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AO—47—2018

FACULTY OF SCIENCE

B.Sc. (First Year) (First Semester) EXAMINATION

MARCH/APRIL, 2018

(CBCS/CGPA Course)

CHEMISTRY

Paper II

(Physical and Inorganic Chemistry)

(MCQ & Theory)

(Friday, 23-03-2018)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt *all* questions.

(ii) *All* questions carry equal marks.

(iii) Use OMR sheet for question No. 1.

(iv) Calculator and logarithmic table is allowed.

MCQ

1. Select the correct answer for each of the following multiple choice questions :

(i) The characteristic of \log_{10} (0.0058) is :

(a) 4 (b) $\bar{4}$

(c) $\bar{3}$ (d) 2

(ii) The relation between $\sin^2 x$ and $\cos^2 x$ is given by relation :

(a) $\sin^2 x + \cos^2 x = 1$ (b) $\sin^2 x - \cos^2 x = 1$

(c) $\sin^2 x \times \cos^2 x = 1$ (d) $\frac{\sin^2 x}{\cos^2 x} = 1$

(iii) In Freundlich adsorption isotherm, when a graph is plotted between

$\log \frac{x}{m}$ and $\log p$, slope of line is given by the value of :

(a) $\log n$ (b) $\log k$

(c) $\log p$ (d) $\frac{1}{n}$

P.T.O.

- (iv) At constant temperature, which of the following pairs of gas molecules have same RMS velocity ?
- (a) O_2 and CO (b) N_2 and CO
(c) N_2 and CO_2 (d) CO and CO_2
- (v) In van der Waals' equation, the term which accounts for intermolecular forces is :
- (a) RT (b) $V - b$
(c) $P + \frac{a}{V^2}$ (d) All of these
- (vi) Which of the following is a non-crystalline solid ?
- (a) ZnS (b) Rubber
(c) KCl (d) PbI
- (vii) The ratio of spacing in case of potassium chloride (KCl) crystal is :
- (a) $1 : 0.704 : 1.136$ (b) $0.707 : 0.571 : 1$
(c) $1 : 0.707 : 0.575$ (d) None of these
- (viii) Calcium imparts.....colour to the flame.
- (a) Brick red (b) Crimson
(c) Grassy green (d) Crimson red
- (ix) Which of the following elements does not react directly with hydrogen to form its hydride ?
- (a) Be (b) Ca
(c) Mg (d) Sr
- (x) Oxidation number of sulphur in H_2SO_4 is :
- (a) $+ 5$ (b) $+ 6$
(c) $+ 7$ (d) $- 6$

Theory (Physical Chemistry)

2. Answer any *two* of the following :

- (a) State and explain combination. Evaluate the value of 8C_4 .
- (b) What is Adsorption Isotherm ? Discuss Langmuir adsorption isotherm.
- (c) Derive the relationship between critical constants and van der Waals' constants.

(d) What are the types of cubic lattices ? Derive Bragg's equation,
 $n_\lambda = 2d \sin \theta$.

3. Answer any *two* of the following :

(a) Define an ideal gas. Explain the deviation of gases from ideal behaviour.

(b) Explain the crystal structure of sodium chloride (NaCl) by Bragg's X-ray diffraction method.

(c) (i) Give the difference between physical adsorption and chemical adsorption.

(ii) Calculate the RMS velocity of N_2 molecule at $37^\circ C$. ($R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)

(d) What is S.I. unit of 'Pressure' and 'Volume' ?

Find the equation of straight line passing through two points (4, 5) and (6, 9).

(Inorganic Chemistry)

4. Answer any *two* of the following :

(a) Give the general characteristics of *s*-block elements.

(b) Explain in brief oxides of *s*-block elements.

(c) (i) Write a note on complex of calcium with EDTA.

(ii) Define oxidation and reduction according to electronic concept.

(d) Balance the following equation by ion electron method :

