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SARDAR PATEL UNIVERSITY EXAMINATION

Day- Tuesday DATE - 29/12/20 TIME-2:00-4:00 P.M. Course- US05CBNF24

SUBJECT: Bioinformatics Applications

CLASS- T.Y.B.Sc SEMESTER-V MAX. MARKS- 70

Q1- Select the correct from the following Multiple Choice: [1 X 10] [10]

(i) **Which of the following is not a characteristic of the nuclear scaffold?**
a) SMC protein c) Protein in nature
b) Associated with loops of 40 – 90 kb d) Topoisomerase I

(ii) **How many human mitochondrial proteins are encoded in the mitochondrial genome and synthesized within mitochondria?**
a) 11 b) 12 c) 13 d) 14

(iii) **Which generation of sequencing uses longest reads?**
a) First b) Second c) Third d) None

(iv) **Next generation sequencing is characterized by**
a) higher error rate c) long sequence reads
b) lot of sequencing data per run d) none of the above

(v) **Rooted tree give**
a) branches b) Ancestors of all species c) flowers d) future species

(vi) **Which method use clustering algorithm**
a) Likelihood b) UPGMA c) NJ d) Parsimony

(vii) **Fastq format starts with sign**
a) < b) + c) > d) @

(viii) **What feature does mRNA have that tRNA and rRNA do not?**
a)Contains a GABA box. b) Contains a TATA sequence.
c)Ends with a G tail. d)Ends with a poly-A tail.

(ix) **Genomewide gene expression analysis is done using**
a) Microarray b) Northern analysis c) Real time PCR d) Dot blot

(x) **In microarray, when two different gene do not express at all, the color on the chip**
a) Yellow b) red c) blue d) black.

Q2- Fill in the blanks and True –False (1X8) [8]

(i) C-value in genome represents_____
(ii) .....is the main enzyme component of Sanger sequencing.
(iii) Sequencing method that detects light emitted during the sequential addition of nucleotides is.....
(iv) Phylip software is used for .....
(v) Every ds DNA has eight possible reading frames, four in each direction. [TRUE/FALSE]
(vi) Next generation sequencing uses single DNA for sequencing [TRUE/FALSE]
(vii) Histones have a high content of negatively charged amino acids. [TRUE/FALSE]
(viii) The histone tails stabilize the 30 nm fibre by interacting with adjacent nucleosomes. [TRUE/FALSE]

Q3- Short Answer Questions (Attempt any 10 out of 12) (10X2) [20]

(i) Write 4 differences between nuclear DNA and Mitochondrial DNA.

(ii) What are Histone proteins? Write its important property.

(iii) Diagrammatically show the organization of human genome.

(iv) Give 4 differences between dNTP and ddNTP.
(v) What are the important features of Nanopore sequencing.
(vi) Give advantages of second generation sequencing.

(vii) What are promoters? How they are predicted using online software.

(viii) Give the principle and significance of microarray.
(ix) Sketch a well labeled phylogenetic tree.
(x) How phylogram differ from cladogram.

(xi) Differentiate rooted tree from unrooted tree.

(xii) Illustrate the structure of a gene.

Q4- Long Answer Questions (attempt any 4 out of 8) (4X8) **[32]**

(i) Explain in detail about prokaryotic genome organization
(ii) Elaborate the aims, objectives and application of Human Genome Project.
(iii) What is ORF? Discuss the basic algorithm for gene identification
(iv) Explain UPGMA method with an example.
(v) What are phylogenetics tree? Explain in detail its structure, type and significance.
(vi) Discuss the method and significance of genome sequencing.
(vii) Explain Sanger sequencing method in detail.
(viii) Write a note on next generation sequencing.