Printed Pages: 02

Sub Code:KNC-502

Paper Id: 231143

Roll No. 2 0 0 1 4 3 0 5 4 0 0 0 7

B.TECH.
(SEM-V) THEORY EXAMINATION 2022-23
INDIAN TRADITION, CULTURE AND SOCIETY

Time: 3 Hours *Total Marks: 100*

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

(a) What is Force Theory?
(b) What is Slavery?
(c) What do you understand by Council of Ministers?
(d) Define Hindi Literature.
(e) Define Brahmi Script.
(f) Define Pre-Vedic Religion.
(g) Mention the four ashrama in Hinduism.
(h) What are the different languages of India?
(i) Define Theatre.
(j) Define Puppetry.

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

(a) Define Varnāshrama System and Āshrama or the Stages of Life.
(b) What is Kautilya's saptanga (The sevenlimbs) theory of state?
(c) Discuss ashrama or the stages of life according to Indian philosophy.
(d) Define Modern religious practices.
(e) Write the Major cave Architecture in India.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Define the Understanding Gender as a social category and the representation of Women in Historical traditions.
(b) What are the Stages of State Formation in Ancient India? Explain.

4. Attempt any *one* part of the following: **10 x 1 = 10**

(a) What do mean by Evolution of script and languages in India?
(b) Give the Note on (i) Ramayana and (ii) Mahabharata

5. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Write an essay on the Vedic literature.
(b) What is the basic principle of Jainism? Also discuss the vrats.

6. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Write a short note on: mathematics in Ancient India.
(b) Write the Technology in India Pyrotechnics in India Trade in Ancient India.

7. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Give an account of contribution made by Guru Nanakin Bhakti movement.
(b) Compare the Indo-Islamic Architecture and Indian Architecture.

Printed Pages: 02

Sub Code:KBT-502

Paper Id: 231232

Roll No. 2001430540044

B. Tech

(SEM V) THEORY EXAMINATION 2022-23

FERMENTATION BIOTECHNOLOGY

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

(a) Differentiate between upstream and downstream processing.
(b) How microbial activity is optimized?
(c) What are the criteria for transfer of inoculum?
(d) What are the advantages of fed batch culture?
(e) What are the main components of culture media?
(f) Why antifoams are used in fermenter?
(g) How Pasteur effect is different from Crabtree effect?
(h) What do you understand by diauxic growth curve?
(i) What are the advantages of microbial ore leaching?
(j) Why microbial cells are ideal choice for biotransformation?

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

(a) What are the selection criteria for any microbial strain in fermentation industry? What are the problems often associated with industrial microbial processes? How these problems are tackled?
(b) Explain the material balance for batch and continuous cultures.
(c) What are the different methods of air sterilization. Describe.
(d) What are the characteristics of secondary metabolites? Explain the over-production of secondary metabolites with its regulations.
(e) How microbes are used to produce enzymes? Explain the selection process of fermentation type used for industrial enzyme production with suitable example.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Why strain improvement is a key to successful fermentation process? How the improved strained are described as GRAS (genetically regarded as safe)? Enlist the pros and cons of different strain improvement methods.
(b) Describe the evolution of fermentation industry. Briefly explain the effect of introducing modern tools (such as genome editing and CRISPR technology) on the current fermentation industries.

4. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) What is biphasic growth? Describe the factors which influence the microbial growth curve.

(b) Describe-

(i) Aseptic inoculation and sampling

(ii) Microbial growth measurement methods

5. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) Explain the direct and indirect methods of media sterilization.

(b) Describe-

(i) thermal death rate of microorganisms

(ii) oxygen requirements of fermentations

6. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) What do you understand by operons? Explain the inducible and repressible operons with suitable example.

(b) Differentiate between feedback inhibition and feedback repression with examples.

7. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) What are the types of insulin? How human insulin genes are recombined with microbe? What is proinsulin method? What are the optimal parameters for human insulin production?

(b) Explain the conventional method of citric acid production. How it is different from integrated citric acid-methane fermentation process?

Printed Pages: 02
Paper Id: 231662

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Sub Code: KBT 501

B. TECH
(SEM V) THEORY EXAMINATION 2022-23
BIOINFORMATICS I

Time: 3 Hours **Total Marks: 100**

Note: Attempt all Sections. If require any missing data, then choose suitably.

SECTION A

1. Attempt all questions in brief. **2 x 10 = 20**

(a) What is meant by secondary database? What are the major secondary databases?
(b) What is bioinformatics? What are the branches, scope and aim of bioinformatics?
(c) What is the significance of E value in a BLAST result?
(d) What are the features of PSI BLAST?
(e) What do you understand by Affine Gap penalty?
(f) Compare PAM & BLOSOM matrices.
(g) Define Levenstein distance.
(h) What is an outgroup? How to select one?
(i) What do you mean by double blind approach in CASP?
(j) What are the major interatomic forces that determine protein structure?

SECTION B

2. Attempt any *three* of the following: **10x3=30**

(a) Give the applications of bioinformatics in drug discovery, QSAR, microbial genome andcrop improvement.
(b) Write down the significance of multiple sequence alignment in biological data analysis.
(c) Discuss-
  (i) Similarity matrix
  (ii) Functional site detection in DNA
(d) What are the methods of analyzing Phylogenetic trees? Explain.
(e) Justify that how bioinformatics is helping in novel drug designing? Explain with suitable example.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Explain the common bioinformatics pipeline in identifying the homologues gene regions in thesequence data of an unknown prokaryotic organism.
(b) What is Entrez? Schematically represent the architecture of Entrez System, briefly explaining each of them.

4. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) Explain the working of BLAST based on your knowledge of sequence alignment.

(b) Discuss the difference between local and global alignment with suitable examples.

5. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) Explain the concept of scoring matrices for aligning amino acid sequences. Briefly explain how PAM is derived?

(b) There are two given sequences- S1 = TATTCGCAAG and S2 = GCTATATCCA. Obtain the optimal global alignment using dynamic programming method. Use any Scoring scheme of your choice.

6. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) Define a Root, Node and Clade. How the distances between species are calculated for phylogenetic tree construction? Explain.

(b) List out the steps involved in phylogenetic tree construction and discuss with a distance-based method.

7. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) What is the rationale behind homology modelling? Discuss the various steps involved in the process.

(b) Write about-

(i) Motifs

(ii) RASMOL

Printed Pages: 01

Sub Code: KBT-053

Paper Id: 2 3 1 6 5 0

Roll No. 2 0 0 1 4 3 0 5 4 0 0 0 7

B.TECH
(SEM V) THEORY EXAMINATION 2022-23
BIOMEDICAL INSTRUMENTATION

Time: 3 Hours *Total Marks: 100*

Notes:

- *Attempt all Sections and Assume any missing data.*
- *Appropriate marks areallotted to each question, answer accordingly.*

SECTION A

2 x 10 = 20

1. Attempt *all* questions in brief.

(a) What do you understand by transducers?
(b) What are the different components of biosensors?
(c) What is electrocardiography?
(d) What do you understand by pacemakers?
(e) What do you meant by neural communication?
(f) Which instrument is used for the measurement of heart sounds?
(g) Define breathing.
(h) What ispatient care monitoring?
(i) What are the instruments used in sensory measurements?
(j) Give the application of microprocessors.

SECTION B

10 x 3 = 30

2. Attempt any *three* of the following:

(a) What is biopotential? Describetheorigin of biopotential and its propagation in brief.
(b) Discuss the principle and application of electromyography.
(c) What do you understand by cardiovascular measurement? Briefly describe the biotelemetry
(d) Describe the principle and applications of digital radiography.
(e) Give a brief discussion on electrical safety of medical equipment.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) What is the difference between active and passive transducers? Give the applications of transducers.
(b) Briefly describe the principle and application of electro encephalogram.

4. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Describe the procedure for the measurement of blood flow.
(b) What is respiratory therapy? Explain the importance of instruments used in respiratory therapy.

5. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Explain the instrumentation for pshycophysiological measurements?
(b) Give a brief note on Non-invasive diagnostic instrumentation.

6. Attempt any *one* part of the following: **10 x 1 = 10**

(a) What are the biomedical instruments used in surgery? Give the importance of automation of chemical test.
(b) Describe the instrumentation and the application of X-ray mechine.

7. Attempt any *one* part of the following: **10 x 1 = 10**

(a) What do you understand by imaging equipment? How they are applicable in medical diagnostics?
(b) What are the microprocessors? Describe the working principle of Microprocessors?

Printed Pages: 02

Sub Code: KBT-404

Paper Id: 231936

Roll No. 2 0 0 1 4 3 0 5 4 0 0 7

B. TECH

(SEM V) THEORY EXAMINATION 2022-23

BIOFUEL & ALCOHOL TECHNOLOGY

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data, then choose suitably.

SECTION A

2 x 10 = 20

1. **Attempt *all* questions in brief.**

(a) What are the fermentation conditions for the ethanol production?
(b) What do you understand by single cell protein?
(c) What do you understand by fed batch fermentation process?
(d) What is fivefold purpose of cooking?
(e) Enlist various feedstocks used in alcohol industries.
(f) What is the use of denatured spirit?
(g) Describe reduction and blending of spirits.
(h) What do you understand by biomass?
(i) What do you understand by thermal gasification of biomass?
(j) Why do we use bioenergy?

SECTION B

10 x3= 30

2. **Attempt any *three* of the following:**

(a) Enlist the types and properties of raw materials used in alcohol industries.
(b) Differentiate between batch and continuous fermentation techniques.
(c) Write short note on-
  (i) Biochemistry of alcoholic fermentation
  (ii) Fusel oil separation from alcohol
(d) Compare the direct, thermochemical and biochemical biomass conversion processes.
(e) What are the different types of biomass fuel? Explain.

SECTION C

10x1 = 10

3. **Attempt any *one* part of the following:**

(a) What are the different pre-processing methods used for raw materials? What are the advantages of pre-processing? How the raw materials are stored? Discuss with examples.
(b) What is the role of yeast in alcohol production? Enlist the different yeast strains used in alcohol (respective) industries.

10x1 = 10

4. **Attempt any *one* part of the following:**

(a) Describe various cooking systems used in alcohol industries.
(b) Write short note on-
  (i) Bio-still Fermentation
  (ii) Wet milling of grains

10x1 = 10

5. **Attempt any *one* part of the following:**

(a) What do you understand by cellulosic feed stocks? What characteristics of cellulosic feed stocks make them fit for alcohol fermentation? How it is used in alcohol production?

(b) Explain the process of distillation.

10x1 = 10

6. **Attempt any *one* part of the following:**

(a) Write short note on-

(i)Parameters affecting alcoholic fermentation

(ii)Scale-up process

(b) What are the byproducts of alcohol industries? How it is used? Explain.

10x1 = 10

7. **Attempt any *one* part of the following:**

(a) What is anaerobic digestion? What are its stages? Write a note on quantitative evaluations of the anaerobic digestion process.

(b) Briefly explain the processes used to convert biomass into biofuels by industries.

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Printed Pages: 02

Sub Code: KBT-501

Paper Id: 231450

Roll No. [redacted]

BTECH
(SEM V) THEORY EXAMINATION 2022-23
GENETIC ENGINEERING

Time: 3 Hours *Total Marks: 100*

Note: Attempt all Sections. If require any missing data, then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a. Define Cosmids, Phagemids, Methylases and Phosphatase.
b. What is the process of DNA isolation?
c. Differentiate between jumping and cloning libraries.
d. What is blue-white screening?
e. Which are the key features required for a DNA polymerase for polymerase chain reaction?
f. What is the principle of PCR primer designing?
g. How DNA is used as therapeutics?
h. Draw a flow chart of cloning of sheep – Dolly.
i. Differentiate between intercellular and intracellular cell signaling.
j. Enlist the characteristics of the receptor- tyrosine kinases.

SECTION B

10 x 3 = 30

2. Attempt any *three* of the following:

a. Human CFTR gene is 250KB. Choose an ideal vector to clone this gene and alsodescribe the construction and screening principles of that vector.
b. Write short note on-
   i. Chromosome walking
   ii. BACs
c. Explain in detail the principal, procedure and application of PCR. Add a note on real time PCR.
d. Write various methods involved in production of insecticide resistant transgenic plants.
e. What are different types of cell-signaling? Enlist characteristics of each type.

SECTION C

10 x 1 = 10

3. Attempt any *one* part of the following:

a. What are restriction endonucleases? Explain in detail the various types.
b. Write short note on-
   i. Phage as vector
   ii. Synthetic promoter used in expression vector
   iii. Alpha complementation

4. **Attempt any *one* part of the following:** **10 x 1 = 10**

a. Describe the construction of a genomic library. What are its applications?

b. Describe the production of monoclonal antibodies by hybridoma technology.

5. **Attempt any *one* part of the following:** **10 x 1 = 10**

a. Write short note on-

i. Nested PCR

ii. Taqman Assay

iii. Maxam Gilbert method of DNA sequencing

b. Evaluate the efficiencies and deficiencies of RFLP, RAPD and SNP markers.

6. **Attempt any *one* part of the following:** **10 x 1 = 10**

a. Explain the role of genetic engineering in producing engineered insulin.

b. Explain gene targeting and gene silencing.

7. **Attempt any *one* part of the following:** **10 x 1 = 10**

a. Write note on-

i. Intracellular cascades

ii. GTPase molecular switch

b. Write note on-

i. Interconnecting signaling pathway

ii. Nitric oxide signaling