

M. Sc. DEGREE EXAMINATION, APRIL 2016  
BIOINFORMATICS  
FOURTH SEMESTER

COURSE : CORE

PAPER : RECENT ADVANCES IN BIOINFORMATICS

TIME : 3 HOURS

MAX. MARKS: 100

SECTION – A

ANSWER ALL QUESTIONS

(20 X 1=20)

1. File name extension for SMILES is  
a. .sme                      b. smi                      c. sml                      d. sms
2. Convert the chemical structure into SMILES formula -  $\text{CH}_3\text{-N=C=O}$   
a.  $\text{CN=C=O}$     b.  $\text{C=N=C=O}$     c.  $\text{CN-C-O}$     d.  $\text{C-N-C-O}$
3. The cheminformatics software emolecules was invented by  
a. Gates                      b. Craig                      c. Watson                      d. Del Mar
4. How do pharmacogenetics help doctors to treat their patients?  
a. selection of right drug                      b. treat different to one for each patient  
c. selection of right dose                      d. all the above
5. The scientific field Cheminformatics is the study in the area of  
a. chemistry                      b. Biology  
c. Physical synthesis                      d. All the above
6. The QSAR model is based on a biophore consisting of a six-membered aromatic ring containing two \_\_\_\_\_nitrogen atom.  
a.  $\text{SP}_4$ -hybridized                      b.  $\text{SP}_3$ -hybridized  
c.  $\text{SP}$ -hybridized                      d.  $\text{SP}_2$ -hybridized
7. R is an implementation of the programming language of  
a. S                      b. C++                      c. C                      d. Java
8. What do the black spots mean in micro array data ?  
a. gene was strongly expressed                      b. gene was strongly repressed  
c. none DNA has bonded to the DNA in the gene located in that spot.  
d. gene was neither strongly expressed nor strongly repressed
9. The structural fragments, fingerprints come under  
a. OD descriptors    b. 1D descriptors    c. 2D descriptors                      d. 3D descriptors
10. The safety margin of pre clinical trial is  
a. therapeutic dose    b. lethal dose    c. optimal dose                      d. both a and b correct

11. Gene expression Omnibus segregates data into three principle components. There are,
  - a. sequence , protein , amino acid
  - b. header, extensive, empirically
  - c. platform, sample, series
  - d. database, sequence, dataset
12. The treatment of Alzheimer's disease depends on variation of the following gene
  - a. APOE
  - b. CYP
  - c. ACE
  - d. All are correct
13. In R programming when the same or similar tasks need to be performed multiple times done by
  - a. data shift
  - b. data frame
  - c. database
  - d. loop
14. Which of the following is the amount of a drug absorbed per the amount administered?
  - a) Bioavailability
  - b) Bioequivalence
  - c) Drug absorption
  - d) Bioinequivalence
15. The mapping for T cell epitopes by web based tools
  - a. EpiMatrix
  - b. ClustiMer
  - c. JanusMatrix
  - d. All the above
16. Toxicogenomics combines toxicology with other high throughput molecular profiling technologies such as
  - a. transcriptomics
  - b. proteomics
  - c. metabolomics
  - d. All the above
17. DNA microarrays allow detection of Gene mutations using?
  - a. Polymerase Chain Reaction
  - b. Cloning
  - c. Southern Blotting
  - d. Hybridization
18. How can scientists determine the function of or differences between cell types? They can examine the:
  - a. Number of nucleotide bases in genes versus intergenetic sequences.
  - b. Amount of mRNA expressed for each gene in a cell type, and then compare that information between cell types.
  - c. Amount of mutations between genes in the intergenetic spaces.
  - d. Number of tRNA copies for a particular cell type.
19. How is a microarray constructed? In each spot, there are:
  - a. Copies of all the genes for an organism.
  - b. Multiple copies of one gene; each spot has copies for a different gene.
  - c. Multiple copies of intergenetic sequences, which bind to genes in the samples.
  - d. Copies of intergenetic sequences, which promote the replication of DNA in a sample.
20. How do the beads in the column separate mRNA from all other RNA? The beads contain:
  - a. Sequences that magnetically separate the mRNA.
  - b. A glue-like substance derived from spider webs.
  - c. Poly-T's.
  - d. A sequence of uracil's that bind to the Poly-A tail.

**SECTION – B**

**ANSWER ANY FOUR QUESTIONS. EACH ANSWER SHOULD NOT EXCEED 500 WORDS.** (4 X 10 = 40)

21. What is Pharmacokinetics? Explain briefly about the safety metabolisms
22. Describe the different tools used for Vaccine development
23. Define PubChem. Explain the role of PubChem on searching the molecules
24. Illustrate the salient feature of R programming on database management.
25. Write short notes on molecular descriptor and Finger prints
26. Explain in details about application of DNA microarray on gene sequencing.
27. Give an account of role of Immunoinformatics in personalized medicine

**SECTION – C**

**ANSWER ANY TWO QUESTIONS. EACH ANSWER SHOULD NOT EXCEED 1200 WORDS.** (2 X 20 = 40)

28. Describe the pharmacogenomics and toxicogenomics of Alzheimer disease
29. Explain in details about the 3-D QSAR and its applications.
30. Write the features of any one chemical drawing packages used for searching & construction of 3 D structures of chemical molecule.
31. Explain the process involved in designing the Microarray experiments and data analysis

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