B.Sc. 5th Semester (Honours) Examination, 2023 (CBCS)

Subject : Zoology

Course : DSE-1

(Animal Biotechnology)

Time : 2 Hours **Full Marks : 40**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Group-A

1. Answer *any five* questions of the following: 2×5=10

(a) Differentiate between genomics and transcriptomics.

(b) What are the properties of a cosmid cloning vector?

(c) Why are 'restriction enzymes' so called?

(d) Define transgenic animals.

(e) Give four essential properties of plasmid expression vector.

(f) What is SCID?

(g) State the significance of SDS in SDS-PAGE technique.

(h) What is gene silencing technique? State one example of its application in animal biotechnology.

Group-B

2. Answer *any two* questions of the following: 5×2=10

(a) State the significant differences between genomic DNA library and cDNA library. How would you identify the right clone of your choice from the genomic DNA library? 3+2

(b) Explain how quantitative reverse transcriptase PCR works. How can it be used in transcriptome analysis? 3+2

(c) Describe the DNA fingerprinting technique. State two applications of this technique. 4+1

(d) What is DNA microarray? State the process of gene expression in a specific tissue from microarray analysis. 2+3

Group-C

3. Answer *any two* questions of the following: 10×2=20

(a) What do you mean by 'knock out mice'? Describe the process by which knock out mouse is produced. What are the applications of knock out organisms? 2+6+2

(b) Explain how an antibiotic-resistance gene and the *lacZ gene* can be used to determine which cells contain a particular plasmid. What is YAC cloning vector and what are its properties? 6+1+3

(c) Give detailed description of Sanger dideoxy-sequencing method giving special emphasis on the purpose of the dideoxyribonucleoside triphosphates. 10

(d) Write short notes on *any two*: 5×2=10

(i) Retroviral method of gene transfer

(ii) Molecular diagnosis of Cystic Fibrosis

(iii) $CaCl_2$ method of bacterial transformation

(iv) Western Blotting

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Course : DSE-1 (OR)

(Microbiology)

Time : 2 Hours **Full Marks : 40**

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Group-A

1. Answer *any five* questions of the following: 2×5=10

(a) Distinguish between exotoxins and endotoxin.

(b) Define sensitivity and specificity in context of diagnostic tests.

(c) What make the prion and vivoids distinct from typical viruses?

(d) How does absence of a nuclear membrane impact the regulation of gene expression in bacteria?

(e) How do we calculate specific growth rate of bacteria?

(f) Mention the importance of spike protection in viruses.

(g) How does the oxygen requirement influence the solution of culture condition for bacterial isolation?

(h) Distinguish between communicable and non-communicable disease.

Group-B

2. Answer *any two* questions of the following: 5×2=10

(a) Describe the three domains proposed by Carl Woose and the criteria used to differentiate them.

(b) State the fundamental differences between bacterial chromosomes and eukaryotic chromosomes.

(c) Discuss the steps and significance of plasmids in their transfer of genetic material.

(d) Explain the principles of Koch's postulates. Describe the specificity and sensitivity of the postulate.

Group-C

3. Answer *any two* questions of the following: 10×2=20

(a) How do pathogen evade the host immune response and what implications does this have for the course of infection? Discuss the factors that contribute to the termination of acute viral infections. 6+4

(b) Enumerate the beneficial role of normal flora in the human body. What are the factors that can lead to pathogenicity of normal flora? Explain the concept of virus shedding. 3+4+3

(c) State the impact of structural organization of viruses on their classification and mode of infection. Explain the importance of cyanophycin as a resume material in certain bacterial species. Biofilm production is an adaptive and protective measure of pathogen.— Justify. 4+4+2

(d) Name the virus responsible for dengue fever. Explain the symptoms, pathogenesis and mode of action of the dengue virus. Discuss the preventive measures, including vector control and public health interventions for dengue fever. 1+5+4
