explain the mechanisms of probiotics in our body. **[6]**

OR

Describe in detail penicillin preparation as per IP.

b) Describe phase I clinical trial. **[4]**

Q5) Write short notes on (any 4) **[10]**

a) Plant as a source of drugs

b) Role of FDA

c) Clean rooms

d) Dietary Fibers

e) FSSAI

f) Sweet Toddy

Total No. of Questions : 5]

SEAT No. :

PD538

[Total No. of Pages : 2

[6469]-65
T.Y. B.Sc.
BIOTECHNOLOGY
BBt-605 : Bioinformatics
(Revised 2019 Pattern) (Semester - VI)

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

Instructions to the candidates:

1) ***Q1 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 record.

b) Give 2 examples of secondary database.

c) What is sequencing?

d) What are public data resources?

e) Give 2 examples of protein visualization tools.

f) Elaborate DDBT & SCOP.

Q2) a) What is biological database? Classify with suitable examples. **[6]**

OR

What is BLAST? Explain principle and steps involved in performing BLAST.

b) Micro array is good data generation tool. Justify. **[4]**

Q3) a) Give different methods of alignment and explain dot matrix in detail. **[6]**

OR

Enlist various file format available for data presentation. Explain PDB file format.

b) Write a short note on data retrieval systems used in bioinformatics. **[4]**

P.T.O.

Q4) a) Describe SPDBV in detail. Comment on different styles available for protein structure visualization by visualizing programme. **[6]**

OR

What is algorithm? Give comparative account of Needleman wunch & smith-waterman algorithm.

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

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

a) Use of Bioinformatics in Biotechnology

b) PDB sum

c) MMCIF Format

d) BLOSUM

e) Secondary protein structure

f) SRS

Total No. of Questions : 5]

SEAT No. :

PD539

[Total No. of Pages : 2

[6469]-66

T.Y. B.Sc. (Biotechnology)

BBt-606 : BIOSAFETY AND BIOETHICS AND INTELLECTUAL PROPERTY RIGHTS

(Revised 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 IPR.

b) Name any two examples of GMOs in agriculture.

c) Expand PPE.

d) Mention criterias of patentability.

e) d value.

f) Non-malficence.

Q2) a) Discuss in detail objectives and role of WIPO. **[6]**

OR

Write explanotory note on history of GATT and creation of WTO. **[6]**

b) Explain bleech should not be used to sterlize laboratory. **[4]**

Q3) a) Explain confidentiality is not related to autonomy. **[6]**

OR

Should it be allowed to donate organs by euthanasia. Explain. **[6]**

b) Describe Bind apart treaty. Mention the types of biological material accepted by IDA. **[4]**

P.T.O.

Q4) a) What are roles of biosafety officer. **[6]**

OR

MSDS does not provide all safety information. Explain. **[6]**

b) What is TRIPS agreement? Describe its significance. **[4]**

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

a) Indian patent law

b) CDC

c) Geographical Indication

d) BSC

e) NIH

f) Trademarks