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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 <u>TEN</u> from the following:** **[20]**

i. What do you mean by synapsis?
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 Iojap 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]

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