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SEAT NO. _____

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[] SARDAR PATEL UNIVERSITY

M.Sc. (I Semester- CBCS) Examination

Subject: BOTANY

PS01CB0T23; Genetics, Plant Breeding & Evolution

Friday, October 26, 2018

Time: 10.00 a.m. to 1.00 p.m.

Total Marks: 70

Note: Figures in brackets indicate marks
Answer all the questions in the given answer book

Q1. Attempt all the multiple choice questions given below (8x1=8)

- (i) When three coins (One rupee, 50 paise, 25 paise) tossed together, what is the probability of three coins coming up as heads?
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{1}{8}$ (d) $\frac{1}{3}$
- (ii) The phenotypic and genotypic ratio appears as 2:1 in which interaction of the genes
(a) Incomplete dominance (b) lethal genes
(c) co-dominance (d) pleiotropy
- (iii) The process in which a part of a chromosome becomes detached and joins a part of a nonhomologous chromosome is called:
a) Deletion b) addition c) Inversion d) translocation
- (iv) The process in which two 'X' chromosomes during the meiotic prophase of Oogenesis remained together and migrate to the same pole and result into one female gamete with two 'X' chromosome and the other with no 'X' chromosome is known as:
a) Nondisjunction b) Dissociation
c) Haplodiploidy d) Heterodiploidy
- (v) Transposable elements move from one position to another in genome and responsible for ----- and -----.
(a) Mutations, Chromosome breakage
(b) Chromosome addition, inversion
(c) Variation, ploidy
(d) Mutation, chromosome structure
- (vi) Plant evolution can be traced primarily from the shift in the pattern of
(a) Homomorphy to heteromorphy
(b) Unisexuality to bisexuality
(c) Both the above
(d) None of the above
- (vii) Potential for interbreeding and producing fertile offspring are the two basic parameters to define a group of organisms as a species. Which is the third such parameter?
(a) continuous variations (b) high biological potential
(c) reproductive isolation (d) wide distribution
- (viii) The processes of ----- and ----- generate variations while ----- produces adaptation to the environment.
(a) genetic drift----- mutation----- sexual recombination
(b) mutation----- natural selection----- sexual recombination
(c) mutation----- sexual recombination----- natural selection
(d) sexual recombination----- natural selection----- mutation

(7)

(P.T.O.)

Q2. Answer any SEVEN of the following in brief:

(7x2=14)

- i) Types of mutations
- ii) Incomplete dominance
- iii) Pleiotropy
- iv) Sex determination
- v) Allopolyploidy
- vi) Male sterility
- vii) Over generations of time, a plant population with pale color flowers is gradually replaced with a population having bright color flowers. How do you justify this change from the angles of Lamarkism and Darwinism?
- viii) What are vestigial organs? Where do you find them in plant kingdom? What do they indicate?
- ix) Taking one example each, state the significance of petaloid -bracts, -sepals and -stamens.

Q3. (a) Explain the transmission of traits in humans with the help of pedigree (6)

(b) Write notes on Epistasis with any three examples (6)

OR

(b) Establish the transmission of sex-linked traits with suitable example. (6)

Q4. (a) With two suitable examples explain the extrachromosomal inheritance (6)

(b) Write notes on transposable elements and its importance (6)

OR

(b) Write notes on chromosomal mutations with suitable examples (6)

Q5. (a) Explain various methods of emasculation in hybridization (6)

(b) Describe in brief the methods and objectives of plant breeding (6)

OR

(b) Explain the importance of reproduction in plants in the context of plant breeding (6)

Q6. (a) Taking different examples from the plant kingdom, write a brief account on evidences of organic evolution (6)

(b) Taking adequate examples and making diagrams, justify that flower is a modified shoot and all the floral parts are evolved from vegetative organs. (6)

OR

(b) Natural selection is considered as a driving force for the evolutionary change. Taking the help of three kinds of selection, justify the statement. Support your justification with illustrations. (6)

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(2)