Q.P. Code :12153

[Time: Three Hours] **[Marks:100]**

Please check whether you have got the right question paper.

N.B:
1. All questions are compulsory.
2. Answer to the same questions must be written together.
3. Figure to the right indicate full marks.
4. Use of Non-Programmable calculator is allowed.

Q.1 **Select the correct option and complete the following sentences:** (12)

i) The units of the role constant of a second order reaction with equal initial concentration of the reactants are _____.
a) $dm^3\ mol^{-1}\ s^{-1}$ b) mol. $dm^3\ s^{-1}$ c) time. mol^{-1}

ii) Units of surface tension is _____.
a) Nm^{-1} b) Nm^2 c) $N^{-1}m$

iii) The saponification of ethyl acetate is a reaction of_____order.
a)First b) Second c) third

iv) With increasing molecular mass of a liquid, the viscosity_____.
a) Increases b) Decreases c) No effect

v) Among the following _____ can cause global warming.
a) H_2 b) O_2 c) Co_2

vi) Among the following _____has valence electrons in the third shell.
a) Boron b) Oxygen c) Phosphorus

vii) _____element exhibits catenation property.
a) Sodium b) Calcium c) Carbon

viii) Bucky ball fullerene is an allotrope of _____
a) Carbon b) Phosphorus c) Sulfur

ix) The _____group from following have the lowest priority as per sequence rule
a) – Cl b) -CH_3 c) - OH

x) Absolute configuration of molecule is determined using _____technique
a) X-ray diffraction b) Polarography c) I.R. Spectroscopy

xi) Among following _____will exist as optical isomer
a)$(CH_3)_2$ C=CH_2 b) $CH_3 - CHClCH_3$ c) $CH_3\ CH(OH)CN$

xii) Racemic mixture rotates plane polarised light in _____.
a) anti clockwise direction b) neither direction c) clockwise direction

B **State whether the following statements are true or false:** (03)

i) Metallic character increases down the group in the periodic table.

ii) Half life time for a fist order reaction is a constant and independent of the initial concentration

iii) Meso isomer is optically inactive

C **Match the following columns:** (05)

	A		B
i)	$N_2\ O_5 \rightarrow\ N_2O_4 + \frac{1}{2} O_2$	a)	Represented by 'd'
ii)	Nematic mesophase	b)	Group 14
iii)	Dextro reotatory enantiomer	c)	Acidic
iv)	Germanium	d)	Unimolecular reaction
v)	Carbon dioxide	e)	Liquid crystal

Q.2 A i) A second order reaction with a=b is 30% complete in 80 minutes. Calculate the time taken for 90% completion of the reaction. (05)

ii) Explain =Acid catalysed inversion of a cane sugar (sucrose) as a pseudo unimolecular reaction (03)

OR

A i) A second order reaction with equal initial concentration of the reactants is 80% complete in 1Hr. Calculate how much amount will be left unreacted at the end of 2hrs. (05)

ii) Explain-Acid catalysed hydrolysis of methyl acetate. (03)

B i) What is coefficient of viscosity? At 293K, water with a viscosity of 0.0101 poise and density 0.997 gcm^{-3} takes 1.9 minutes to flow through a viscometer. Find the time required by an organic liquid to flow through the same viscometer, given its density to be 0.890 gcm^{-3} & its viscosity to be 0.0062 poise. (05)

ii) Explain the term Molar Refractivity. (03)

OR

B i) In a Stalagamometer experiment, the same volume of organic liquid and water formed 40 and 35 drops respectively. It the surface tension of water is 7.2×10^{-2} Nm^{-1}. Calculate the surface tension of organic liquid. The density of organic liquid is 0.84×10^{3} kgm^{-3} and that of water is 1.0×10^{3} kgm^{-3}. (05)

ii) What is refractive index? Explain the term 'Molar refraction'. (03)

C i) Define a) Molecularity of a reaction b) Rate of a reaction (02)

ii) Define a) Viscosity b) Liquid crystal (02)

OR

C i) Explain the Order of a reaction (02)

ii) Define a) Surface tension b) Specific refractivity (02)

Q.3 A i) How does beryllium differs from other group 2 elements? (04)

ii) Write the similarities shown by lithium and magnesium. (04)

OR

A i) Oxygen behaves differently with respect to the other elements in the same group; justify the statement. (04)

ii) Explain the diagonal relationship between boron and silicon. (04)

B i) How is calcium oxide prepared? What are its properties? (any two) (04)

ii) Outline the importance of sodium chloride (04)

OR

B i) State any four uses of sodium bicarbonate. (04)

ii) Write one method of preparation and two properties of calcium carbonate. (04)

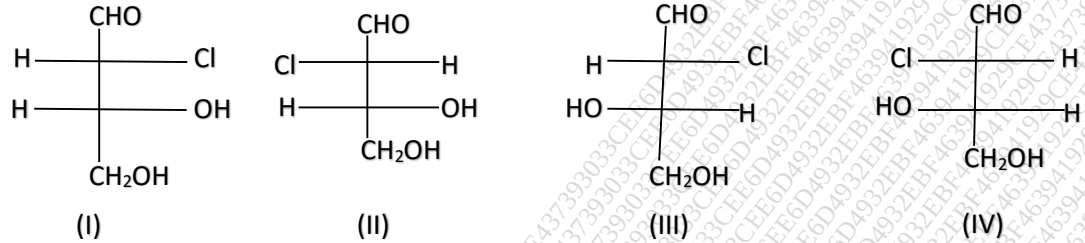
C Summarise the characteristics of nitrides of alkali and alkaline earth metals. (04)

OR

C What are the different types of oxides formed by alkali metals? Explain each with a suitable example. (04)

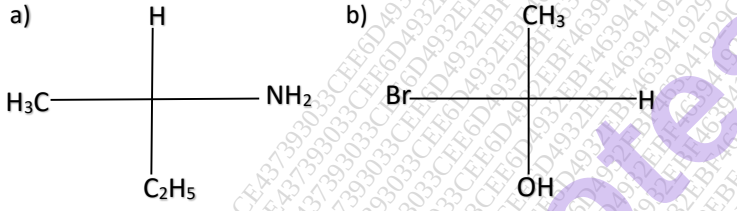
Q.4 A i) Write a short note on various conformations of n-butane. (04)

ii) Enlist two pairs of enantiomers from following (04)



OR

A i) Assign 'R' or 'S' descriptors to the following molecules using sequence rule. (04)



ii) Define geometric isomerism. Explain geometric isomerism in olefins and cyclic compounds. (04)

B i) Using sequence rule decide priority order of the substituents and assign 'E' or 'Z' descriptors to following molecules. (04)

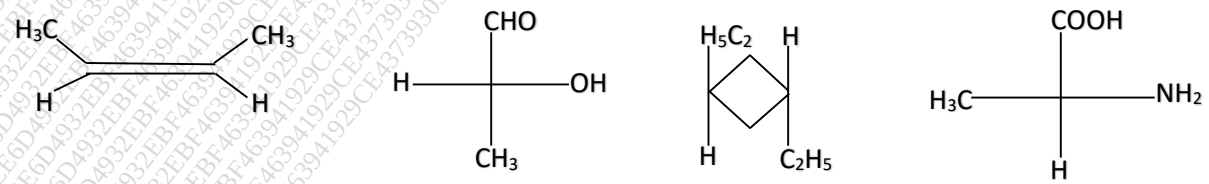
ii) Identify the compound containing chiral carbon from following (04)

a) $OHC\text{-}CHNH_2\text{-}CH_2OH$ b) CH_3CHBr_2

c) $CH_3\text{-}CHCl\text{-}C_2H_5$ d) $HOOC\text{-}CHOH\text{-}CH_3$

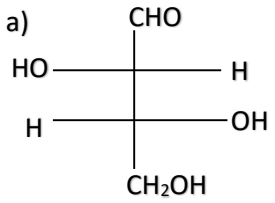
OR

B i) Assign 'D' or 'L' OR 'cis' or 'trans' notations, whichever applicable to the following compounds:- (04)



ii) Convert following Fischer projection formulae to Newman projection formulae (04)

a)



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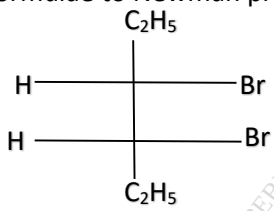
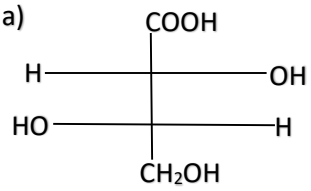


C What is racemic mixture? What is resolution of racemic mixture? (04)

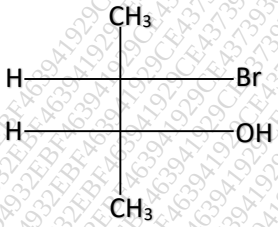
OR

C Lable the following structures with Erythro and Threo notations (04)

a)



b)



Q.5 **Attempt any four of the following**

A Explain the kinetic characteristics of a first order reaction (05)

B i) Explain Integration method of determination of order of a reaction. (03)

ii) Draw a neat labelled diagram of stalagmometer. (02)

C Write a note on photo chemical smog (05)

D Explain the control techniques used for the emission of oxides of carbon. (05)

E Distinguish between enantiomers and diastereoisomers. (05)

F What is conformation? Explain conformations of ethane and comment on their relative stabilities. (05)

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