B. Sc. DEGREE END SEMESTER EXAMINATION - OCT. 2020 : JANUARY 2021
SEMESTER 3 : COMPLEMENTARY CHEMISTRY FOR B Sc PHYSICS
COURSE : **19U3CPCHE3.1 : ADVANCED PHYSICAL CHEMISTRY - 1**
(For Regular - 2019 Admission)

Time : Three Hours   Max. Marks: 60

PART A
Answer All (1 mark each)

1. Complete the following reaction which involve the preparation of nanoparticle.
   $SnCl_2 + Ca(OH)_2 + 0.5O_2 \rightarrow$ ----------- $+ CaCl_2 + H_2O$

2. Which among the following molecules possess a horizontal mirror plane? Water, Ammonia, Carbon dioxide

3. If a crystal plane makes intercepts of 1/2a,1/2b and c, what are the Miller indices of the plane?

4. How does the conductivity of a semiconductor vary with temperature?

5. p-Azoxyanisole forms liquid crystals of .... type.

6. Define gel. Give an example

7. Define the term 'phase' of a system.

8. How many phases are present in sulphur system?

                                                              (1 x 8 = 8)

PART B
Answer any 6 (2 marks each)

9. What is Surface Plasmon Resonance?

10. What is an inversion centre? Illustrate with an example.

11. Define a) Unit cell b) Point defect.

12. What are F-centres?

13. Differentiate between n-type and p-type semiconductors.

14. What are liquid crystals? Give an example

15. Give the expression for the Freundlich adsorption isotherm and explain the terms in it.

16. Define the term 'degrees of freedom' of a system in equilibrium.Illustrate with an example.

                                                         (2 x 6 = 12)

PART C
Answer any 4 (5 marks each)

17. Sol gel method is bottom up and CVD is a top down process in the synthesis of nanomaterials. Justify with examples?

18. Compare and contrast the molecular symmetry of ammonia and boron trifluoride.

19. Draw the (200), (220) and (111)planes of a face-centred cubic lattice. How the distance ratio $d_{200}:d_{220}:d_{222}$ for a FCC lattice is arrived at?

20. Define viscosity. How will you measure the coefficient of viscosity? What is the effect of temperature and pressure on viscosity?

21. What are lyophilic and lyophobic sols? Discuss the differences between lyophilic and lyophobic sols.

22. Discuss the phase diagram of water system.

                                                         (5 x 4 = 20)

PART D
Answer any 2 (10 marks each)

23. How do you explain the chemistry and applications of Carbon nanotubes?

24. Give an account of symmetry elements with suitable examples.

25. a) Briefly discuss the important magnetic properties of solids.
    b) The first order reflection of a beam of X-rays of wavelength 1.54 A° from the (100)plane of NaCl occurs at an angle of 15.9°. Calculate the edge length of the unit cell.

26. a) State and explain Nernst distribution law.
    b) Applying Nernst distribution law prove that multiple extraction is more effective than single step extraction in a solvent extraction process.

(10 x 2 = 20)

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