

(20)

SARDAR PATEL UNIVERSITY
B.Sc. (Genetics) – Fourth Semester Examination (CBCS)

Thursday, 7th April 2016

10:30 a.m. to 1:30 p.m.

US04CGEN02: Principles of Genetics-II

Total Marks: 70

Note: (1) Figures to the right indicate marks.

(2) Draw a neat and labeled diagram, wherever necessary.

- Q. 1** Choose the most appropriate answer from the four alternatives given: [10]
- i. Who coined the term linkage?
(a) Stern (b) Morgan (c) James (d) Louis
 - ii. According to classical theory, the crossing over takes place at _____.
(a) Pachytene (b) Diplotene (c) Leptotene (d) Zygotene
 - iii. The unit of crossing over has been designated as _____.
(a) Centi Morgan (b) Deci Morgan (c) Centi Cistron (d) Deci Cistron
 - iv. Extranuclear inheritance commonly occur in _____.
(a) Nucleus (b) Cytoplasmic organelles
(c) Ribosomes (d) Cell membrane
 - v. Kappa particle refers to inheritable _____ symbionts.
(a) Mitochondrial (b) Chloroplast (c) Cytoplasmic (d) None of them
 - vi. Cytoplasmic inheritance involves inheritance of _____.
(a) Mitochondrial DNA (b) Chloroplast DNA
(c) Nucleus DNA (d) Both (a) and (b)
 - vii. The *lac* operon is an example of _____.
(a) Arbinose operon (b) Inducible operon
(c) Repressible operon (d) Overlapping operon
 - viii. The *lac* operon in *E. coli* comprises _____.
(a) Promoter and structural genes only (b) Promoter and operator genes only
(c) Structural and operator genes only (d) All of these
 - ix. Gene mutation occurs at the time of _____.
(a) DNA repair (b) DNA replication (c) Cell division (d) RNA transcription
 - x. A condition in which the organisms have more than two complete sets of chromosomes is called _____.
(a) Polyploidy (b) Euploidy (c) Aneuploidy (d) None of these

Q.2 Answer any **TEN** from the following:

[20]

- i. What do you mean by synopsis?
- ii. Define linkage. Write a short note on linkage groups.

- iii. Write any one example of linkage studied by you.
- iv. Enlist the factors responsible for male sterility in plants.
- v. Write a short note on evolution of mitochondria and chloroplast.
- vi. What do you mean by chloroplast genetics?
- vii. What is genetic code?
- viii. What do you mean by position effect?
- ix. Write a short note on discovery and properties of genetic code.
- x. Define aneuploidy and euploidy.
- xi. Write a short note on gene mutation.
- xii. Define mutagens. Write about mutagens types.

- Q.3 (a) Give a detail account on Stern's experiment for cytological basis of crossing over. [06]
 (b) Write a note on chromosome maps. [04]

OR

- Q.3 (a) What do you mean by Linkage? Explain in detail about complete linkage. [06]
 (b) Briefly discuss about the mechanism of crossing over. [04]

- Q.4 (a) What do you mean by maternal inheritance? Explain the role of maternal effect on coiling of shell in snail. [06]
 (b) Write a note on Iojob inheritance in maize [04]

OR

- Q.4 (a) Give a detail account on male sterility in plant. [05]
 (b) Write a note on plastid inheritance in *Mirabilis jalapa*. [05]

- Q.5 (a) State and explain about regulation of gene expression that is operon concept with example. [10]

OR

- Q.5 (a) Explain in detail about classical concept for gene and allele. [05]
 (b) Write a note on Genetic code and Wobble hypothesis. [05]

- Q.6 (a) Discuss in detail numerical chromosomal changes. [10]

OR

- Q.6 (a) What do you mean by chromosome mutation? Write a brief note on duplication and translocation of chromosomes. [06]
 (b) Discuss the various practical applications of mutation. [04]
