KATHMANDU UNIVERSITY
End Semester Examination [C]
April, 2023

Marks Scored:

Level : B.Tech.
Year : IV
Course : BIOT 413
Semester : I
Exam Roll No. :
Time: 30 mins.
F. M. : 10
Registration No.:
Date 07 APR 2023

SECTION "A"
[10Q. × 0.5 = 7.5 marks]

Choose and tick [✓] the most appropriate answer.

1. An initial indication of whether the drug successfully treats the disease in humans is made during _____.
   [ ] Pre-Clinical Trials [ ] Phase I Clinical Trials
   [ ] Phase II Clinical Trials [ ] Phase III Clinical Trials

2. In X-ray crystallography, for what resolution value, the electron density will clearly show heavy atoms?
   [ ] 1 Angstrom [ ] 2 Angstrom [ ] 3 Angstrom [ ] 4 Angstrom

3. Which protein produces protective prostaglandins in the stomach?
   [ ] Cyclooxygenase enzymes (COX-1) [ ] Cyclooxygenase enzymes (COX-1)
   [ ] Peroxidase [ ] Glucocorticoids

4. In the presence of the allosteric modulator the agonist concentration–effect curve; the maximum response does not change and the curve shifts to the right in _____.
   [ ] Negative affinity modulation [ ] Positive affinity modulation
   [ ] Negative efficacy modulation [ ] Positive efficacy modulation

5. Which of the amino acids do not belong to regular secondary structures and have higher propensity to be found in coils or loops?
   [ ] Proline [ ] Valine [ ] isoleucine [ ] Methionine

6. Which of the protein 3D structure prediction method does not use any knowledge of previously solved structures?
   [ ] Profile-based methods [ ] Threading Methods
   [ ] Ab Initio Methods [ ] Homology modeling

7. The energy from electrostatic interactions decreases between a monopole and a dipole at the rate of _____.
   [ ] $1/r$ [ ] $1/r^2$ [ ] $1/r^3$ [ ] $1/r^4$

8. Which protein display method is favored to see how the proteins fold?
   [ ] Wireframe [ ] Ball and Stick
   [ ] Space filling [ ] Backbone and Ribbon

9. Which database stores information on detailed drug data with identified drug targets?
   [ ] PubChem [ ] Zinc [ ] LIGAND [ ] DrugBank

10. Insulin is used to treat diabetes; which of the statement regarding Insulin use is **CORRECT**?

[ ] compensate for inadequacies [ ] cure a condition
[ ] treat symptoms [ ] alter the patient's emotional state

11. Which lipophilic substituent increases lipophilicity in aromatic group but reduces lipophilicity in aliphatic system _____.

[ ] -methyl [ ] -fluorine [ ] -chlorine [ ] -hydroxyl

12. Which of the statement regarding Allosteric drugs is **INCORRECT**?

[ ] binds to primary site on the target
[ ] alters the shape of the target
[ ] alters the vibrational motion of the target
[ ] donate or accept electrons or protons

13. How many degrees of freedom are allowed for rigid docking methods?

[ ] None [ ] Three
[ ] Six [ ] Depends upon the no. of atoms

14. The value of energy attributed to Stretching for force field calculation is _____.

[ ] 1.017 KJ/mol [ ] 9.406 KJ/mol [ ] -6.084 KJ/mol [ ] -0.121 KJ/mol

15. Drugs that are absorbed by placing them under the tongue is defined as _____.

[ ] Buccal Administration [ ] Sublingual Administration
[ ] Subcutaneous Administration [ ] Intravenous Administration

SECTION "B"

[5Q. × 0.5 = 2.5 marks]

Define in one sentence.

16. Multiple drug interactions:

17. Suicide inhibitor:

18. Biased Agonism:

19. Soft docking:

20. Drug bioavailability:

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SECTION "C"
(Long answer questions)
[4Q. × 6 = 24 marks]

Attempt *ANY FOUR* questions.

1. Explain the process of allosteric modulation. How does binding to allosteric sites changes the concentration effect curve? [3+3]

2. Explain how protein structures can be determined by X-ray crystallography.

3. Explain how the de novo structure-based ligand design works?

4. Explain the methods for handling ligand flexibility during molecular docking.

5. Explain structure activity relationships and quantitative structure activity relationships. How adding new substituents alters the behavior of the molecule? [3+3]

SECTION "D"
(Short answer questions)
[8Q. × 2 =16 marks]

6. Write short notes on (*ANY EIGHT*):
   a. Caco-2 assay
   b. DNA binding Zinc Finger Motif
   c. Two-state receptor model
   d. Homology Modeling
   e. Biological Assemblies
   f. Octanol/water partition coefficient
   g. Pharmacophore
   h. DNA binding drugs
   i. Small Molecule Preparation during Docking
   j. Adverse Drug Reaction