Or

Mention various enzymes and proteins required for DNA replication. Describe the major stages of the replication process. Write how the leading strand differs from a lagging strand. 2+6+2=10

6. Explain how the sex of an individual is determind by a balance between the genes for maleness and that for femaleness. Add a note on the involvement of SRY gene in testis differentiation. 6+4=10

Or

What is an idiogram? Write about the nomenclature of different chromosomes of human karyotype. Mention briefly the salient features of Human Genome Project. 1+5+4=10

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2016

ZOOLOGY

(Major)

Paper : 4·2

(Genetics)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following as directed : 1×7=7

(a) What term is used to denote the dominant gene that stops the expression of another dominant gene of a different locus?

(b) Trinucleotide nub occurs in mRNA/tRNA/rRNA/hnRNA.
(Find out the correct answer)

(c) What is a pro-virus?

(d) Name the type of ionizing radiation which is produced by decay of some radioactive isotopes.

(e) _____ is the amino acid that initiates the translation process during protein synthesis. (Fill in the blank)

(f) Express the chromosome number in nullisomy.

(g) Down's syndrome arises due to non-disjunction of 21st chromosome during meiosis. (State True or False)

2. Give brief answer to the following : 2×4=8

(a) Mention the type of cross which is done between F_1 hybrid and its homozygous recessive parent. Show the result of this cross in percent taking the cross between a tall and a dwarf pea plant as an example.

(b) Distinguish between autopolyploids and allopolyploids.

(c) Give at least two positive consequences of mutation.

(d) Write the differences between transformation and transduction in bacteria.

3. Answer any *three* questions from the following :

(a) Define inversion. Explain different types of inversion and mention one genetic consequence of inversion. 1+3+1=5

(b) Explain coupling phase and repulsion phase of linkage with appropriate examples. 5

(c) How can the mitochondrial DNA be distinguished from nuclear DNA? Give brief account of the inheritance of mitochondrial DNA. 2+3=5

(d) Who first suggested the triplet nature of genetic codes? Write the important features of genetic code. 1+4=5

(e) Explain how the non-ionizing radiations affect the cytogenetic setup of a living cell. 5

4. Define multiple allele. Write the characteristics of multiple alleles. Explain this phenomenon taking human ABO blood groups and their inheritance. 1+3+6=10

Or

What is an operon? Describe the mechanism of gene regulation with the help of *lac* operon concept. 2+8=10

5. In which cellular process the synaptonemal complex is formed? Illustrate the structure of a synaptonemal complex and write its significance. 1+6+3=10