CHEMISTRY

HSE - I Model paper 2018

Total No. of question: **30** Max. Marks: **70**

Time Allotted: **3 hours**No. of printed pages: **4**

LONG ANSWER TYPE (5 X 4)

Q1 Define the term 'lonization Enthalpy'. Discuss the factors affecting ionization enthalpy and its trends in the periodic table.

OR

What do you mean by 'hydrohalogenation' of alkenes. Discuss Markovnikov's rule in detail with suitable example.

Q2 Define the term 'Hybridization'. Using the concept of hybridization explain the shapes of CH₄ and PCl₅ molecules.

OR

What are s-Block elements? Discuss the following in case of alkali metals:

- a) Electronic configuration
- b) Atomic size
- c) Ionization enthalpy

Q3 State and explain 'Law of Mass Action'. Derive the law of Chemical Equilibrium and hence define 'Equilibrium Constant'

OR

What is 'Allotropy'? Discuss various allotropic forms of Carbon in detail.

What are 'Reactive Intermediates'? Write a note on 'Carbocations'. Discuss types, formation, structure and stability of Carbocations.

OR

Discuss the 'Directive Influence of substituents and their effect on the reactivity of arenes

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SHORT ANSWER TYPE (3 X 8)

- Why 'Law of Conservation of mass' should better be called as 'Law of conservation of Mass and Energy'?
- **Q6** Define Boyle's Law. How is it represented mathematically?
- What do symbols ΔH , ΔS , and ΔG signify? How are they inter related? What is the importance of the relation formed?
- **Q8** Give the IUPAC names of:
 - a) $CH_3 CH = CH CH_2 C \equiv CH$
 - b) $HO CH_2 CH_2 CH_2 CHO$
 - c) $CH_3 CH_2 CH_2 O CH_2 CH_3$
- **Q9** Draw the cis- and trans- isomers of But-2-ene.
- Q10 Draw the lewis dot structure of
 - a) CO_3^{2-}
 - b) HCN
- Write the Molecular orbital electronic configuration of N₂⁺. Calculate its bond order.
- Q12 Calculate the pH of a solution whose H_3O^+ ion concentration is 2.5 x $10^{-4}M$

VERY SHORT ANSWER TYPE (2 X 8)

Q13	Wh	What is the relation between Molecular mass and vapour density of a gas?							
Q14	Det	Determine the oxidation state of S in H ₂ SO ₄ and H ₂ SO ₅ .							
Q15	What is 'Water gas'. How is it prepared?								
Q16	What is 'Acid rain'? What is its cause?								
Q17	Give the electronic configuration of following ions: a) Mg ²⁺ b) N ³⁻								
Q18	Wh	What is the equation of state for ideal gas of 'n' moles?							
Q19	Wh	What is 'Heterolytic cleavage'?							
Q20	Wh	What is an amphoteric substance? Give one example.							
		OBJECT	IVE TY	/PE (1 x 10)					
Q21	Chose the most appropriate option given.								
(i)									
()	a)	CaSO ₄	b)	CaSO ₄ . ½ H ₂ O					
	c)	CaSO ₄ . H ₂ O	d)	CaSO ₄ . 2 H ₂ O					
(ii)	Dry	Dry ice is							
	a)	Solid NH ₃	b)	Solid SO ₂					
	c)	Solid CO ₂	d)	Solid N ₂					
(iii)	The	The best method for separation of naphthalene and benzoic acid from their							
	mixture is								
	a)	Sublimation	b)	Chromatography					
	c)	Crystallization	d)	Distillation					
(iv)	₂ ?								
	a)	0.034%	b)	27.27%					
	c)	3.4%	d)	28.7%					
(v)	The set of quantum numbers for the 11 th electron of Sodium Na (Z=11) are								
	a)	n=4, l=0, m=0, s= ½	b)	n=3, l=0, m=0, s=- ½					
	c)	n=3, l=2, m=1, s= ½	d)	n=4, I=1, m=0, s= ½					
(vi)	Wh	Which of the following elements can show covalency greater than 4?							
	a)	Ве	b)	P					
	c)	S	d)	В					

(vii)	Which of the following can be considered as weak electrolyte?						
	a)	NaCl	b)	HCI			
	c)	CH₃COOH	d)	K ₂ SO ₄			
(viii)	Whic	Which of the following is most electronegative?					
	a)	Lead	b)	Silicon			
	c)	Carbon	d)	Tin			
(ix)	Whic	Which of the following is a primary pollutant?					
	a)	CO	b)	PAN			
	c)	Aldehydes	d)	H ₂ SO ₄			
(x)	Whic	hich of the following is the most stable carbocation?					
	a)	CH ₃ CH ₂ ⁺	b)	$(CH_3)_2CH^+$			
	c)	$(CH_3)_3C^+$	d)	$C_6H_5CH_2^+$			