

(37) SARDAR PATEL UNIVERSITY

External Examination

Class- T.Y. B. Sc. VI Semester

Date: - 04-04-2018, Day: - Wednesday

Time: - 10:00 am to 01:00 pm

Course: - US06CBNF05

Subject: Bioinformatics

Title: - Bioinformatics Applications II

Total Marks: 70

Q1. Multiple choice questions (All are compulsory).

[10]

- (1) Which route of drug administration is most likely to lead to the first-pass effect?
a) Sublingual b) Oral c) Intravenous d) intramuscular
- (2) What is the term used for the automated *in vitro* testing of large numbers of compounds using genetically modified cells?
a) robotic testing b) high throughput screening
c) multiscreening d) nanotechnology
- (3) How many codons are needed to specify five amino acids?
a) 3 b) 6 c) 15 d) 21
- (4) What secondary structures are formed when single-stranded DNA or RNA is inverted and complementary?
A) double helix b) B-DNA c) Z-DNA d) hairpin
- (5) A bifurcating branch point in the phylogenetic tree is known as _____.
a) node b) clade c) branch d) taxon
- (6) Expand UPGMA.
a) Unweighted Pair Group Method with Arithmetic Mean.
b) Unweighted Pair Group Method with All Mean.
c) Upregulated Gene Method with Arithmetic Mean.
d) Unregulated Genome Method with All Mean.
- (7) In standard microarrays, the probes are attached via surface engineering to a solid surface by a _____ to a chemical matrix
a) Metallic bond b) Chemical bond c) Covalent bond d) Aromaticity
- (8) Microarray data processing using _____
a) Generative topographic map b) Artificial intelligence
c) Artificial neural network d) Self-organizing map
- (9) Microarray analysis can be used to:
a) Determine the intron-exon organization of a gene.
b) Determine the concentration of a protein in a cell.
c) Determine the stage-specific expression of a gene
d) Determine the presence of a DNA sequence in a cell
- (10) Species evolve by.....
a) diversification b) progression c) linear advancement d) magic

Q2. Answer the following questions in short. (Attempt any 10) (each carry 2 marks)

[20]

- (1) Differentiate average linkage and complete linkage.
- (2) How image processing occur in microarray.
- (3) Explain about Affymetrix's Photolithographic Approach.
- (4) How mutation plays an important role in evolution?
- (5) Differentiate between Rooted and Unrooted tree.
- (6) Enlist any two software's for both phylogenetics analysis and CADD.

(P.T.)

- (7) What is a basic structure of phylogenetic tree?
- (8) Explain preclinical and clinical trial in CADD.
- (9) Define Combinatorial Chemistry and docking.
- (10) Elaborate different route of drug delivery system.
- (11) Differentiate between DNA and RNA structure.
- (12) Give the applications and limitations of Mfold method.

Q3. What is microarray? Discuss its methods and applications in detail. [10]

OR

Q3. Discuss the clustering method and its types. [10]

Q4. What is a phylogenetic tree? Discuss its important methods and applications. [10]

OR

Q4. Construct the tree using UPGMA method with following matrix table [10]

| | A | B | C | D | E | F | G |
|---|-------|-------|-------|-------|-------|-------|---|
| A | | | | | | | |
| B | 19.00 | | | | | | |
| C | 27.00 | 31.00 | | | | | |
| D | 8.00 | 18.00 | 26.00 | | | | |
| E | 33.00 | 36.00 | 41.00 | 31.00 | | | |
| F | 18.00 | 1.00 | 32.00 | 17.00 | 35.00 | | |
| G | 13.00 | 13.00 | 29.00 | 14.00 | 28.00 | 12.00 | |

Q5. Define drug and its basic features. Explain the steps for CADD [10]

OR

Q5. Write a short note on following: [10]

- i) ADME
- ii) knockout Gene
- iii) Lipinski's rule.

Q6. i) Explain M-fold method and its utility. [5]

ii) Explain tertiary structure of RNA. [5]

OR

Q6. Write a short note on following: [10]

- i) A, B and Z type of DNA
- ii) tRNA