

Reg. No:.....

Name:.....

U 325

## B. SC. DEGREE END SEMESTER EXAMINATION - OCTOBER 2015

### SEMESTER- 3: CHEMISTRY (COMPLEMENTARY)

#### COURSE: U3CPCHE3 - ADVANCED PHYSICAL CHEMISTRY

Time: Three Hours

Max. Marks:60

#### Section A

(Answer **all** the questions.1 Mark each)

1. Define half-life period of a radioactive compound.
2. Mention any one application of radioisotopes in agriculture.
3. Define improper rotation axis.
4. What are Miller indices?
5. How many Bravais lattices are possible in crystal systems?
6. How will you account for the fact that drops of a liquid assume spherical shape?
7. What is physisorption? Give an example.
8. Define Nernst distribution law.

(1 x 8 = 8)

#### Section B

(Answer any **six** questions.2 marks each)

9. Discuss briefly rock dating for determining the age of the earth.
10. Identify the axis of symmetry and planes of symmetry present in (a)  $\text{NH}_3$  (b)  $\text{H}_2\text{O}$
11. Write briefly on the point group  $\text{C}_{nv}$ .
12. Sketch the (200) and (110) planes of a bcc lattice.
13. State and explain ferromagnetism and antiferromagnetism shown by solid substances.
14. Write down the Freundlich adsorption isotherm and explain the terms.
15. Define the terms electrophoresis and electroosmosis.
16. Explain the term "eutectic point".

(6 x 2 = 12)

#### Section C

(Answer any **four** questions.5 marks each)

17. Explain how a breeder reactor is different from a conventional reactor.

18. Explain the terms mass defect and binding energy per nucleon. Calculate the binding energy per nucleon of the helium nucleus if the masses of helium nucleus, proton and neutron are respectively 4.003, 1.0078 and 1.0083 amu.
19. Discuss plane of symmetry and the reflection operation with two suitable examples.
20. Derive Bragg equation.
21. Explain the crystal structure of NaCl.
22. Discuss the applications of colloids. (4 x 5 = 20)

### Section D

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

23. Write notes on
- (a) Neutron activation analysis. (3 marks)
  - (b) Induced radioactivity (2 marks)
  - (c) Radio carbon dating. (5 marks)
24. (a) Using the Band theory explain the conductivity of conductors and semi conductors. (5 marks)
- (b) Describe briefly all the seven crystal systems. (5 marks)
25. What are liquid crystals? How are they classified?
- (a) Discuss the thermographic behavior of a solid which shows mesomorphism. (5 marks)
  - (b) Explain the structure and main characteristics of nematic and cholesteric liquid crystals. (5 marks)
26. (a) State the phase rule and explain the terms involved. (4 marks)
- (b) Discuss the phase diagram of water system. (6 marks)
- (2 x 10 = 20)

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