

B. Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER 2018**SEMESTER – 3, CHEMISTRY (COMPLEMENTARY FOR B.Sc. PHYSICS)****COURSE: 15U3PCHE3.1 – ADVANCED PHYSICAL CHEMISTRY - 1***(For Regular - 2017 Admission and Supplementary / Improvement 2016 & 2015 Admissions)*

Time: Three Hours

Max. Marks: 60

Section A*(Answer **all** the questions. 1 mark each)*

1. State Moore's Law.
2. State the Gibbs phase rule.
3. What are amorphous solids? Give an example.
4. What are the Miller indices of a crystal plane which cut through the crystal axes at (2a,3b,3c)
5. What is a symmetry operation?
6. What are lyophilic and lyophobic sols?
7. A liquid drop is spherical. Why?
8. What is the effect of size of molecules on the viscosity of liquids?

 $(1 \times 8 = 8)$ **Section B***(Answer any **six** questions. 2 marks each)*

9. Differentiate between chemical adsorption and physical adsorption?
10. Draw the graph for sulphur system. What is meant by triple point?
11. What is Nernst distribution Law? Discuss its application to study of dissociation of a solute.
12. Calculate the interplanar spacing for a cubic system, of edge length 'a' for unit cell between the following sets of planes. a) 121 b) 212
13. To which point group does boron trifluoride belong to? List out the symmetry elements of boron trifluoride.
14. Give the expression for the Freundlich adsorption isotherm
15. What are liquid crystals? Give an example.
16. How is nanosilver synthesized by the green route?

 $(2 \times 6 = 12)$ **Section C***(Answer any **four** questions. 5 marks each)*

17. How is the distribution law used in the process of extraction? Discuss the cases when the extracting solvent (1litre) is used completely at one time and when the extracting solvent is used in 2 instalments (500mL each). Which is better?
18. How are solids classified based on their magnetic properties? Discuss any two.
19. Discuss on the factors influencing adsorption of a gas by a solid.
20. Illustrate the following symmetry operations using any *two* examples: reflection and improper axis of rotation.

21. What are Nanocomposites? Discuss their properties and applications.
22. Discuss on the classification of liquid crystals. Explain each type and give their structure.

(5 × 4 = 20)

Section D

(Answer any **two** questions. 10 marks each)

23. Write short notes on:

- (a) Fullerenes (3)
(b) CNT (3)
(c) SEM & TEM (4)

24. a) Derive Bragg's equation. (3)
b) How is interplanar distance of a crystal determined? (3)
c) Using Bragg's equation, determine the structure of NaCl. (4)

25. a) What are surfactants? How are they classified? Explain. (6)
b) What are micelles and how are they formed. Explain the mechanism of soap action. (4)

26. Draw and discuss the phase diagram of lead-silver system. How is this applied to the Pattinson's process of desilverisation of lead? [8+2]

(10 × 2 = 20)
