

1st PUC MOCK Paper – Jan. 2024

Course: I PUC

Subject: Chemistry

Max. Marks: 70

Duration: 3:15 hour

PART A

I. S	Select the correct option from th	ne given choices:		$1 \times 15 = 15$	
1.	. The number of significant figures in Avagadro number is.				
	a) 1	b) 2	c) 3	d) 4	
2.	The isoelectronic pair of Ne is				
	a) Na ⁺	b) Cr ²⁺	c) Fe ²⁺	d) Zn^{2+}	
3.	. The atomic number of Unniloctium is				
	a) 108	b) 107	c) 101	d) 109	
4.	The number of lone pair and bon	nd pair of electrons pres	sent in ammonia is		
	a) 1, 2	b) 1,3	c) 2,2	d) 2,1	
5.	The type of chemical interaction	present in ice is			
	a) hydrogen bonding		b) dispersion force		
	c) dipole-dipole force		d) electrostatic force		
6.	During the conversion of water i	nto vapour state ΔS			
	a) decreases	b) increases	c) remains constant	d) none of these	
7.	Which of the following is an exte	ensive property?			
	a) ΔH	b) temperatue	c) density	d) viscosity	
8.	The conjugate acid pair of H ₂ SC	0^{-}_{4} is			
	a) SO ₄ ²⁻	b) H ₂ SO ₄	c) H ₂ SO ₃	d) SO ₃ ²⁻	
9. Concentration of H ⁺ ion in the given solution is 10 ⁻⁵ M. The pH of the solution is					
	a) 1	b) 3	c) 5	d) 7	
10. An increase in oxidation number of an element in a given substance is called					
	a) oxidation	b) redox	c) reduction	d) disproportionation	
11. Identify the reducing agent in $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$					
	a) Zn	b) Zn ²⁺	c) Cu	d) Cu ²⁺	
12. The number of sigma and pi bonds present in benzene is					
	a) 3, 12	b) 6,3	c) 12,3	d) 6, 12	
13. Two liquids with less difference in boiling point is separated by					
	a) simple distillation		b) steam distillastion		
	c) fractional distillation		d) separating funnel		
14. The reagent used to convert bromoethane to ethene is					
	a) H ₂ -Pd/BaSO ₄	b) Li/liq NH ₃	c) aq KOH	d) alc KOH	
15. Propanone and propanal are isomers					
	a) chain	b) position	c) functional	d) geometrical	

II.	Fill in the blanks by choosing the appropriate word from those given in the brackets:	$1 \times 5 = 5$
	[Benzene,2-methyl butane ,sp 2 ,zero , $1.6x10^{-4}$]	
16.	0.00016 can be expressed in scientific notation as	
17.	is the type of hybridization of boron in BCl ₃ .	
18.	Standard enthalpy of formation of an element is	
19.	The IUPAC name of isopentane is	
20.	The product formed when acetylene gas is passed through red hot iron is	
	PART B	
III.	Answer any four of the following. Each question carries two marks.	$2 \times 4 = 8$
21.	What amount of oxygen is liberated when 120 g of potassium chlorate undergoes thermal	
	decomposition?	
22.	Write the relation between Kc and Kp. Give an example where Kc = Kp.	
23.	Write the molecular orbital configuration of O_2 .	
24.	Illustrate Hess's law with an example.	
25.	Write the electronic configuration of iron and copper.	
26.	Explain Friedel Craft's acylation of benzene.	
27.	Using suitable example explain hydrogenation of alkyne.	
28.	Calculate the oxidation number of Manganese in potassium permanganate.	
	PART C	
IV.	Answer any four of the following. Each question carries three marks	$3 \times 4 = 12$
29.		
	b) How does atomic radius vary across the period and down the group?	(1+2)
30.	a) Write the Lewis dot structure of carbonate ion and sulphuric acid.	
	b) Give an example of a molecule which exhibits intramolecular hydrogen bonding.	(2+1)
31.	Explain the formation of methane molecule based on hybridization.	(2+1)
32.	Explain the formation of H ₂ O molecule based on VSEPR theory.	(3)
33.	•	
	$I^{-}(aq) + MnO_4^{-}(aq) \rightarrow MnO_2(s) + I_2$	(3)
34.	a) Calculate the wave number and frequency of a light wave with wave length 5800A	
	b) Define threshold frequency.	(2+1)
35.	Mention any three postulates of Dalton's atomic theory.	(3)
36.	Give any three differences between BMO and ABMO	(3)
	PART-D	
V. A	Answer any four of the following. Each question carries five marks.	$5 \times 4 = 20$
37.	a) Calculate the molecular formula of a compound containing 4.07% hydrogen, 24.47% ca	arbon and
	rest is chlorine, if molar mass of a compound is 98.96 g/mol.	
	b) Convert 27°C to degree Fahrenheit.	(3+2)
38.	a) Explain emission spectrum of hydrogen and write the equation to calculate the wave nu spectral lines formed.	mber of
	b) State Aufbau's principle.	(4+1)
39.	a) Explain the formation of Nitrogen molecule based on MOT.	
	b) Write all possible values of 1 and m if n= 2.	(3+2)

- 40. a) Derive Ostwald dilution law for a weak acid.
 - b) What are buffer solutions? Give an example of basic buffer.

(3+2)

- 41. a) How do you determine internal energy change by Bomb calorimeter?
 - b) Mention two criterias for a process to be spontaneous.

(3+2)

- 42. a) Calculate the standard Enthalpy of formation of benzene. Given that enthalpy of combustion of carbon and hydrogen are -393.5kJmol⁻¹ and -285.83kJmol⁻¹ respectively.
 - b) State first law of thermodynamics and give its mathematical form.

(3+2)

- 43. a) What are homogeneous and heterogeneous equilibria? Give an example.
 - b) For a reaction 2NOCl \leftrightarrow 2NO+Cl₂, Kc is 3.75x10⁻⁶ at 1069K. Calculate Kp for the reaction (3+2)
- 44. a) Explain the effect of temperature and pressure on equilibrium for the formation of ammonia in Haber's process.
 - b) Calculate the pH of 0.001M KOH solution assuming it to undergo complete ionization at 25 C. (3+2)

VI. Answer any two of the following. Each question carries five marks

 $5 \times 2 = 10$

- 45. a) Write the principle and calculation involved in the estimation of nitrogen present in organic compound by Kjeldahl's method.
 - b) What is position isomerism? Give an example

(3+2)

- 46. a) Explain the mechanism of chlorination of methane.
 - b) Give any two differences between inductive and mesomeric effect.

(3+2)

- 47. a) Explain the formation of ethane by Kolbe's electrolysis method.
 - b) Give equation for the following conversions:
 - i) propene to 2-bromopropane
 - ii) benzene to chlorobenzene

(3+2)