No. of Printed Pages : 4

Sem-I-Chem-CC-II
(Reg&Back)

2020-21

Time - 3 hours

Full Marks - 60

*Answer **all groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP – A

1. Answer all questions or fill in the blanks as required. [1 × 8

(a) RMS velocity of gas molecule is proportional to _____ of temperature.

(b) Evaporation of liquid causes _____ .

(c) Most probable velocity is _____ times rms.

(d) Mathematical expression of pH is _____ .

(e) Solution with pH < 7 is called _____ solution.

(f) Which crystal is used in wrist watch ?

(g) When pH of a solution is 2, what is the $[H^+]$ in mole/ltr.

(h) Solution of CH_3COONa is _____ in nature.

P.T.O.

GROUP – B

2. Answer any eight of the following questions within two sentences each. [1½ × 8

(a) What is the effect of temperature and pressure on coefficient of viscosity of gas ?

(b) Which of the following gases show maximum deviation from ideal gas and why ?

CH_4 , H_2 , N_2 , NH_3

(c) Why a drop of liquid is spherical in shape ?

(d) Why degree of dissociation of CH_3COOH decreases with adding CH_3COONa ?

(e) Why pH of KCN is more than 7 ?

(f) Why CH_3COONH_4 is a buffer ?

(g) Find the solubility product of AgCl solution, when solubility is 'X' mole/ltr.

(h) Define buffer capacity.

(i) Write the name of method for determining internal structure of crystal.

(j) Define common ion effect.

GROUP – C

3. Answer any eight of the following questions within 75 words each. [2 × 8

(a) At what temperature is the average velocity of O_2 molecule is equal to root mean square velocity at 27^0 C ?

(b) The ratio of molar heat of a gas (atomic weight = 16) at constant pressure to constant volume is 1.41. Determine the molecular weight of gas.

(c) Why surface tension of liquid vanishes at its critical temperature ?

(d) A solution of 0.03 M of acetic acid is found to be dissociated to the extent of 1.25%. Calculate the dissociation constant of acid.

(e) Given, pH = 5. What is the $[OH^-]$?

(f) $K_w = 4 \times 10^{-14}$. What is its pH ?

(g) What is differences between Schotty and Frenkel defect ?

(h) What is F-centre ?

(i) What is the relationship between solubility and solubility product in $Al(OH)_3$?

(j) Write two features of a good acid-base indicator.

GROUP – D

*Answer **any four** questions within 500 words each.*

4. Derive critical constant values from Van der Waal's equation. [6

5. Define surface tension and how it can be measured ? [6

6. Derive kinetic gas equation. [6

7. Write short notes : [3 × 2

   (a) Common ion effect

   (b) Viscosity

8. Derive $2d \sin \theta = n\lambda$. [6

9. Derive Henderson equation for acidic buffer. [6

10. What is a buffer solution ? Why CH_3COONH_4 is a buffer but not NaCl ? [6