

Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Sc(H)/MOL.BIO/SEM-3/GNO-304/2012-13**

**2012**

**GENOME ORGANIZATION**

Time Allotted : 3 Hours

Full Marks : 70

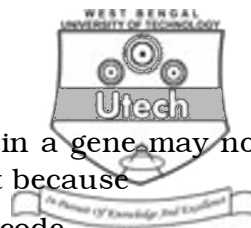
*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

**GROUP – A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10
- i) Which molecule serves to destabilize the DNA helix in order to open it up, creating a replication fork ?
    - a) DNA gyrase                      b) DNA polymerase
    - c) DNA ligase                      d) DNA helicase.
  - ii) What activity of DNA polymerase I (pol I of Kornberg's enzyme) is responsible for the removal and replacement of the RNA primer ?
    - a) 5' to 3' exonuclease      b) 3' to 5' polymerase
    - c) 3' to 5' exonuclease      d) 5' to 3' polymerase.
  - iii) The primer required for DNA synthesis is made by the enzyme
    - a) DNA polymerase II      b) Replicase
    - c) Primase                      d) DNA polymerase I.



- iv) Base substitutions (point mutations) in a gene may not result in a change in the gene product because
- a) of the redundancy of the genetic code
  - b) most DNA is non-coding
  - c) single bases are largely unimportant; it is the overall structure of the gene that matters
  - d) none of these.
- v) Frameshift mutations result from
- a) incorporation of base analogues
  - b) tautomeric shifts
  - c) cancer
  - d) base deletions or additions.
- vi) Myotonic dystrophy patients exhibit
- a) no dystrophin and a single nucleotide change
  - b) trisomy
  - c) a single nucleotide change
  - d) a triplet sequence repeated many times.
- vii) When comparing ultraviolet light and X-rays,
- a) X-rays have longer wavelengths and are thus less mutagenic
  - b) X-rays have shorter wavelengths and are thus less mutagenic
  - c) X-rays and UV light are of the same wavelength and are equally mutagenic
  - d) X-rays have longer wavelengths and are thus more mutagenic.
- viii) VNTR stands for
- a) Variable Number of Tagged Repeats
  - b) Variable Number of Tandem Repeats
  - c) Various Number of Tandem Repeats
  - d) None of these.



- ix) DNA fingerprinting was discovered by
- a) Barbara McClintock      b) Alec Jeffery  
c) David Baltimore        d) None of them.
- x) A type of DNA polymorphism makes use of southern blot to detect differences in genotype among individuals, is
- a) RFLP                              b) SNP  
c) RAPD                              d) none of these.
- xi) The role of tautomerism in causing mutations relates to the fact that the process ultimately affects the
- a) hydrogen bonding affinities of the nitrogenous base  
b) ability of DNA to replicate at all  
c) phosphate group  
d) deoxyribose sugar.

**GROUP – B**

**( Short Answer Type Questions )**

Answer any *three* of the following.                      3 × 5 = 15

2. Write a Short note on Genetic Markers.
3. What is tandem repeats ? Give example of it. What are minisatellite and microsatellite ?    2 + 1 + 2
4. What is the full form of RAPD ? Describe how it can be used as genetic fingerprint.
5. What are Transposons ?



**GROUP – C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

6. What short notes on the following :  $3 \times 5$
- a) STR
  - b) VNTR
  - c) Satellite DNA.
7. What is Holliday junction ? Who proposed this structure ? Describe the holiday model with diagram.  $2 + 1 + 7 + 5$
8. How does recombination take place during bacterial transformation ? What is the assymetric strand transfer model ? Describe the rec BCD pathway with suitable diagram.  $5 + 3 + 7$
9. "Tautometic shifts lead to mutation." Explain the statement. Compare the mechanism of mutations induced by nitrous acid and acridine dyes. How are mutations induced by high energy radiations ?  $5 + 5 + 5$

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