[109] SEAT NO. ..... No. of printed pages:02

SARDAR PATEL UNIVERSITY

M.Sc SECOND SEMESTER EXAMINATION 2018

Friday, 26th October 2018,10.00 am to 1.00 p.m.

PS02CCHE03 , PHYSICAL CHEMISTRY II

N.B. figures to the right indicates full marks.

Q.1 **Choose appropriate answer from the followings.** **08**

1 Which of the following is the example of consecutive reaction?
(a) polymerisation (b) Thermal craking
(c) Chlorination of hydrocarbans (d) All

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

3 Which of the following molecules shows square pyramidal geometry?
(a) SF_6 (b) XeF_4
(c) BrF_5 (d) NH_3

4 _____ of the following reverses the sign of negative electrical double layer to maximum.
(a) Thorium Nitrate (b) Calcium nitrate
(c) Potassium Chloride (d) Potassium nitrate

5 What is the unit of the rate constant for the 5/2 order reaction?
(a) dm^{-3} mol s^{-1} (b) $(dm^3)^{3/2}$ $mol^{-3/2}$ s^{-1}
(c) $(dm^3)^{-1/2}$ $mol^{1/2}$ s^{-1} (d) s^{-1}

6 Biological functions of proteins are determined by their ...
(a) Tertiary structure (b) secondary structure
(c) primary structure (d) Quaternary structure

7 Combination of Unit element with other element of the group leave them
(a) Doubled (b) Changed
(c) Unchanged (d) Fold maltiplied

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

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

(i) PCl_5 has a point group D_3h. Describe various symmetry element in the molecule.
(ii) Show that $C^3_4.C_4C^-_4 = E\ C^-_4$
(iii) Give two differences between parallal and consecutive reaction.
(iv) Give two differences between streaming and sedimentation potentials.
(v) What are parallel reactions? Give the relation for determining the concentration of a reactant in the cause of reaction.
(vi) What is Liposomes?
(vii) What is Electrophoresis?
(viii) Write a note on denaturation of DNA.
(ix) Write a note on hydrolysis of DNA.

Q.3 **A** The character table for D_5 point group is **06**

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

Deduce the values for a to f.

B (i) Explain how one can construct character table. **03**

B(ii) Draw the neat sketch of ethylene and show that it belongs to D_{2h} point group. **03**

OR

B (i) Describe that under orthogonal transformation the length of the vector remains constant. **03**

B(ii) Prove that for a rotation about x axis , the transformation matrix is **03**

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\theta & \sin\theta \\ 0 & -\sin\theta & \cos\theta \end{bmatrix}$$

Q.4 **A** What is opposing reaction ? Derive the expression for the same. **06**

B What is consecutive reaction? Derive the expression for consecutive reaction **06**

OR

B What is relaxation time? Considering the following reaction $2A \leftrightarrow B$, derive an equation for relaxation time **06**

Q.5 **A** How one can find zeta potential using quantitative treatment of electrical double layer. **06**

B Explain stern model for electrical double layer. **06**

OR

B Classify proteins and describe any one of them. **06**

Q.6 **A** Explain how many ways do you express the free energy change for an acid non catalysed hydrolysis of ethyl acetate. **06**

B(i) Explain ATP is energy currency in biological reaction. **03**

B(ii) For a general reaction : $cS_1 + dS_2 \leftrightarrow aP_1 + bP_2$ **03**
define free energy change ΔG and equilibrium constant K_{eq} and show that $\Delta G^0 = -1364 \log K_{eq}$ at 25^0c.

OR

B 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? **06**

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