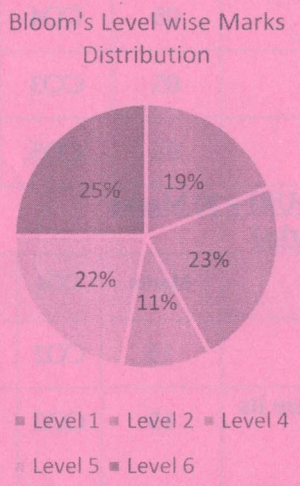
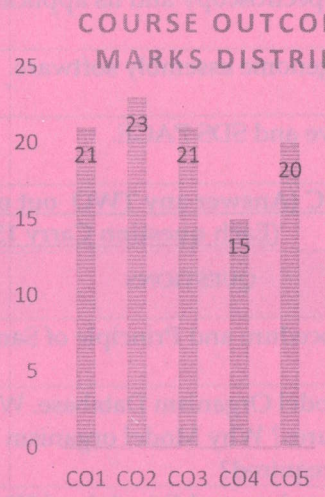
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Comprehend introduction and scope of genomics and proteomics
	CO2	Know about Protein sequencing methods
	CO3	Understand Genome sequencing, human genome project
	CO4	Analyze Genomic databases and genome analysis
	CO5	Analysis of proteomes
	CO6	Understand Mass spectrometry based methods for protein identification

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY

END SEM EXAMINATION
School of Health & Allied Science

Program	**Bachelor of Science Biotechnology**		
Subject Name	**Genomics and Proteomics**	**Semester**	**V**
		Year	**Nov/Dec 2024**

Time: 3 Hour
Max. Marks : 60

- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
- **Answer all Questions of Section A (Compulsory)**
- **Answer Any Four out of Six of Section B**
- **Answer Any Two out of Four of Section C**
- **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers**.

Knowledge Level (KL)	**K1 :** Remembering	**K3 :** Applying	**K5 :** Evaluating
	K2 : Understanding	**K4 :** Analysing	**K6 :** Creating

Section A (Each question Carry 01 Mark from Q1-i to x) – 10 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	The basic base-specific cleavage sites used in Maxam and Gilbert method a) A, T, G, C b) C, T, A+G, T+C c) A, G, A+T, G+C d) G, C, A+G, C+T	01	CO3	KL1
ii	VISTA is a) Visualisation of comparative genome analysis b) Visualisation of controlled genome analysis c) Visualisation capacity of genome analysed d) Virtual coding gene analysis	01	CO4	KL1
iii	Genomics that attempts to describe gene and protein function and interaction a) Structural b) Functional c) Comparative d) None	01	CO1	KL2
iv	Which of the following statements is true about size exclusion chromatography? a) During the separation of a mixture of proteins, protein with smallest molecular weight is eluted first	01	CO2	KL4

	b) During the separation of a mixture of proteins, protein with largest molecular weight is eluted first c) During the separation of a mixture of proteins, protein with largest molecular weight is eluted last d) During the separation of a mixture of proteins, protein with largest molecular weight flow around the beads			
v	Proteins can be visualized directly in gels by a) Staining them with the dye b) Using electron microscope only c) Measuring their molecular weight d) None of these	01	CO5	KL1
vi	Edman degradation is used for _____ a) Identifying N-terminal amino acids b) Identifying C-terminal amino acids c) Identifying amino acid d) Identifying carbohydrates	01	CO5	KL2
vii	Alpha helix complete turn consists of how many amino acids a) 2 b) 2.6 c) 3.6 d) 4	01	CO5	KL4
viii	Complete set of proteins expressed by an organism is a) Proteome b) Proteomics c) Transcript d) Transcriptome	01	CO2	KL3
ix	It is used for determine masses of particles, for determining the elements composition of a sample or molecules and for elucidating the chemical structures of molecules a) 2D PAGE b) Mass spectrometry c) PAGE d) None of the above	01	CO5	KL1
x	Ionisation, detection and amplification are part of a) 2D PAGE b) Mass spectrometry c) PAGE d) None of the above	01	CO5	KL2

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Discuss Principle of Pyro sequencing.	05	CO3	KL2
3	Why clone contig method was used for Human genome project. What are the steps in the process?	05	CO2	KL3
4	Explain when Shotgun sequencing method is preferred and Why?	05	CO2	KL4
5	Explain Mass spectroscopy and its application.	05	CO4	KL3
6	Discuss any 2 genome assembly software.	05	CO3	KL2
7	Compare Native and SDS PAGE.	05	CO5	KL5

Section C (Answer any TWO out of FOUR) – 30 Marks
(Each question Carry 15 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	What is the procedure and Principle of Sanger Sequencing?	15	CO2	KL1
9	Discuss any Model Organism Database. What are its important features? Why Model organism Databases are required?	15	CO3	KL2
10	What is the procedure and Principle of 2D PAGE? Why it is preferred in Proteomics studies.	15	CO5	KL4
11	What is your view regarding important prospects and significance of Genomics related studies?	15	CO1	KL5

JGI ARKAJAIN University Jharkhand		**END SEM EXAMINATION** **School of Health and allied Science**	
Branch	**Biotechnology**	**Program**	**Bachelor of Science**
Subject Name	**Recombinant DNA Technology**	**Semester**	**V**
		Year	**Odd Nov/Dec 2024**
Time: 3 Hour Max. Marks : 60	• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • **Answer all Questions of Section A (Compulsory)** • **Answer Any Four out of Six of Section B** • **Answer Any two out of four of Section C** • **Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Meansand will Result in the Cancellation of the Papers.**		

Section A (Each question Carry 01 Marks from Q1-i to Q1-x) – 10 Marks

Q. N 1	QUESTIONS	Marks	COs
i	Restriction endonuclease has the ability of cutting a) DNA at random sites b) DNA at specific sites c) Both a and b d) DNA and RNA at random sites	01	CO1
ii	Expression vector differs from cloning vector in having a) origin of replication b) unique restriction site c) suitable marker d) regulatory elements	01	CO2
iii	Match the following 1. Electrophoresis — p. Gene transfer in plants 2. Probe — q. Breaks bond between insulin and galactosidase 3. Cyanogen bromide — r. Small DNA segment used for hybridization 4. Ti plasmid — s. Separation of DNA segments a) 1-r, 2-s, 3-q, 4-p b) 1-s, 2-r, 3-q, 4-p c) 1-p, 2-r, 3-q, 4-s d) 1-q, 2-p, 3-s, 4-r	01	CO1
iv	EcoR1 cleaves DNA at a) 5′G↓AATTC3′ 3′C↑TTAAG5′	01	CO1

	b) 5′GTT↓AAC3′ 3′CAA↑TTG5′ c) 5′C↓AATTG3′ 3′GTTAA↑C5′ d) 5′GGGCC↓T3′ 3′CCCGG↑A5′		
v	Using genetic technique in forensic science is also called a) genetic finger printing b) In vitro culture c) hybridoma technology d) gene therapy	01	CO3
vi	Virulence trait of *Agrobacterium tumefaciens* is borne on a) Chromosomal DNA b) Tumour inducing plasmid DNA c) Both chromosomal and plasmid DNA d) Cryptic plasmid DNA	01	CO2
vii	Some of the steps involved in Gene Cloning are given below i. Insertion of isolated gene to the vector ii. ntroduction of recombinant vector to the host iii. Isolation of desired gene iv. Expression of recombinant gene in host v. Extraction of recombinant gene product The correct sequence of steps involved are a) iii, i, iv, ii, v b) iii, i, ii, iv, v c) i, ii, iii, iv, v d) ii, i, iii, iv, v	01	CO4
viii	Co-integrating transformation vectors must include a region of homology in a) The vector plasmid b) The Ti-plasmid c) Between vector plasmid and Ti-plasmid d) None of these	01	Co4
ix	The bacteria associated with plant genetic engineering are a) *Salmonella* and *Pseudomonas* b) *Bacillus thuringiensis* c) *Agrobacterium tumefaciens* d) Both (B) and (C)	01	CO2
x	Incorporation of desired amino acid in place of specific amino acid is a) random mutagenesis	01	CO2

	b) site directed mutagenesis c) DNA shuffling d) Frame shift mutation		

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question 5 Marks)

Q. No.	QUESTIONS	Marks	COs
2	Write short notes on a) Site directed Mutagenesis b) Bacterial artificial chromosome	05	CO1
3	What is genomic and cDNA library? Write the difference between genomic and cDNA library.	05	CO2
4	Define recombinant DNA technology and briefly describe the steps carried out during the process.	05	CO2
5	What are the properties of a vector? Draw pBR322 vector.	05	CO3
6	Describe the production of recombinant insulin using genetic engineering.	05	CO4
7	Describe primer extension method for site-directed mutagenesis	05	CO4

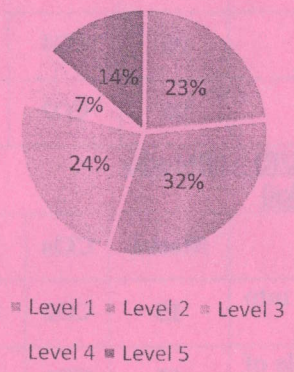
Section C (Answer any TWO out of FOUR) – 30 Marks-
(Each question Carry 15 Marks)

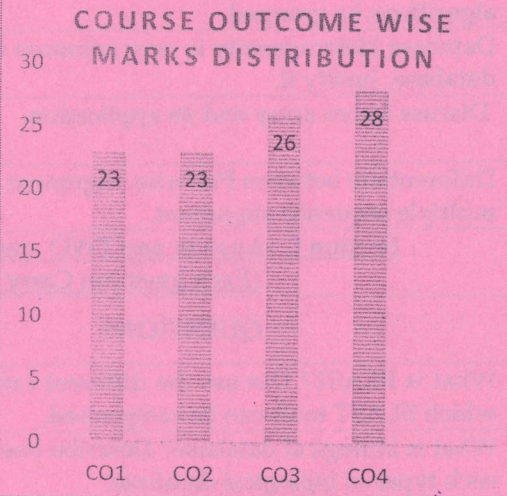
Q. No.	QUESTIONS	Marks	COs
8	Write notes on a) Ultra-sonication b) cDNA library c) Chimeric proteins d) Episomes e) Primer	15	CO4
9	Describe amplification of nucleic acids by PCR. What are the steps and enzymes involved? What are the parameters for designing a primer for PCR?	15	CO1
10	Discuss in detail about the Ti-plasmid based vectors.	15	CO3
11	What is a restriction modification system? Discuss its different types.	15	CO4

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Students will be able to understand and describe and use the biological databases, perform structured query and analyse and discuss the results in biologically significant way.
	CO2	Students will acquire knowledge of BLAST, in silico molecular biology
	CO3	Students will be able to explain principle, algorithm and different methods of sequence alignments as well as execute alignments to address research problems
	CO4	Students will become familiar with a wide variety of bioinformatics tools and software and apply these to conduct basic bioinformatics research and thus develop platform for molecular biology experiments

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY

END SEM EXAMINATION
School of Health & Allied Science

Program	**Bachelor of Science Biotechnology**		
Subject Name	**Bioinformatics**	**Semester**	**V**
		Year	**Nov/Dec 2024**
Time: 3 Hour Max. Marks : 60	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any Four out of Six of Section B** • **Answer Any Two out of Four of Section C** • **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers**.		

Knowledge Level (KL)	**K1** : Remembering	**K3** : Applying	**K5** : Evaluating
	K2 : Understanding	**K4** : Analysing	**K6** : Creating

Section A (Each question Carry 01 Marks from Q1-i to x) – 10 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	Which of the following is not the objective to perform sequence comparison? a) To find the common motifs present in both sequences b) To study the physical properties of molecules c) To study evolutionary relationships d) To observe patterns of conservation	01	CO1	KL2
ii	Which of the following is not a variant of BLAST? a)BLASTX b)TBLASTNX c)BLASTP d) BLASTN	01	CO2	KL2
iii	Which of the following is not correct about FASTA? a) It was in fact the first database similarity search tool developed, preceding the development of BLAST b) FASTA uses a 'hashing' strategy to find matches for a short stretch of identical residues with a length of k c) The string of residues is known as blocks d) Its stands for FAST ALL	01	CO3	KL3

iv	Which of the following is not correct about the Coils and Loops? a) They are irregular structures b) If the connecting regions are completely irregular, they belong to random coils c) They are regular structures d) The loops are often characterized by sharp turns or hairpin-like structures	01	CO3	KL3
v	Which of the following is not among the methods for finding localized sequence similarity? a)Profile Analysis b)Block Analysis c) Extraction of Blocks from a Global or Local MSA d) Pattern blocking	01	CO4	KL4
vi	Which of these following are not Bioinformatics Applications? a) Data storage and management b)Understand the relationships between organisms c) Drug designing d) None of the above	01	CO1	KL2
vii	What is the stepwise method for solving problems in computer science? a) Flowchart b)Algorithm c) Procedure d) Sequential design	01	CO1	KL2
viii	What is the term for the laboratory work using computers and associated with web-based analysis generally online? a) In silico b) Dry lab c) Wet lab d) All of the above	01	CO2	KL3
ix	What is the computational methodology that attempts to find the best matching between two molecules, a receptor and ligand? a) Molecular fitting b) Molecular matching c) Molecular docking d) Molecule affinity checking	01	CO4	KL3
x	Which of the factors listed below is not an advantage of BLAST? a) Speed b) Statistical rigor c) Handling gaps d) More perceptive	01	CO2	KL3

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	What is submission matrix? Explain the formation of BLOSUM 62.	05	CO3	KL1
3	Discuss the role of Bioinformatics in Scientific research.	05	CO1	KL3
4	How can the secondary resources and associated algorithms be grouped	05	CO4	KL4
5	Database Heterogeneity is very common in biological database. Justify it.	05	CO3	KL4
6	Discuss Micro array and its application.	05	CO4	KL3
7	Differentiate between Pairwise alignment and multiple sequence alignment.	05	CO2	KL1

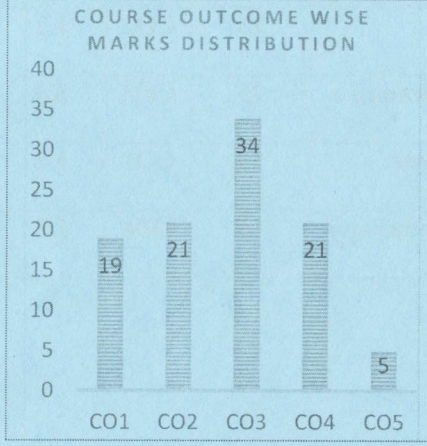
Section C (Answer any TWQ out of FOUR) – 30Marks
(Each question Carry 15 Marks)

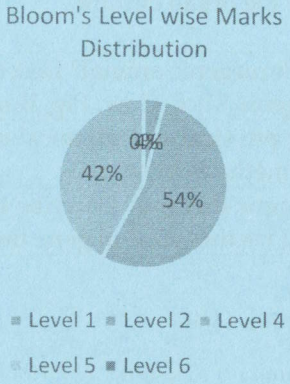
Q. No.	QUESTIONS	Marks	COs	KL
8	What is BLAST? Discuss the different categories into which BLAST tools can be categorised.	15	CO2	KL2
9	What is biological database? Describe one example of each types of biological database.	15	CO1	KL2
10	What do you understand by sequence alignment? Differentiate between global and local alignment.	15	CO3	KL2
11	Write a note on LAN, DMBS and Unikernel	15	CO4	KL1

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Students will understand gene transfer technologies for animals and animal cell lines.
	CO2	Students will understand how Biotechnology helps Animal diseases control.
	CO3	Students will understand basic principles and techniques in genetic manipulation and genetic engineering.
	CO4	Students will understand Genetic modification in Medicine like gene therapy
	CO5	Students will understand the techniques and problems both technical and ethical in animal and human cloning.

GRAPHICAL REPRESENTATION





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JGi ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY	**END SEM EXAMINATION** **School of Health & Allied Science**	
Program	**Bachelor of Science Biotechnology**	
Subject Name	**Animal Biotechnology**	**Semester** V
		Year Nov/Dec 2024
Time: 3 Hour Max. Marks : 60	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any Four out of Six of Section B** • **Answer Any Two out of Four of Section C** • **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers**.	

Knowledge Level (KL)	**K1 :** Remembering	**K3 :** Applying	**K5 :** Evaluating
	K2 : Understanding	**K4 :** Analysing	**K6 :** Creating

Section A (Each question Carry 01 Mark from Q1-i to x) – 10 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	DNA into fish is injected into a) Pronuclei b) Cytoplasm c) Both (a) and (b) d) None of these	01	CO1	K2
ii	Which is macrophage cell line? a) Coca 2 b) Hep G2 c) Raw 264.7 d) All of these	01	CO1	K1
iii	Which is not generally used for the gene transfer in animal cells a) Microinjection b) Biolistic c) Retrovirus d) Embryonic Stem cell	01	CO1	K3
iv	The estrus cycle in cattle is controlled by the hormone a) Prostaglandin (PGF2alpha) b) Follicle stimulating hormone (FSH) c) Both of these d) None of these	01	CO3	K2

v	Tsetse flies is the vector for a) Theileria b) Eimeria c) Trypanosoma d) None of these	01	CO2	K1
vi	Recombinant fish that able to survive at low temperature is due to presence of a) Antifreez protein b) High fat content c) Crystalline protein d) None of these	01	CO3	K2
vii	Abbreviation "SIT" stand for a) Sterile insect technique b) Sperm infertility type c) Small insect technique d) None of these	01	CO3	K3
viii	Neutral co-lipids mixed with cationic liposomes to enhance the efficiency of gene transfer is/are a) Dioleoylphosphatidyl ethanolamine b) Dioleoylphosphatidyl choline c) Both of (a) and (b) d) None of above	01	CO1	K3
ix	Mouse is preferred mammal for studies on gene transfer due to a) Short generation time b) Convenient in-vitro fertilization c) Produce more offspring d) All of these	01	CO3	K2
x	In 1990, the first gene-therapy was conducted on a 4 year old girl in US. The girl was suffering from a) AIDS b) Cancer c) SCID d) Malaria	01	CO4	K1

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Write short notes on i) In-vitro fertilization ii) Microinjection	05	CO3	K2
3	Describe the role of animal biotechnology in the control of Theileriosis disease in cattle.	05	CO3	K3
4	What is stem cell? Write the application of stem cell in medicine.	05	CO3	K2
5	What is animal Cell culture? Describe the scaling up of animal cell culture.	05	CO2	K3
6	Draw a well labelled diagram of STR. Write any three limitations of STR.	05	CO5	K2
7	What is artificial insemination? Write the applications of this technique in Animal Biotechnology.	05	CO4	K2

Section C (Answer any TWO out of FOUR) – 30 Marks
(Each question Carry 15 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Describe the organ culture.	15	CO2	K2
9	What is transgenic animal? Describe the application of transgenic Mice, Cow, Pig, Bird and Insect.	15	CO3	K3
10	Describe physical and chemical methods of gene transfer methods in animals.	15	CO1	K2
11	What is gene therapy? Describe types of gene therapy and viral vectors used in gene therapy.	15	CO4	K3