SC

SEAT No._____ No. of Printed Pages : 2

[20]

SARDAR PATEL UNIVERSITY

Monday, 16th April 2018

Time: 10:00 a.m. to 01:00 p.m.

Subject: Physical chemistry-II

Paper: PS02CCHE03

Total Marks: 70

N.B. (1) Figures to the right indicate Marks.
(2) Attempt all Questions.

Q.1 **Multiple choice questions.** 08

1 In RNA pyrimidine base is ...
(a) Uracile (b) Thymine
(c) Adanine (d) Guanine

2 Nucleotide base in a nucleic acid is attached to .
(a) Glucose (b) Sugar & Phosphate
(c) Phosphate (d) Protein & Glucose

3 Which of the following molecules shows square pyramidal geometry?
(a) H_2O (b) CO_2
(c) BrF_5 (d) NH_3

4 Combination of unit element with other elements of group leave them ..
(a) doubled (b) changed
(c) fold multiplied (d) unchanged

5 Which of the following pair of molecules contains centre of inversion?
(a) CO_2, SO_4^{-2} (b) CO_2, BF_3
(c) C_2H_2, BF_3 (d) CO_2, C_2H_2

6 The dG for chloride ion transport from plasma to urine is 278 cal/mol. How many moles of chloride ion can be transported under hydrolysis of one mole of ATP.
(a) 35 (b) 28
(c) 82 (d) 12

7 Zeta potential is inversely proportional to
(a) Current (b) Viscosity
(c) Dielectric consta (d) Both a & c

8 Which of the following ,reverses the sign of negative electrical double layer to maximum .....
(a)Potassium nitrate (b) Calcium nitrate
(c) Potassium chloride (d) thorium nitrate

Q-2 **Answer the following. (ANY SEVEN)** 14

(I) ATP is energy currency in biological reaction. Elaborate.
(ii) How dose DNA can be hydrolyzed chemically?
(iii) Explain Sedimentation potential.
(iv) Explain the CO-NH bond with example.
(v) What are parallel reactions? Give the relation for determining the concentration of a reactant in the cause of reaction.
(vi) How acyl phosphate is formed?
(vii) What are liposome's?
(viii) NH_3 has a point group C_{3v}. Describe the various symmetry elements in the molecule.
(ix) How the irreducible representation are arranged in D_{3h}.

[P.T.O.]

Q.3 A The character table for D_3 point group is 06

D_5	E	$2C_2(Z)$	$2[C_5]^2$	$5C_2$
$\bar{l}_1$	1	1	1	1
$\bar{l}_2$	1	1	1	-1
$\bar{l}_3$	2	a	b	c
$\bar{l}_4$	2	d	e	f

Deduce the values for a to f.

B

(i) Write rules for constructing of character table. 03

(ii) What do subscripts v, d and h stands for a plane of symmetry? show each of it with suitable example. 03

OR

B Explain different symmetry elements present in C_{3v} point group with neat sketch and work out the charecters of this point group. 06

Q.4 A What are fast reactions? Consider an equilibrium reaction of type A to B with rate constants K_1 and K_2 for forward and backward reaction and explain how this reaction can be monitored by relaxation method? 06

B How unimolecular reaction becomes 1st order at higher pressure and 2nd order at lower pressure? Explain. 06

OR

B Justify with mathematical derivation that the ratio of concentration of products B and C is always equal to K_1/K_2 in a reaction 06

OR

Q.5 A Derive the expression for quantitative treatment of electrical double layer. 06

B Give classification of proteins and describe 3 structure of protein. 06

OR

B Write different models of electrical double layer and explain Guoy chapman model. 06

Q.6 A how many ways one can express the free energy change for an acid catalysed hydrolysis of ethyl acetate.Explain. 06

B

(i) Give the detailed classification of proteins based on their functions. 03

(ii) Calculate the K_{eq} and dG for the hydrolysis of ATP at pH 7 and 25c taking the concentration of ATP and Pi to be 10^{-2}, 10^{-3} and 10^{-4} respectively. 03

OR

B

(i) Give 3 basic differences between DNA and RNA. 03

(ii) The concentration of chloride ion in blood is about 0.10 mole dm^{-3} and that of urine is 0.16 mole dm^{-3}. Calculate the energy expanded by the kidneys in transporting chloride from plasma to urine. How many moles of chloride ions can be transported per mole of ATP hydrolysed? 03