CHEMISTRY P-II S.Y.B.Sc SEM-III MARKS 100 TIME 3HRS

VCD - 17/10/19

NOTE: i) All the questions are compulsory.
ii) Figures to right indicate full marks.
iii) Use of non –programmable calculator / log table is allowed.

Q.1.A.Fill in the Blanks : (12)

i) According to Arrhenius theory as temperature increases, the rate of reaction ----------
(a) Increases (b) decreases (c) remains same

ii) The reactions of type: A $\xrightarrow{k_1}$ B $\xrightarrow{k_2}$ C are called ----------
(a) reversible reactions (b) consecutive reactions (c) parallel reactions

iii) When a chemical reaction obeys collision theory probability factor ----------
(a) p=1 (b) p >1 (c) p <1

iv) ---------- method is used to determine the rate of ultra-fast reaction.
(a) HPLC (b) stop flow (c) spectrophotometry

v) ---------- method is used to determine rate of reaction of ultra fast reaction. (a) continuous flow (b) stop flow (c) non flow

vi) The activation energy of reaction at a given temperature is found to be 2.303 RT J/mol. The ratio of rate constant to the Arrhenius factor is ---------- (a) 0.1 (b) 0.01 (c) 0.001

vii) Atomic number of silicon is ----------
(a) 6 (b) 14 (c) 28

viii) Atomic number of germanium is ----------
(a) 32 (b) 14 (c) 50

ix) Silicon tetrachloride has co-ordination number ---------
(a) five (b) four (c) six

x) Following is the very good conductor ----------
(a) arsenic (b) bismuth(c) antimony

xi) Dinitrogen pentaoxide is also known as ----------
(a) nitric acid (b) nitrous acid (c) nitric anhydride

xii) ----------is known as laughing gas.
(a) nitrous oxide (b) nitric oxide (c) nitrous dioxide

xiii) Nitrophenol has quite effective electron widrawing inductive effect at ---------position than *p*-position.
(a) meta (b) ortho (c) both (a) and (b)

xiv) Alcohol react with conc sulphuric acid at 80^0C to form alkyl hydrogen sulphate or alkyl bisulphate is called----------
(a) dow's process (b) esterification (c) sulphation

xv) ----------alcohols with oxidizing agent form ketone containing same number of carbon atoms.
(a) primary (b) secondary (c) tertiary

xvi) The methylene group is _____
(a) $-CH_2$
(b) $-CH_3$
(c) $-CH$

xvi) ----------alcohols with oxidizing agent form aldehyde containing same number of carbon atoms.
(a) primary (b) secondary (c) tertiary

xvii) $R\text{-}OH + SOCl_2 \xrightarrow{\text{pyridine}}$ ---------$+ SO_2 + HCl$
(a) R-Cl (b) R-OH (c) R-OCl

B) State whether the following statements are true or false :— (03)
i) Distribution law is applicable in concentrated solutions.
ii) Total number of electrons involved in tetraborane is 20.
iii) Phenols are weak acids.

C) Match the following-- (05)

	I		II
i)	Lindermann's theory	i)	22 electrones
ii)	Activated complex theory	ii)	Tetrahedral and sp^3
iii)	Tetraborane	iii)	Intermediate formed
iv)	$SiCl_4$	iv)	Unimolecular reactions
v)	O-acylation of phenol	v)	formation of ester

2. Answer any four **(20)**

a. Explain the Lindmann's unimolecular theory of reaction rates.

b. Explain reversible reactions giving a suitable example.

c. State and explain any five conditions for the validity of Nernst Distribution Law.

d. Discuss the variation of mutual solubility with temperature for the 'Trietanolamine-water' system.

e. For 1st order reaction $A=1.8x10^{12}\ sec^{-1}$ and at a particular temperature, fraction of molecules reaching transition state is $3x\ 10^{8}$. Find rate constant (k) at that temperature.

f. A mixture of water and aniline boils at a temperature of 98·5°C at pressure of $1{\cdot}013 \times 10\ Nm^{-}$, The vapour pressure of water at this temperature is $9{\cdot}558 \times 10\ Nm^{-}$, Find the composition of the distillate.
[Given : Molecular weight of water = 18, molecular weight of aniline = 93]

3. Answer any four **(20)**

a. Explain the purification of 'Germanium' by Czochralski technique.
b. Discuss the gradation in properties of group 15 elements with respect to atomic radii and Ionisation energy values.
c. Name minerals containing germanium. How metal is extracted from its mineral?
d. Write down the preparation ,properties and structure of N_2O_5.
e. Write notes on 'Oxidation states' exhibited by the elements of group 14.
f. Write a note on HABER-BOSCH process.

4. Answer any four . **(20)**

a. Write a note on Fries rearrangement of phenolic ester.
b. How will you convert aldehydes and ketones to primary and secondary alcohols by—(i) catalytic hydrogenation (ii) reduction with metal hydrides.
c. Write a note on Dow's process.
d. What is O-acylation? How O-acylation of phenol carried out ?
e. Explain Claisen rearrangement of alkoxy arenes.
f. Write a note on Rossenmund reduction .

5 Attempt any **four** :— (20)

a. Define Nernst distribution law. Give its application in solvent extraction process
b. What are complex reactions? Give their types with examples..
c. Why Zone refining technique is not effective for the purification of silicon'.
d. Discuss the preparation of borax from 'boric acid'. Mention any two important properties and any two uses of borax.
e. What is sulphonation of alcohols? Give its application with an example.
f. How will you obtain phenol to cumene?