18BT56

Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

USN | | | | | | | | | | |

Fifth Semester B.E. Degree Examination
Genetic Engineering & Applications

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module – 1			
Q.1	**(a)**	Explain in detail about steps involved in construction of recombinant DNA molecule.	12
	(b)	Write a short note on the following vectors: I. YAC II. BAC	08
OR			
Q.2	**(a)**	What are restriction endonucleases? Explain in detail the various types.	10
	(b)	Explain the working mechanism of Ligases.	05
	(c)	Write a note on role of polynucleotide kinase in genetic engineering.	05
Module – 2			
Q.3	**(a)**	Explain in detail the principal, procedure and application of PCR. Add a note on real time PCR.	12
	(b)	Describe how southern blotting technique is used for DNA detection.	08
OR			
Q.4	**(a)**	What are genomic & CDNA libraries? Explain the construction of CDNA library.	10
	(b)	Enumerate the methods of plasmid DNA isolation.	10
Module – 3			
Q.5	**(a)**	Infer on agrobacterium tumefaciens mediated gene transfer in plants.	08
	(b)	Write a short note on: I. Electroporation II. Liposome mediated gene transfer	12
OR			
Q.6	**(a)**	Discuss the gene transfer methods using microinjection & gene gun method. Add a note on their applications.	12
	(b)	Describe in detail chloroplast transformation and its application.	08

Module – 4			
Q.7	**(a)**	Summarize your idea about "Biopharming" of plants & animals for the production of recombinant proteins.	12
	(b)	Explain marker assisted selection in breeding of plants.	08
OR			
Q.8	**(a)**	How is recombinant DNA technology used to develop biotic stress resistant plant? Explain with an example.	10
	(b)	Write various methods involved in production of insecticide resistant transgenic plants.	10
Module – 5			
Q.9	**(a)**	Describe the production of monoclonal antibodies by hybridoma technology.	12
	(b)	Illustrate the production of human insulin by genetic manipulation.	08
OR			
Q.10	**(a)**	Write a short note on : I. Gene therapy in cancer treatment II. Microbial biotechnology in clearing oil spills III. Gene targeting & silencing IV. Challenges in gene therapy	20

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Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome

Question		Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome
Q.1	(a)	L2	CO1	PO6
	(b)	L1	CO1	PO6
Q.2	(a)	L1	CO1	PO6
	(b)	L2	CO1	PO6
	(c)	L1	CO1	PO6
Q.3	(a)	L2	CO2	PO6
	(b)	L2	CO2	PO6
Q.4	(a)	L1	CO2	PO6
	(b)	L1	CO2	PO6
Q.5	(a)	L2	CO3	PO6
	(b)	L1	CO3	PO6
Q.6	(a)	L3	CO3	PO6
	(b)	L3	CO3	PO6
Q.7	(a)	L5	CO4	PO6
	(b)	L2	CO4	PO6
Q.8	(a)	L1	CO4	PO6
	(b)	L1	CO4	PO6
Q.9	(a)	L2	CO5	PO3
	(b)	L3	CO5	PO3
Q.10	(a)	L1	CO5	PO3

Bloom's Taxonomy Levels			
	Lower order thinking skills		
	Remembering (knowledge): L_1	Understanding Comprehension) : L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6

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Fifth Semester B.E. Degree Examination

GENETIC ENGINEERING & APPLICATIONs

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

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Module – 1			
Q.1	**(a)**	A gene encoding for a novel protein needs to be expressed in *E.coli* strain *DH5α*. Develop rDNA process for this objective and explain how do you select positive recombinants?	10
	(b)	. "DNA Ligases are valuable tools in genetic engineering". Justify	10
OR			
Q.2	**(a)**	Distinguish endonucleases and exonucleases with reference to their applications in genetic engineering. Elaborate on the action mechanism and importance of Restriction endonucleases in GE.	10
	(b)	Human CFTR gene is 250KB. Choose an ideal vector to clone this gene and also describe the construction and screening principles of that vector	10
Module – 2			
Q.3	**(a)**	Differentiate between the cDNA and genomic DNA libraries.	10
	(b)	A patient is suspected with a retroviral infection. Select and explain a suitable molecular diagnosis method to confirm the infection and also to know the progression of infection?	10
OR			
Q.4	**(a)**	Examine the roles of detergents, chloroform, sodium salts, EDTA and isopropyl alcohol in nucleic acid isolations.	10
	(b)	Apply a non-PCR technique to detect the presence of a 'gene X' in a given genome.	10
Module – 3			
Q.5	**(a)**	*"Agrobacterium* species is termed as nature's genetic engineer". Justify	10

	(b)	For years Cotton farming suffered because of Bollworm and other Coleopteran insects. How did transgenic science help in solving this problem?	10
OR			
Q.6	**(a)**	Weeds compete with crops for nutrients, light and space. Suggest transgenic approaches to solve this problem.	10
	(b)	What is transfection? Compare microinjection and retroviral infection methods	10
Module – 4			
Q.7	**(a)**	Evaluate the efficiencies and deficiencies of RFLP, RAPD and SNP markers in MAS.	10
	(b)	Distinguish between biotic and abiotic stresses to the crops. Discuss few examples wherein transgenic techniques were applied to offer abiotic stress tolerance.	10
OR			
Q.8	**(a)**	"Biopharming offers to exploit animals as bioreactors". Justify the statement with relevant examples.	10
	(b)	Distinguish between Physical mapping and Genetic Mapping. Explain the common physical mapping techniques.	10
Module – 5			
Q.9	**(a)**	Explain *invivo* and *exvivo* gene therapy with examples.	10
	(b)	A given gene needs to silence through a post transcriptional silencing approach. Suggest a suitable technique to achieve this objective.	10
OR			
Q.10	**(a)**	Elucidate the recombinant DNA steps in heterologous expression of Insulin.	10
	(b)	Describe the Challenges & future of gene therapy	10

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome

Question		Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome
Q.1	(a)	2,3	1	1,3
	(b)	4	1	1
Q.2	(a)	2,3	1	1
	(b)	4	1	1
Q.3	(a)	4	2	1
	(b)	2,3	2	1,2
Q.4	(a)	4	2	1,4
	(b)	2,3	2	1,3
Q.5	(a)	4	3	1
	(b)	2,3	3	1,3
Q.6	(a)	2,3	3	1,3
	(b)	4	3	1
Q.7	(a)	4	3	1
	(b)	3,4	3	1,3
Q.8	(a)	2,3	3	1,3
	(b)	4	3	1
Q.9	(a)	2	3	1,3
	(b)	3	3	1,3
Q.10	(a)	3	3	1,3

	(b)	2	3	4

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6

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Fifth Semester B.E. Degree Examination

Subject Title- Genetic Engineering and Applications

TIME: 03 Hours **Max. Marks: 100**

Note: 02. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module – 1			
Q.1	**(a)**	Define Cosmids, Phagemids, Methylases and Phosphatase	6
	(b)	Write a neat note on restriction endonucleases and explain its classification	6
	(c)	Explain the Blue-White screening with a neat diagram	8
OR			
Q.2	**(a)**	Explain Red- White Screening	8
	(b)	What are YAC's? Explain its importance with respect to Next Generation Sequencing?	6
	(c)	List out silent features of ideal vectors	6
Module – 2			
Q.3	**(a)**	Write a neat note on methods of nucleic acid detection	6
	(b)	What is PCR? Explain its various steps in detail.	8
	(c)	Write a neat note on isolation of DNA	6
OR			
Q.4	**(a)**	List out the different variants of PCR and discuss its principle	8
	(b)	Write a neat note on isolation of Plasmids	6
	(c)	Explain southern hybridization with the example	6
Module – 3			
Q.5	**(a)**	What is Ti Plasmid? Explain Agrobacterium mediated gene transfer	8

	(b)	Write neat note on Transformation and Transfection	6
	(c)	What is chloroplast transformation mention its applications	6
OR			
Q.6	**(a)**	What is calcium phosphate co precipitation? explain with the diagram	8
	(b)	Write a neat on electroporation and microinjection	6
	(c)	What is Ri plasmid? Explain the structure of Ti plasmid in detail	6
Module – 4			
Q.7	**(a)**	What is Biopharming in plants? Explain with respect to plants as bioreactors	6
	(b)	What is gene mapping? Explain how it is useful in transgenic science?	6
	(c)	How marker assisted selection helps in producing plants with resistance?	8
OR			
Q.8	**(a)**	What is Biopharming in animals? Explain with respect to animals as bioreactors for recombinant proteins.	8
	(b)	What is marker assisted selection? Explain how it is useful in breeding for improvement	6
	(c)	List out different techniques in gene mapping and explain its basis	6
Module – 5			
Q.9	**(a)**	Write a neat note on microbial biotechnology reference to engineering microbes for the production of antibiotics	6
	(b)	Explain the role of biotechnology in clearing oil spills faster than other techniques	8
	(c)	What are challenges and future of gene therapy	6
OR			
Q.10	**(a)**	Explain the role of biotechnology in producing engineered insulin	6
	(b)	Write neat note on gene targeting and gene silencing	8
	(c)	Explain the role of biotechnology in gene therapy in the treatment of SCID and Cancer	6

Course Outcomes

CO1: To learn basic concepts involved in genetic engineering tools

CO2: To learn basic concepts involved in Nucleic acid Visualization and Detection Techniques

CO3: To Know importance of applications of transgenics in animals and plants in genetic engineering

CO4: To learn Principle and application involved in Gene transfer Techniques in genetic engineering

CO5: To know and learn different techniques involved in DNA libraries preparation

CO6: To learn different applications of Genetic engineering in Industry, Health sector and Agriculture

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome				
Question		**Bloom's Taxonomy Level attached**	**Course Outcome**	**Programme Outcome**
Q.1	(a)	L2	CO1, CO2	PO1
	(b)	L1	CO1, CO2	PO1
	(c)	L2	CO1, CO2	PO2
Q.2	(a)	L2	CO1, CO2	PO2
	(b)	L1	CO1, CO2	PO2
	(c)	L1	CO1, CO2	PO1
Q.3	(a)	L2	CO1, CO2	PO4
	(b)	L2	CO1, CO2	PO4
	(c)	L2	CO1, CO2	PO6
Q.4	(a)	L1	CO1, CO2	PO3
	(b)	L2	CO1, CO2	PO5
	(c)	L2	CO1, CO2	PO5
Q.5	(a)	L2	CO3, CO4	PO5
	(b)	L1	CO3, CO4	PO4
	(c)	L1	CO3, CO4	PO1
Q.6	(a)	L1	CO3, CO4	PO2
	(b)	L2	CO3, CO4	PO4
	(c)	L1	CO3, CO4	PO4
Q.7	(a)	L3	CO3, CO4	PO1
	(b)	L1	CO3, CO4	PO6
	(c)	L1	CO3, CO4	PO7
Q.8	(a)	L2	CO5, CO6	PO6
	(b)	L2	CO5, CO6	PO6
	(c)	L2	CO5, CO6	PO6
Q.9	(a)	L1	CO5, CO6	PO4
	(b)	L1	CO5, CO6	PO7
	(c)	L2	CO5, CO6	PO7
Q.10	(a)	L1	CO5, CO6	PO8
	(b)	L2	CO5, CO6	PO6
	(c)	L2	CO5, CO6	PO8

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6