Total No. of Questions : 5]

SEAT No. : ____

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[Total No. of Pages : 2

[6156]-51
T.Y. B.Sc. (Biotechnology)
BBt 501 : INDUSTRIAL MICROBIOLOGY
(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 2 to 5 carry equal marks.***

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

a) Enlist various inhibitors used in media.

b) Write any two characteristics of ideal fermenter.

c) What is solid? State fermentation.

d) Write any two roles of culture collection centers of industrially important microorganisms.

e) Define : Del factor

f) What is Primary screening?

Q2) a) With neat labelled diagram describe construction and working Principle of pocked bed reactor. **[6]**

OR

Explain continuous sterilization process and add its advantages and disadvantages.

b) Justify: Fixed pore filters are used to prepare virus free media. **[4]**

Q3) a) What is strain improvement? Describe in detail. Primary screening methods used for selection of industrially important microorganisms. **[6]**

OR

What is centrifugation? Describe Disc bowl centrifuge in detail with diagram.

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

P.T.O.

Q4) a) Describe Large Scale Manufacturing process of citric acid w.r.t. production strain, Fermentation media, growth condition and recovery process. **[6]**

OR

Describe machanism of rotary Vacuum filter.

b) Explain use of high pressure homogeniser in cell disruption. **[4]**

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

a) Scale up

b) Drum drying.

c) Auxotrophic mutant.

d) Fed - Batch culture.

e) Surface treatments of bioreactor.

f) Nitrogen sources used in Fermentation media.

Total No. of Questions : 5]

SEAT No. :

P6418

[Total No. of Pages :2

[6156] - 52
T.Y.B.Sc. (Biotechnology)
BBT 502 : R-DNA TECHNOLOGY
(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 question No.2 to Question No.5.***
3) ***Question No.2 to No.5. carry equal marks.***

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

a) What is recombinant DNA?

b) Explain characteristics of a good vector.

c) State the role of ligases enzyme.

d) What is Host organism

e) State applications of genomic library.

f) Define transformation

Q2) a) What are restriction enzymes? How are they useful in R-DNA technology. **[6]**

OR

Write a detailed note on signifecance & role of alkaline phosphatases in R-DNA technology. **[6]**

b) Describe Lambda phage vectors in brief. **[4]**

P.T.O.

Q3) a) How is cDNA synthesized? How cDNA libraries are constructed? Mention applications of it. **[6]**

OR

Comment on: **[6]**

i) Cosmid vectors

ii) Phagemid vectors

b) Explain how is R-DNA constructed & transformed? Describe basic mechanism of it with applications. **[4]**

Q4) a) Describe Sanger's enzymatic method of DNA sequencing. **[6]**

OR

Write a detailed note on PCR. Mention types of PCR & its applications. **[6]**

b) Comment on CRISPR-Cas 9 as genome editing tool. **[4]**

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

a) PBR 322

b) Gene therapy

c) Recombinant insulin production

d) M 13 vectors

e) Application of DNA polymerase in RDT

f) Real time PCR.

Total No. of Questions : 5]

SEAT No. :

P-6419

[Total No. of Pages : 2

[6156]-53

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

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

a) Define chemostat & turbidostat.

b) Define hyper hydration.

c) Enlist different methods of artificial plant propagation.

d) Define totipotency and developmental plasticity.

e) Importance of physical environment on *invitro* growth of plants.

f) Comment on filter sterilization techniques.

Q2) a) Write principle of haploid culture. Describe isolated pollen pollen culture method in detail. Add a note on applications of haploids. **[6]**

OR

Enlist essential nutrients for healthy plant growth with their role. Write the role of PGR in invitro growth of plants.

b) What is callus? Write downstream applications of callus culture. **[4]**

P.T.O.

Q3) a) What is somatic hybridization? Explain the methods of protoplast isolation, culture & fusion. **[6]**

OR

What is organ culture? Comment on leaf and ovule culture.

b) Write applications of plant tissue culture. **[4]**

Q4) a) Describe methods of artificial seed production with any one method in detail. Add a note on applications of artificial seeds. **[6]**

OR

What is cell suspension culture? Write a note on immobilisation of hairy root culture & synchronisation of suspension cultures.

b) Write applications of embryo and endosperm culture. **[4]**

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

a) Micropropagation

b) Cytodifferentiation

c) Direct and indirect organogenesis

d) Aseptic transfer technique

e) Principle and working of horizontal laminar airflow cabinet

f) Contamination and decontamination.

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Total No. of Questions : 5]

SEAT No. :

P6420

[Total No. of Pages : 2

[6156]-54

T.Y.B.Sc.

BIOTECHNOLOGY

BBT 504 : Animal Tissue Culture

(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 split ratio.

b) Mention contribution of Ross G. Harrison in the field of animal tissue culture.

c) Write any one function of cell repositories.

d) Enlist any two methods of Mechanical disaggregation.

e) Why is vertical laminar air flow cabinet used in ATC.

f) What is generation time of cells?

Q2) a) Describe concept of primary culture. Write in details about establishment of fibroblast cell culture. **[6]**

OR

Mention different types of contaminants found in animal cell cultures. Also describe methods of their detection.

b) Differentiate between finite & infinite cell lines. **[4]**

Q3) a) Elaborate on evolution of a cell line. **[6]**

OR

Describe methods of cytogenetic characterization of cell lines.

b) Write a note on histotypic cultures. **[4]**

P.T.O.

Q4) a) Mention which type of microscope in needed in animal tissue culture lab. Describe its principle & application. **[6]**

OR

Comment on subculturing of adherent cells.

b) Describe rationale of animal tissue culture media formulation. **[4]**

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

a) Suspension culture.

b) Applications of ATC.

c) Culture vessels used in ATC.

d) Balanced salt solution.

e) Mammalian cell lines.

f) Layout of animal tissue culture laboratory.

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Total No. of Questions : 5]

SEAT No. :

P6421

[Total No. of Pages : 2

[6156]-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) ***Solve any three questions from Q2 to Q5.***
3) ***Question 2 to 5 carry equal marks.***

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

a) Define 'Mineralization'

b) Write any two applications of chitosan

c) Bottom up method

d) Name any two molecular diagnostic techniques.

e) Define buck ministerfullence

f) Give the names of barophillic organisms

Q2) a) Explain biochemistry of composting **[6]**

OR

Write the principles of nanoparticle synthesis.

b) Discuss the concept of briquetting. **[4]**

P.T.O.

Q3) a) Explain immunodiagnostics with one example. **[6]**

OR

Discuss electro-chemiluminescent tags.

b) Describe economic analysis of briquetting. **[4]**

Q4) a) Explain role of sea weeds in removal of metal pollutants. **[6]**

OR

Discuss biomarkers in disease diagnostics.

b) Illustrate cellular diagnosis w.r.t. blood cells or (CBC) **[4]**

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

a) Electro - chemiluminescent tags

b) Sea weeds in removing pollutants

c) Biochips

d) Chitosan applications

e) Actinobacterial metabolites

f) GFP

Total No. of Questions : 5]

SEAT No. :

P-6422

[Total No. of Pages : 2

[6156]-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) ***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) Define species richness.

b) Define Genetic diversity.

c) What is aesthetic and cultural use of Biodiversity?

d) Define Biodiversity.

e) What is Insular habitats?

f) Enlist two IUCN threat categories.

Q2) a) Describe Shanon and Simpson's Biodiversity Index. **[6]**

OR

Explain in brief CITES and Traffic.

b) Explain Survivorship Curve of population. **[4]**

Q3) a) Describe importance of forest research institute and zoological survey of India in conservation of Biodiversity. **[6]**

OR

Describe various molecular methods used in taxonomy.

b) What is biodiversity hot spots? Add a note on anyone hot spot. in India. **[4]**

P.T.O.

Q4) a) Explain the strategies used for conservation of Biodiversity. **[6]**

OR

Give the importance of NGO's in India & their contribution in conservation of Biodiversity.

b) What is Red data book? Also give its importance. **[4]**

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

a) Population density

b) Types of Habitat

c) Logistic growth of Population

d) Role of Panipanchayat

e) Concept of opportunistic species

f) Uses of Biodiversity in food and medicine

Total No. of Questions : 5]

SEAT No. :

P-6423

[Total No. of Pages : 2

[6156]-61

T.Y. B.Sc.

BIOTECHNOLOGY

BBt-601 : Enzyme & Enzyme Technology

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

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

a) Specific activity

b) Kcat

c) Ribozymes

d) Thermophillic enzymes

e) Initial velocity

f) Activation energy

Q2) a) Explain the concept of acid fase catalysis with an appropriate example. **[6]**

OR

Give the application of enzymes in meat and leather industry.

b) Discuss the effect of temperature on enzyme action. **[4]**

Q3) a) Derive the Michaelis Menten equation to study enzyme kinetics. **[6]**

OR

Explain any one method of immobilization of enzymes and its applications.

b) Give the importance of enzymes as thrombolytic agent. **[4]**

P.T.O.

Q4) a) Discuss the mechanism of non-lysosomal degradation of enzymes. **[6]**

OR

With an representative example explain the mechanism of proteolytic activation of zymogens.

b) Explain the protein nature of enzymes. **[4]**

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

a) Components of enzyme biosensor

b) Isozymes (LDH)

c) Compartmentalization of metabolic pathways.

d) Double reciprocal plot.

e) Proximity and orientation effect.

f) Metalloenzymes.

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Total No. of Questions : 5]

SEAT No. :

P6424

[Total No. of Pages : 2

[6156]-62
T.Y. B.Sc.
BIOTECHNOLOGY
BBT-602 : Agribiotechnology
(Revised 2019) (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 carries equal marks.***

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

a) Define biopesticide

b) Comment on environmental stress factors of plants.

c) Describe morphological markers in brief.

d) What are non conventional biofertilizers.

e) Define vertical farming.

f) Define urban agriculture.

Q2) a) Explain the utility of biotechnological approaches in variety purity testing & pathogen diagnosis. **[6]**

OR

Comment on concepts & application of e-agriculture & use of ICT in agriculture.

b) What is molecular marker assisted selction? Add a note on its application in modern agribiotechnology. **[4]**

Q3) a) What is Green house? Discribe types of green houses based on utility and type of construction material. **[6]**

OR

Explain the forms of soil less culture with suitable diagrams & examples.

b) Write short note on application of biotechnology in developing salinity tolerant planst. **[4]**

P.T.O.

Q4) a) What are molecular markers? Describe mechanism of PCR based molecular markers. **[6]**

OR

Describe the role of new technologies & microbial Control of promissing plant species for pest control.

b) Write short note on quality control of biofertilizers. **[4]**

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

a) Koch's postulates.

b) Methods of fungal pathogen diagnosis.

c) Biochemical markers.

d) Agrobacterium tumefaciens mediated plant transformation.

e) Compare classical & modern agribiotechnology.

f) Global scenario of agribiotechnology.

Total No. of Questions : 5]

SEAT No. :

P-6425

[Total No. of Pages : 2

[6156]-63

T.Y. B.Sc.

BIOTECHNOLOGY

BBT-603 : Applied Biotechnology - II

(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 2 to 5 carry equal marks.***

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

a) Define biofuels.

b) Define genetically modified crops.

c) Define synthetic biology.

d) What is mean by 2^{nd} generation biofuels.

e) Define pleuripotent stem cell.

f) Define green technology.

Q2) a) Explain the role of DNA profiling for solving crimes. **[6]**

OR

What is functional genomics? Write it's role in developing precision medicine.

b) Write biotransformation of recalcitrant metabolites. **[4]**

Q3) a) Explain in detail genetically modified crops and foods. **[6]**

OR

Explain implications of human genome project in health and diseases.

b) Write ecological impact of microbes. **[4]**

P.T.O.

Q4) a) Explain long-term storage of stem cells. **[6]**

OR

Explain in detail 1st generation of biofuels.

b) Explain modelling in system biology. **[4]**

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

a) Algal Fuel

b) Applications of system biology in biotechnology.

c) 3rd generation biofuels.

d) Stem cell policy and ethics.

e) Cord blood banking.

f) Applications of DNA profiling.

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Total No. of Questions : 5]

SEAT No. :

P6426

[Total No. of Pages : 2

[6156]-64
T.Y. B.Sc.
BIOTECHNOLOGY
BBT-604 : Food and Pharmaceutical Biotechnology
(Revised 2019) (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) ***Questions 2 to 5 carries equal marks.***

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

a) Define 'Nutraceuticals'.

b) Give role of probiotics in human nutrition.

c) What are biocomposites?

d) Define LD50

e) Give concept of preclinical trail.

f) What is USP?

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

OR

Describe types of packaging materials and their Functions. **[6]**

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

Q3) a) Explain about microbial drug discovery. **[6]**

OR

Describe Formulation process of antibiotic with suitable example. **[6]**

b) Explain role of quality assurance. **[4]**

P.T.O.

Q4) a) Explain about GMP in pharmaceutical industry. **[6]**

OR

Explain concept of Rational Drug discovery. **[6]**

b) Write role of enzymes as food processing. **[6]**

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

a) ED50

b) TQM

c) Ediable packaging

d) FSSAI

e) WHO guidelines for QC

f) Phase I of clinical trial

Total No. of Questions : 5]

SEAT No. :

P-6427

[Total No. of Pages : 2

[6156]-65

T.Y. B.Sc.

BIOTECHNOLOGY

BBt-605 : Bioinformatics

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

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

a) What is homologs?

b) What is composite database?

c) Define E-value.

d) Give 2 examples of indices.

e) What is dot matrix.

f) What do you mean by INSDL.

Q2) a) Enlist different types of file formats used in Bioinformatics. Explain any one in detail. **[6]**

OR

Enlist Dynamic programming approaches & discuss any one in detail.

b) Explain SCOP in detail. **[4]**

Q3) a) What is data generation? Give examples of data generation method. Explain any one method in detail. **[6]**

OR

Discuss Clustal W as a tool for MSA.

b) What is protein structure visualization tool. Explain SPDBV in detail. **[4]**

P.T.O.

Q4) a) What is database? Enlist types and explain protein database. **[6]**

OR

Explain the steps involved in alignment using FASTA for similarity search.

b) Give an account on sequence retrival system. **[4]**

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

a) Microarray

b) Exaustive algorithm

c) Local alignment

d) Gap penalty

e) Pitfall of biological database

f) Limitations of Bioinformatics

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Total No. of Questions: 5]

SEAT No. :

P6428

[Total No. of Pages :2

[6156]-66
T.Y. B.Sc.
BIOTECHNOLOGY
BBt-606 : Biosafety and Bioethics and Intellectual Properly Rights
(2019 Pattern) (CBCS) (Semester-VI)

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

Instructions to the candidates:

1) ***Q 1 is compulsory.***
2) ***Attempt any three of Q2 to Q5.***
3) ***Q2 to Q5 carry equal marks.***

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

a) What is the duration of Indian patent?

b) Define Bioethics

c) Enlist four carcinogens

d) Define Biological hazard

e) Define trade mark

f) Define autonomy in biomedical ethics

Q2) a) Explain protection of GMOS. **[6]**

OR

Discuss Buda pest treaty and its significance.

b) Describe with example geographicla indications. **[4]**

Q3) a) Discuss the use of fume-hood **[6]**

OR

Wipo-objectives and it role, explain.

b) Explain GLP in detail. **[4]**

P.T.O.

Q4) a) Explain the significance of Rio Conference **[6]**

OR

Discuss Multilateral ethical agreement

b) TRIPs **[4]**

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

a) Teratogens
b) Organisms allowed in BSL-2 facility
c) Copyright
d) Tuskegee syphilis study
e) Nuremberg code
f) Autonomy in medical ethics