B.Sc. 5th Semester (Honours) Examination, 2024 (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) What is a shuttle vector? Give example.

(b) What are the properties of a phagemid?

(c) What are 'Expressed Sequence Tags (ESTs)'?

(d) State the source of Taq Polymerase and mention one drawback of its application.

(e) Give four essential properties of a YAC vector.

(f) What does cDNA stand for? How it is obtained?

(g) What is a reporter gene? Give example.

(h) What is the principle of electroporation?

Group-B

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

(a) Describe blue-white screening method in gene cloning with a flow chart. Comment on the role of IPTG in blue-white screening. 4+1

(b) What is primary cell culture? State the disadvantages associated with retroviral method of transgenesis. 2+3

(c) What is a knock out mouse? Who first introduced the technology? Explain the steps to obtain a knock out mouse. 1+1+3

(d) State the differences between Southern and Northern blotting. Mention the applications of Southern blot in forensic science. 3+2

Group-C

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

(a) Mention the key steps associated with the cloning of animals by nuclear transplantation. Discuss the process of expressing cloned genes in mammalian cells. 5+5

(b) Give the significance of ethidium bromide and DNA marker in agarose gel-electrophoresis. Discuss the principle and applications of SDS-PAGE. State the significance of blocking and two different types of antibodies in Western Blotting. 2+4+4

(c) Give four significant differences between cDNA library and genomic DNA library. Describe the chain termination method of DNA sequencing. 4+6

(d) What is the full form of DMEM? State its composition. Does it need to be supplemented and why? What is the full form of HEPA? State the importance of using it in laminar air flow. Draw a diagram of hood showing direction of airflow. 1+2+2+1+2+2

B.Sc. 5th Semester (Honours) Examination, 2024 (CBCS)

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Course : DSE-1 (OR)

(Microbiology)

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

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

(a) What are the differences between plasmids and episomes?

(b) How does 16S rRNA sequencing aid in bacterial taxonomy?

(c) What are magnetosomes?

(d) Distinguish between epidemic and pandemic.

(e) What is cyanophycin?

(f) Give one example of normal bacterial flora of

(i) eye

(ii) urino-genital tract. 1+1

(g) Why are horizontal gene transfers significant in bacterial evolution?

(h) What is the function of reverse transcriptase in RNA viruses?

2. Answer *any two* questions: 5×2=10

(a) What do you mean by bacterial antigenic switching?

(b) State the cytopathic effects of virus. What is the utility of gas vesicles? 4+1

(c) Differentiate between exotoxins and endotoxins. Discuss the role of bacterial toxin in virulence and development of disease. 2+3

(d) Who proposed Five-kingdom classification system? Briefly describe the concept. 1+4

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

(a) What do you mean by conjugation? What do F^+ and F^- mean? What is sexduction? Describe the conjugation process between F^+ and F^- strains with a labelled diagram. 2+1+2+5

(b) What are the symptoms of AIDS in final stage of infection? Explain the mode of action of HIV. Describe the preventive measures to control the disease. Why it is difficult to make HIV vaccine? 2+4+2+2

(c) What are the difference between gram positive and gram negative bacteria? Why gram negative bacteria cannot retain the crystal violet dye during alcohol wash? Describe the principle of acid-fast staining. 4+2+4

(d) Write short notes on (*any two*): 5+5

(i) Bacterial growth factors

(ii) Virus shedding

(iii) Selective media and enriched media
