

13/12/2019 (M)

Roll No.

Total Pages : 4

337102

December, 2019

B.Sc. (H) Chemistry I SEMESTER

Physical Chemistry-I (BCH-102)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Log tables and non-programmable calculators are allowed.*

PART-A

- (a) What is the effect of temperature on surface tension and viscosity of liquid? (1.5)
- (b) At the boiling point, temperature of the liquid does not rise although it is being heated. Why? (1.5)
- (c) Why a five-fold axis of symmetry cannot be present in any crystal? (1.5)

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- (d) Determine the pH of 0.10 M NaOH solution. (1.5)
- (e) What is the effect of temperature on most probable speed? (1.5)
- (f) Write relationship between mean free path and coefficient of viscosity. (1.5)
- (g) Write edges and axial angle for rhombohedral lattice. (1.5)
- (h) Why cooling is caused by evaporation? (1.5)
- (i) Explain common ion effect with suitable example. (1.5)
- (j) What is effect of temperature on ionic product of water? (1.5)

PART-B

2. (a) What are the postulates of kinetic theory of gases? Derive Kinetic gas equation. (10)
- (b) Prove that mean free path is independent of molecular viscosity. (5)
3. (a) Calculate root mean square velocity of gas having average velocity 400 ms^{-1} . (5)
- (b) Derive van der Waal's equation of state for n moles of a gas. Write the significance of van der Waal's constants. (10)

4. (a) Derive the relationship between critical constants and van der Waal's constants. (8)
- (b) What is cause of viscous flow? Derive the expression for coefficient of viscosity. In which unit it is expressed? (7)
5. (a) Briefly describe the basic principal of Powder method used for X-ray diffraction study. (5)
- (b) What types of lattice NaCl, KCl and CsCl have? Represent them diagrammatically. Why different diffraction patterns are obtained for these crystals? (10)
6. (a) Derive the expression of Henderson equation for basic buffer. (6)
- (b) What is degree of ionization? Explain the factors affecting the degree of ionization. (6)
- (c) What are the criteria of selection of acid-base indicators? (3)
7. (a) Distinguish between an ideal gas and a real gas. (3)
- (b) Explain the cleansing action of detergents. (4)

- (c) What are law of constancy of interfacial angles and law of rotational indices? (4)
- (d) What is buffer solution? Explain its different kinds with examples. (4)
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