



Name :

Roll No. :

Invigilator's Signature :

CS / B.SC(H) / MOLBIO / SEM-3 / GNO-304 / 2011-12

2011

GENOME ORGANISATION

Time Allotted : 3 Hours

Full Marks : 70

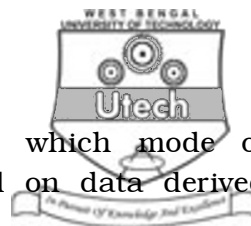
The figures in the margin indicate full marks.

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) What is the complementary strand of the following RNA strand : 5'GCACGUUUACCGA 3' ?
 - a) 3' TACGCAAATGGCT 5'
 - b) 3' AGCCAUUUGCGUA 5'
 - c) 3' AUGCGUUUACCGA 3'
 - d) 3' CGUGCAAUGGCU 5'.
 - ii) *In vivo* synthesis of DNA is
 - a) 5' to 3'
 - b) 3' to 5'
 - c) both (a) and (b)
 - d) neither (a) nor (b).
 - iii) The discovery of Okazaki fragments suggested that DNA synthesis is sometimes
 - a) discontinuous
 - b) continuous
 - c) semi-conservative
 - d) all of these.



- iv) In the Meselson-Stahl experiment, which mode of replication can be eliminated based on data derived after one generation of replication ?
- a) Dispersive b) Semi-conservative
c) Conservative d) None of these.
- v) Which is not a requirement for DNA replication ?
- a) Ready supply of dNTPs (all four deoxynucleoside triphosphates)
b) Primer
c) Template
d) None of these.
- vi) Which one of the following does not explain how human cells can apparently replicate DNA much faster than a bacterium ?
- a) DNA synthesis occurs simultaneously at multiple points along the chromosome in eukaryotes.
b) There are more origins of replication in eukaryotes
c) The eukaryotic DNA polymerase moves much more quickly
d) DNA polymerase III is responsible for DNA synthesis.
- vii) Okazaki fragments
- a) remove the primer
b) are formed in the leading strand
c) are formed in the lagging strand
d) are synthesized by primase.
- viii) The lagging strand of the DNA double helix is orientated in
- a) 3'to 5'manner b) 5'to 3'manner
c) both (a) and (b) d) none of these.



- ix) The discovery of transposons showed that genetic information
- a) can be transferred between species
 - b) is not fixed in the genome
 - c) can be altered
 - d) is passed from one generation to another.
- x) A frameshift mutation is one of the most severe types of mutation because
- a) they occur only in gametes
 - b) more than one amino acid or entire proteins are affected
 - c) more than one gene is affected
 - d) translation is stopped.
- xi) Transposons were discovered by
- a) Lewin B
 - b) Griffith
 - c) Barbara McClintock
 - d) none of them.
- xii) Example of microsatellite is
- a) VNTR
 - b) STR
 - c) RFLP
 - d) RAPD
- xiii) Example of minisatellite is
- a) VNTR
 - b) STR
 - c) RFLP
 - d) RAPD.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Write a short note on STR and its phylogenetic significance. 5
3. Write a note on Transposons. What is its genetic significance ? 3 + 2
4. Write a short note on VNTR. 5
5. Write a short note on Satellite DNA. 5
6. What are minisatellite and microsatellite ? What fingerprinting are possible from minisatellite and microsatellite ? 3 + 2



GROUP – C

(Long Answer Type Questions)

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

7. What experiment did Meselson and Stahl to perform prove that DNA replication is semi-conservative ? What are the different models of prokaryotic DNA replication ? What are leading and lagging strands in DNA replication ? What are the roles of DNA Gyrase, Primase and SSB proteins in DNA replication ?

What is replicon ?

$7 + 2 + 2 + 2 + 2$

8. What is transposition ? What are composite and non-composite transposons ? For composite transposons, if single transposon resides on a plasmid, why does it behave like two different transposons ? What information do you get from the following naming of the transposon-galT135 : : Tn4 ?

$2 + 4 + 1 + 3 + 3 + 2$

9. How does unique DNA differ from Repetitive DNA ? Classify Repetitive DNA and describe each class with suitable example. What are the applications of RFLP ?

$3 + 7 + 5$

10. What is Endosymbiotic theory ? What evidences support this theory ? What are the major problems of this theory ?

$3 + 6 + 6$

11. What is mutation ? Give examples of a harmful and a beneficial mutations. Classify mutation by its impact on protein sequence and briefly describe each class.

$2 + 1\frac{1}{2} + 1\frac{1}{2} + 2\frac{1}{2} + 7\frac{1}{2}$

12. What is replication ? Describe the sigma model of replication in bacteria. How can it be differ from θ model ?

$3 + 7 + 5$

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