TB156185A

Reg. No :.....

Name :.....

B. Sc. DEGREE (C.B.C.S.S) EXAMINATION, MARCH 2018

(2015 Admission Regular)

SEMESTER VI - CORE (CHEMISTRY)

CH6B10TB - RESEARCH METHADOLOGY, NANOCHEMISTRY, ANALYTICAL

Time : 3 Hours **Maximum Marks : 60**

Part A

I. Answer all questions. Each question carries 1 marks **(5x1=5)**

1. The equation for the diameter of a carbon nanotube is ……
2. What is SWNT and MWNT ?
3. Write the different combinations of stationary and mobile phase in partition chromatography.
4. Give the force field equation for a molecule.
5. Mention any two uses of computational chemistry.

Part B

II. Answer any Five questions. Each question carries 2 marks **(5x2=10)**

6. What are the guidelines in evaluating a hypothesis ?
7. What is controlled variable? Give an example.
8. Define mean and standard deviation.
9. Define regression. What is a regression line?
10. What are Quantum dots? Give an example
11. What are the different types of detectors used in HPLC?
12. Give two examples each of stationary phase used in Gas Chromatography and Ion Exchange Chromatography.
13. In the term Hartree-Fock, what essentially, were the contributions of each of these two people?

Part C

III. Answer any Five questions. Each question carries 5 marks **(5x5=25)**

14. Explain the role of concepts and models in science.
15. Name the three types of determinate errors. How are these errors detected and minimized ?
16. Explain the applications of nanotechnology in medicine.
17. What leads to aggregation of nanoparticles ? What are the different ways in which the nanoparticles can be stabilized ?
18. Explain the DTA of calcium acetate monohydrate.
19. a) Explain the fundamental difference between adsorption and partition chromatography. b) Why is gas-solid chromatography not used as extensively as gas-liquid chromatography?
20. Discuss briefly on Ab initio methods
21. What is Born-Oppenheimer approximation? Why is it important in computational chemistry?

Part D

IV. Answer any Two questions. Each question carries 10 marks **(2x10=20)**

22. Explain in detail on 'Research methodologies adopted in science'.
23. a) Explain Correlation and Regression b) Calculate the slope and intercept of the best-fit straight line for the following set of (x,y) data (0.352, 1.09), (0.803, 1.78), (1.08, 2.60), (1.38, 3.03), (1.75, 4.01). Give the equation of the straight line. Calculate y when x = 0.45. What is the value of x when y = 3.85.
24. a)Discuss in detail on the applications of nanotechnology. b) What is Molecular Mechanics? Give its applications. Which application is the most widely used?
25. Write notes on a) Polarography b) Dropping Mercury Electrode