Model Question Paper 2024-25 XI Chemistry

Time Allowed 3 Hours MM 60 Note: 1. Thereare 28 questions in all. a. Q.N. 1 to 12 are multiple choice questions and Carry 1 mark each, b. Q.N. 13 to 19 are very shortanswerquestionscarrying 2 Marks each, c. Q.N.20 to 24 are shortanswerquestionscarrying3 marks each d. Q.N. 25 is case study-based question and carries 4 marks e. Q. 26 to 28 are longanswerquestionscarrying 5 marks each. 2. All Questions are compulsory however internal choices have been given. 3. Students can use log 3 = 0.4771 where required. **Section A** (Multiple Choice Questions) 1. The empirical formula of benzene is a) C_6H_6 b) CH c) C₁₂H₂₂O₁₁ d) $C_6H_{12}O_6$ 1 2. The angular momentum of an electron in the nth orbit is given by: a) n×h c) $\frac{n^2h}{2\pi}$ 1 3. The maximum number of electrons that can be accommodated in a subshell is given by: a) 2l + 1b) 2n² c) 4l+2d) 2(2l+1)1 4. Which of the following molecules has a linear shape? b) NH₃ a) H₂O d) CH₄ 1 c) CO₂ 5. The equilibrium constant (K) for the reaction aA+bB≠cC+dDis given by: $a)\frac{[A]^a[B]^b}{[C]^c[D]^d}$ 1 6. Which of the following is a redox reaction? a) HCl+NaOH→NaCl+H₂O b) $CuO+H_2\rightarrow Cu+H_2O$ c) AgNO₃+NaCl→AgCl+NaNO₃ d) Na₂SO₄+BaCl₂→BaSO₄+2NaCl 1 7. The functional group in an alcohol is: a) -CHO b) -COOH c) -OH d) -NH₂

1

8.	The number of sigma and pi bonds in benzene arerespectively.						
	a) 6,3 b) 6,6						
	c) 12,3 d) 3,12	2	1				
9.	Which of the following is an alkyne?						
	a) Ethylene b) Pro	pane					
	c) Propyne d) Eth	ane	1				
10.	Which of the following reactions involves the addition of hydrogen to an unsaturated						
	hydrocarbon?						
		ogenation					
	,	nydration	1				
	Assertion and Reasoning Questions						
	Which of the following is correct for qu						
	a) Both A and R are true, and R is the c	correct explanation of A.					
	b) Both A and R are true, but R is not to	he correct explanation of A.					
	c) A is true, but R is false.						
	d) A is false, but R is true.						
11.	` /	ectrons in the same subshell have the same energ					
		shell are located in orbitals with the same shape					
12.		brium, the concentrations of reactants and produ	icts remain				
	constant over time.						
	Reason (R): At equilibrium, the forward	-	1				
	Section B (Very Short Answer Questions)					
13.	. Explain the significance of the azim	uthal and magnetic quantum numbers.	2				
		the trend of ionization energy across a perio					
	down a group.	the tiona of formation energy across a period	2				
15	. State and explain the first law of the	armodynamics	2				
	•	•					
10.		eles of an ideal gas expand reversibly and iso	•				
	-	nitial volume of 10 L to a final volume of 30					
	Assume the gas behaves ideally.		2				
17.	. Explain Carius method to estimate t	he percentage of halogen in an organic com	pound.				
			2				
18.	. What is isomerism? Write the funct	ional isomers of propanone.	2				
19.	. Alkynes are more acidic than alkanes v	vhy?					
	OR						
	Explain the Markovnikov's rule wit	h an example.	2				
	Section C	(Short Answer Questions)					
20	State Pauli exclusion principle and l	Hund's rule of maximum multiplicity.	$1\frac{1}{2}$, $1\frac{1}{2}$				
20.	Or	Tana o raio or manimum mamphony.	1/2,1/2				
	a) State Heisenberg's Uncertainty Prince	cinla					
	b) Calculate wave number of radiations	·	1,2				
	o, Carcarate wave number of faulations	maring nequency of $\tau \sim 10 - 11Z$.	1,4				

- 21. a) Define electron gain enthalpy. Explain why electron gain enthalpy of fluorine is less negative than that of chlorine.
 - b) Give the cause of periodicity in periodic properties.

2,1

- 22. a) Explain Gibbs free energy and its significance in predicting the spontaneity of a reaction.
 - b) What will be the sign of ΔS for the reaction $2Cl(g) \rightarrow Cl_2(g)$?

2,1

23. a) Balance the following equation in acidic medium.

$$Cr_2O_7^{2-}+C_2O_4^{2-} \longrightarrow Cr^{3+}+CO_2$$

b) Calculate Oxidation number of Cr in K₂Cr₂O₇.

2,1

- 24. a) Write the IUPAC name of CH₃-CH=CH-CH₂OH.
 - b) Arrange the following in increasing order of acidic strength and give reason for your answer Cl₃CCOOH, Cl₂CHCOOH and ClCH₂COOH 1,2

Section D (Case study Questions)

25. Case Study: The Haber Process

The Haber process is used to synthesize ammonia (NH₃) from nitrogen (N₂) and hydrogen (H₂) gases. The balanced chemical equation for the reaction is:N₂(g)+3H₂(g) \rightleftharpoons 2NH₃(g) In an industrial setup, this reaction is conducted at high pressure (around 200 atmospheres) and high temperature (about 450°C) though forward reaction is exothermic in the presence of a catalyst.

Questions:

- a) Explain how increasing the pressure affects the position of equilibrium in the Haber process.
- b) Predict the effect of increasing the temperature on the equilibrium position of the Haber process.
- c) Describe the role of the catalyst in the Haber process.
- d) Write the equilibrium constant expression for the Haber process.

1,1,1,1

Section E (Long Answer Type Questions)

- 26. a) What is the Volume occupied by 0.5 mole of nitrogen gas at NTP?
 - b) An organic compound contains C = 40%, H = 6.67% & O = 53.33% Calculate its empirical formula.
 - c) Define Limiting Reagent.

2,2,1

- 27. a) BH₃ is non polar whereas NH₃ has net dipole moment Why?
 - b) Write four differences between sigma(σ) and Pi(π) bond.
 - c) Ice floats over water, why?

2,2,1

- 28. a) Write a short note on Friedel Craft' Reaction.
 - b) How will you prepare butane from ethane?
 - c) Complete the reaction.

$$CaC_2 + H_2O \rightarrow ---- + ----$$

2,2,1

Chapter wise Marks distribution and <u>Blueprint of XI Chemistry</u> Paper Session 2024-25

There will be 28 questions in all.

Q.N. 1 to 12 are Multiple choice questions and Carry 1 mark each,

Q.N. 13 to 19 Very short answer questions carrying 2 Marks each,

Q.N.20 to 24 short answer questions carrying 3 marks each

Q.N. 25 is case study-based question and carries 4 marks

Q. 26 to 28 Long answer questions carrying 5 marks each.

S.N.	Chapter	1	2	3	4	5	Total
		Mark	Marks	Marks	Marks	Marks	
1	Some Basic Concepts of Chemistry	1				1	6
2	Structure of Atom	3	1	1			8
3	Classification of elements and periodicity in properties	-	1	1			5
4	Chemical bonding and Molecular structure	1				1	6
5	Chemical Thermodynamics		2	1			7
6	Equilibrium	2	-		1		6
7	Redox Reactions	1	-	1			4
8	Organic Chemistry: Some basic principles and Techniques	2	2	1			9
9	Hydrocarbons	2	1			1	9
	Total Questions	12	7	5	1	3	
	Total Marks	12	14	15	4	15	60