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Seat number _____

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SARDAR PATEL UNIVERSITY
M. Sc. (Genetics) – Second Semester Examination (CBCS)
Monday, 18th March, 2019
2:00 p.m. to 5:00 p.m.
PS02CGEN21: Cytogenetics

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: [08]

- i. _____ is responsible for C – banding.
(a) DNA Denaturation (b) Reannealing (c) DNA methylation (d) Both “a & b”
- ii. The basic structural unit of chromosome is _____.
(a) DNA (b) Nucleosome (c) Histone protein (d) Non - histone protein
- iii. Which one of the following is a latest cytogenetic technique?
(a) B - pulse (b) T - pulse (c) Spectral karyotyping (d) NOR staining
- iv. _____ is a special type of whole arm translocation involving the fusion of two acrocentric chromosomes.
(a) Balanced translocation (b) Unbalanced translocation
(c) Robertsonian translocation (d) Isochromosomal translocation
- v. Human cells with 69 chromosomes are referred to as _____.
(a) Diploid (b) Triploid (c) Tetraploid (d) Polyploid
- vi. Cytogenetic analysis of human oocyte requires _____.
(a) Hyaluronidase (b) FIX I, II & III (c) Podophyllotoxin (d) All the above
- vii. Crossing of cytogenetically abnormal carrier animals produces disease/s in _____% of animals in next generation.
(a) 25 (b) 50 (c) 75 (d) 100
- viii. _____ is an intermediate between autopolyploid and allopolyploid..
(a) Segmental Autotriploid (b) Segmental Allopolyploid
(c) Segmental Autotetraploid (d) Segmental Allotriploid

Q-2 Answer any SEVEN from the following: [14]

- i. What is ISCN? write its importance in cytogenetics.
- ii. Draw labelled diagram for mitotic cell cycle.

(P.T.O.)

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- iii. Enlist miscellaneous/other banding techniques.
- iv. Classify human chromosomes in to groups.
- v. Define the terms: Isochromosomes, Fragile sites.
- vi. What is Philadelphia chromosome?
- vii. Write diploid chromosome numbers in cattle, buffalo, sheep and poultry.
- viii. Name 3 layers present in chorionic villi.
- ix. What are the phenotypic effect of polyploidy?

- Q-3 A. Enlist and explain various types of Giemsa banding techniques. [6]
 B. Write short notes on the following:
 (i) Sister chromatid exchange (ii) Giemsa staining [3+3]

OR

- B. Enlist and explain any two R - banding techniques. [06]

- Q-4 A. List out various structural abnormalities in human chromosomes. Give detailed account on chromosomal deletions. [06]

- B. Enlist various trisomic conditions involving sex chromosomes in human. Explain Klinefelter's syndrome and Turner's syndrome. [06]

OR

- B. Enlist various trisomic conditions involving human autosomes. Explain any two of them in detail. [06]

- Q-5 A. Enlist and explain basal media, serum and phytohemagglutinins used for standard lymphocyte culture. [06]

- B. Name any 4 cell lines? Explain cytogenetic analysis of human sperm. [06]

OR

- B. When and how the amniotic fluid is collected for chromosomal analysis? Describe short term culturing technique for amniocytes. [06]

- Q-6 A. Enlist different assays for genotoxicity testing. Explain any one of them in detail. [06]

- B. Discuss applications of cytogenetic investigations to clinical practice. [06]

OR

- B. What are the types of polyploidy in plants? How artificial induction of polyploidy in plants carried out? [06]

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