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R—49—2017

FACULTY OF SCIENCE

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

MARCH/APRIL, 2017

(CBCS/CGPA)

CHEMISTRY

Paper CCC-II

(Physical and Inorganic Chemistry)

(MCQ + Theory)

(Thursday, 30-3-2017)

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 are allowed.
 - (v) Only one answer sheet should be used for sections A and B.

MCQ

1. Select the *correct* answer for each of the following multiple choice questions : 10

(1) The value of $\log_{10}(10^{-5})$ is equal to :

- | | |
|--------|--------|
| (a) 4 | (b) 5 |
| (c) -5 | (d) -4 |

(2) $\int \cos x \, dx = ?$

- | | |
|------------------------------|---------------|
| (a) $\sin x$ | (b) $-\sin x$ |
| (c) $\operatorname{cosec} x$ | (d) $-\cos x$ |

P.T.O.

- (3) Physical adsorption generally with increasing temperature.
- (a) decreases (b) increases
(c) remains the same (d) None of these
- (4) The correct value of critical temperature (T_C) is given by term :
- (a) $3b$ (b) $\frac{8a}{27 Rb}$
(c) $\frac{a}{27 b^2}$ (d) None of these
- (5) Which of the following is an ideal gas ?
- (a) H_2 (b) N_2
(c) CO_2 (d) None of these
- (6) A cubic crystal never has more than one of symmetry.
- (a) axis (b) centre
(c) plane (d) All of these
- (7) The amorphous solid among the following is :
- (a) Table salt (b) Graphite
(c) Plastic (d) Diamond
- (8) The correct sequence of the alkalimetals in the group is
- (a) Fr, Na, K, Rb^- , Cs, Li
(b) Li, Na, K, Rb, Cs, Fr
(c) Na, K, Rb, Cs, Fr, Li
(d) Rb, Cs, Li, Na, K, Fr

- (9) Which of the following hydride is ionic
- (a) LiH (b) BeH₂
(c) CaH₂ (d) None of these
- (10) Oxidation number of Mn in KMnO₄ is
- (a) +7 (b) -7
(c) +5 (d) -5

Theory

Physical Chemistry

2. Answer any *two* of the following :
- (a) Derive van der Waal's equation.
(b) State and explain, law of rational indices, and write a note on Miller indices.
(c) Discuss the factors affecting adsorption.
(d) What is SI unit of 'force' and 'volume' ? Calculate the concentration of H⁺ ion of a solution having pH = 4.2.
3. Answer any *two* of the following :
- (a) Explain the determination of crystal structure of potassium chloride (KCl) by X-ray diffraction method.
(b) What are critical constants of gases ? Calculate the RMS velocity of Nitrogen (N₂) molecule at 100°C (R = 8.314 JK⁻¹ mol⁻¹).
(c) (i) Explain Langmuir adsorption isotherm.
(ii) Give the relationship between RMS velocity and most probable velocity.
(d) (i) Find the equation of straight line passing through the points (1, 3) and (3, 7).
(ii) Evaluate ⁵P₂.

P.T.O.

Inorganic Chemistry

4. Answer any *two* of the following :
- (a) Explain the diagonal relationship between Li and Mg.
 - (b) Write a note on chlorophyll and complex of Ca with EDTA.
 - (c)
 - (i) Give a brief account on the oxides of s-block elements.
 - (ii) Define Oxidation, Reduction, oxidizing agent and reducing agent by electronic concept.
 - (d) Explain the balancing of redox reaction by oxidation number method with example.