Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – IV • EXAMINATION – WINTER 2012

Subject code: 140401 Date: 27/12/2012

Subject Name: Molecular Biology and Genetics

Time: 02.30 pm - 05.00 pm Total Marks: 70

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Describe classical experiment which demonstrated that DNA is genetic material in eukaryotes.	**07**
	(b)	What do you understand by genetic code? Describe the general properties of genetic code.	**07**
Q.2	**(a)**	What is coupling and repulsion hypothesis of crossing over? Describe it with suitable example.	**07**
	(b)	An inhibitor of pigment production in onion bulbs (I−) shows dominant epistasis over another locus, the genotype iiR− produces red bulbs and iirr produces yellow bulbs. A) when a pure white strain is crossed with a pure red strain and produces all white F1 and an F2 with 12/16 white, 3/16 red and 1/16 yellow. What were the genotypes of parents? B) if yellow onions are crossed to a pure white strain of a genotype different from the parental type in part A), what phenotypic ratio is expected in the F1 and F2 generation?	**07**
		OR	
	(b)	Red green colour blindness in humans is recessive and sex linked. If a woman heterozygous for colour blindness marries a colour blind man, what is the probability that their first child will be a colour blind daughter?	**07**
Q.3	**(a)**	Describe various steps of DNA replication in prokaryotes with a neat diagram.	**10**
	(b)	What is renaturation of DNA? Explain it.	**04**
		OR	
Q.3	**(a)**	Give an account of the mechanism of protein synthesis in prokaryotes.	**10**
	(b)	Explain Mendel's law of segregation with a suitable example.	**04**
Q.4	**(a)**	Explain processing of mRNA.	**07**
	(b)	Discuss effect of α-amanitin to various RNAs.	**04**
	(c)	Define: Shine dalgarano sequence, Enhancer, Sense strand	**03**
		OR	
Q.4	**(a)**	Explain Clover leaf model of t-RNA.	**07**
	(b)	Explain post translational modification.	**04**
	(c)	Define : Promoter, Silencer , Antisense stand	**03**
Q.5	**(a)**	What is sex determination? Describe various examples of sex chromosomal mechanisms of sex determination.	**08**
	(b)	Assume a chromosome with a following gene sequence (the full stop (.) represents the centromere) : ABCD.EFGH You find the following aberrations in this chromosome; for each identify the specific kind of aberration. a) ABCD.EFH b) ADCB.EFGH c) ABCDCD.EFGH.	**06**
		OR	
Q.5	**(a)**	What are transcription factors? Describe three different RNA Polymerases for eukaryotic transcription.	**08**
	(b)	The diploid number of an organism is 12. How many chromosomes would be expected in a) a monosomic b) a trisomic c) a tetrasomic d) a double trisomic e) a monoploid f) a triploid.	**06**

****