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**SARDAR PATEL UNIVERSITY**  
**T.Y.B.Sc EXAMINATION, V<sup>th</sup> semester**  
**Friday, 15<sup>th</sup> November 2013, 10.30p.m to 01.30p.m**  
**Genetics: US05CGEN02**  
**[Molecular and Microbial genetics]**

**NOTE- Figures in the right indicate full marks. Maximum Marks-70**  
**Q.1. Multiple Choice Questions (10 marks- One Mark for Each MCQ)**

**1. Which of the following statements is false concerning a mating between F+ and F- cell?**

- a.the F-cell is converted to an F+ cell
- b.the F+cell is converted to an F-cell
- c.chromosomal genes are rarely transferred
- d.cell-to-cell contact is always necessary.

**2. Specialized transduction is best characterized by**

- a. the transfer of a specific naked DNA sequence into a recipient cell
- b. the transfer of an F plasmid to a recipient cell
- c. the transfer of a particular region of the bacterial DNA to a recipient cell via a phage vector.
- d. the transfer of a specific gene sequence through a sex

**3. TN<sub>10</sub> element are**

- a. Composite transposable element
- b. present in all organism
- c. Has code for essential gene
- d. all the above.

**4. Transposons can not be used as**

- a. Vectors
- b. Mutagens
- c. Genetic marker
- d. None of the above.

**5. Reassociation kinetics of the genome depends on**

- a.Genome Size
- b.Types of Nucleotide in genome
- c.Types of sequence in genome
- d.All the above

**6. Which of the following is part of RNA processing in eukaryotes?**

- a.splicing of introns
- b.reverse transcription
- c.addition of a 5' cap
- d.addition of a poly T tail.

**7. Primase is the enzyme responsible for:**

- a. unwinding the DNA double strand to allow DNA polymerase access to the template DNA.
- b. introducing nicks into the DNA double strand in order to prevent the formation of knots.
- c. hydrolyzing ATP to facilitate DNA unwinding.
- d. making short strands of RNA at the site of replication initiation.

**8. Pseudogenes are**

- a.Mutated copy of a functional gene.
- b.Random copy of a functional gene.
- c.Tandemly repeated function gene.
- d.Copy of pseudogene.

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9. Which of the following would you expect to find if you took apart a spliceosome?  
a. RNA only.    b. Protein only    c. Both RNA and protein    d. Neither RNA nor protein.
10. Which of the following processes is involved in DNA repair:  
a. Conjugation    c. Transposition  
b. Reversion of mutation    d. Homologous recombination

**Q.2.Short Question (any 10 question x2 marks each)**

1. What is HFr? Discuss its function.
2. What is LHT classification?
3. Describe the termination of transcription of tRNA.
4. Describe mitochondria genome with a map.
5. Discuss the importance of Rec A protein in molecular biology.
6. Describe the various type of eukaryotic transposable element.
7. What is Cot value of a highly repetitive DNA?
8. What is the importance of DNA repair?
9. What are the types of Introns?
10. Describe the cross between the  $F^+$  and  $F^-$ .
11. What is episome? How it differ from plasmid.
12. Describe the Copia element with its map.

**Q.3.a. Discuss the transduction with a neat diagram. [5]**

**Q.3.b. Describe the plasmid with its application in molecular biology. [5]**

**OR**

**Q.3.a. Discuss the classification of Virus with examples. [5]**

**Q.3.b. Describe the molecular mechanism of transformation. [5]**

**Q.4.a. Describe the Holliday model of recombination with its significance. [5]**

**Q.4.b. Describe the Ac-Ds element of maize. [5]**

**OR**

**Q.4.a. Describe the SOS repair mechanism for DNA. [5]**

**Q.4.b. Describe the retro-transposon with its types. [5]**

**Q.5.a. Describe the initiation of eukaryotic Replication. [5]**

**Q.5.b. Describe the chloroplast genome with its map. [5]**

**OR**

**Q.5.a. Derive the equation for Cot value of the unique DNA. [5]**

**Q.5.b. Describe the reassociation kinetics for the moderate repetitive DNA. [5]**

**Q.6.a Describe the post transcriptional modification of mRNA. [10]**

**OR**

**Q.6.a. Describe the initiation for tRNA transcription. [5]**

**Q.6.b. Describe the any five post translational modification of a protein. [5]**

**All THE BEST**