CLASS XII PRE-BOARD EXAMINATION – 2024-25

Q.P. Code: **043/2/1**

Roll No. ☐☐☐☐☐☐☐☐☐

Candidate must write the Q.P. Code on
the title page of the answer-book.

- Please check that this question paper contains **8** printed pages.
- Please check that this question paper contains **33** questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

CHEMISTRY (Theory)
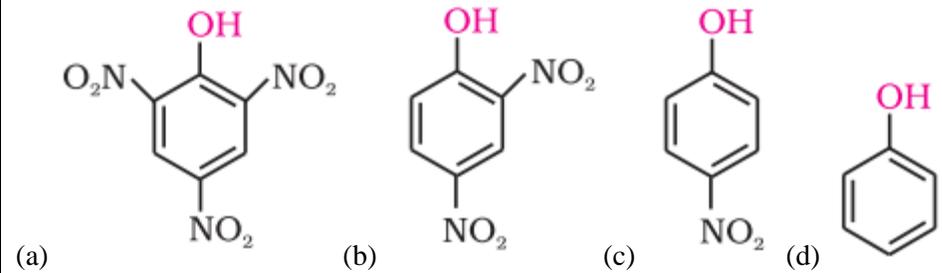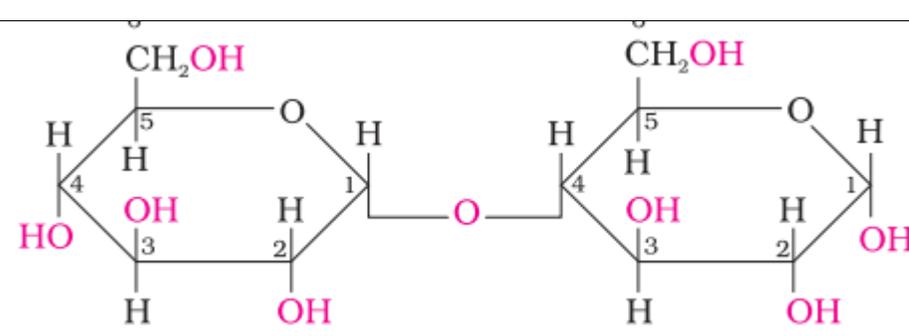
Time allowed : 3 hours   *Maximum Marks : 70*
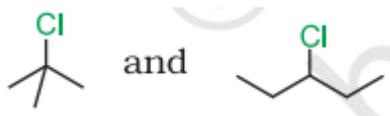
General Instructions:

Read the following instructions very carefully and strictly follow them :

- *(i)   This question paper contains 33 questions. **All** questions are compulsory.*
- *(ii)   This question paper is divided into **five** sections Section **A, B, C, D** and **E**.*
- *(iii) **Section A** questions number **1 to 16** are multiple choice type questions. Each question carries **1** mark*
- *(iv)   **Section B** questions number **17 to 21** are very short answer type questions. Each question carries **2** marks*
- *(v)   **Section C** questions number **22 to 28** are short answer type questions. Each question carries **3** marks*
- *(vi)   **Section D** questions number **29 and 30** are case-based questions. Each question carries **4** marks*
- *(vii) **Section E** questions number **31 to 33** are long answer type questions. Each question carries **5** marks*
- *(viii) There is no overall choice given in the question paper. However, an internal choice has been provided in few questions in all the sections except Section A.*
- *(ix)   Use of calculators is **not** allowed.*

1)	While making tea a student observed that when tea powder is added to boiling milk ,the bubbles will go down, which colligative property is linked here
	
	    a) Osmotic pressure b) Elevation of boiling point
	    c) Depression in freezing point d) Lowering of vapour pressure	

2)	The quantity of charge required to obtain one mole of aluminium from Al2O3 is a) 1F b) 2F c) 3F d) 6F	

3)	$k = -\text{slope}$
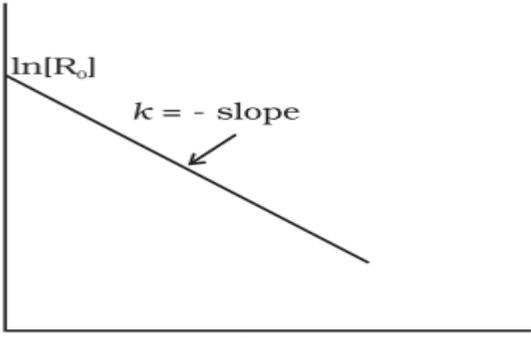	
	Above graph is a plot of first order reaction, which quantity is stated in X and Y axis
	
	    a) X-axis-Time & Y-axis-$\ln[R]$ b) X-axis-Time & Y-axis-$[R]$
	    c) X-axis-Time & Y-axis-$[R]_o/[R]$ d) X-axis-Time & Y-axis-$\ln[R]_o$	

4)	Which of the following statements is NOT correct
	
	    a) Copper liberates hydrogen from acids
	    b) In its higher oxidation states, manganese forms stable compounds with oxygen and fluorine
	    c) Mn^{3+} and Co^{3+} are oxidising agents in aqueous solutions
	    d) Ti^{2+} and Cr^{2+} are reducing agents in aqueous solution	

5)	The ligands which is shown below are coming under the class of
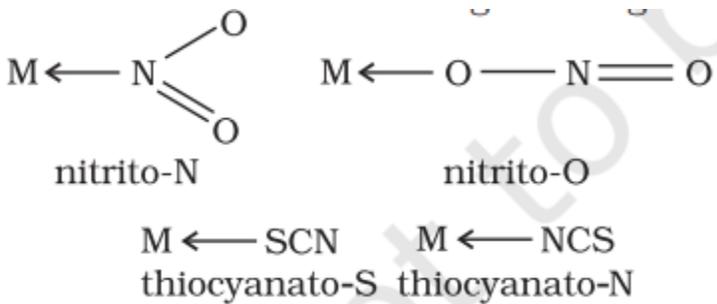	
	    a) Chelating ligands b) Ambidentate ligands
	    c) Didentate ligands d) Flexi dentate ligands
		1

6)	The role of a catalyst is to change
	
	    (a) Gibbs energy of reaction (b) Enthalpy of reaction
	
	    (c) Activation energy of reaction (d) Equilibrium constant
		1

7)	IUPAC name of $[Pt(NH3)2Cl(NO2)]$ is
	
	    (a) Platinum diaminechloronitrite (b) Chloronitrito-N-ammineplatinum(ii)
	
	    (c) Diamminechloridonitrito-N-platinum(ii) (d) Amminochloronitro platinum
		1
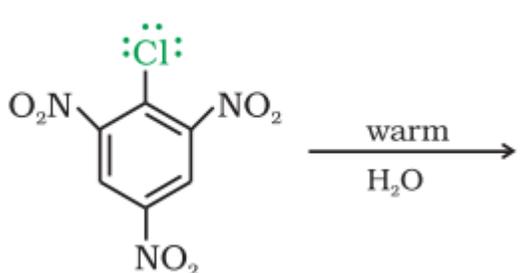
8)	 What will be the product formed in the above reaction (a) (b) (c) (d)	1
9)	 What is the name of above structured carbohydrate (a) Sucrose (b) Maltose (c) Galactose (d) Amylose	1

10)	Sucrose (cane sugar) is a disaccharide. One molecule of sucrose on hydrolysis gives
	
	    (a) Two molecules of glucose
	
	    (b) Two molecules of fructose
	
	    (c) One molecule of glucose and one molecule of fructose
	
	    (d) One molecule of maltose and one molecule of glucose
		1

11)	The unit of ebulioscopic constant is	1

	(a) K Kg/mol or K(molality)$^{-1}$ (b) mol Kg/K or K^{-1}(molality) (c) Kg/mol/K or K^{-1}(molality)$^{-1}$ (d) K mol/Kg or K(molality)	
12)	Which of the following base is not present in DNA? (a) Adenine (b) Thymine (c) Cytosine (d) Uracil	1

13)	Assertion:- Mercury cell does not give steady potential
	
	 Reason:- In the cell reaction ions are not involved
	
	      (a) Both A and R are true and R is the correct explanation of A
	      (b) Both A and R are true but R is not the correct explanation of A
	      (c) A is true but R is false
	      (d) A is false but R is true
		1

14)	Assertion:- Hoffmanns bromamide reaction is given by primary amides
	
	 Reason:- Primary amines are more basic than secondary amines.
	
	      (a) Both A and R are true and R is the correct explanation of A
	      (b) Both A and R are true but R is not the correct explanation of A
	      (c) A is true but R is false
	      (d) A is false but R is true
		1

15)	Assertion:- Vitamin D can be stored in our body
	
	 Reason:- Vitamin D is a fat soluble vitamin
	
	      (a) Both A and R are true and R is the correct explanation of A
	      (b) Both A and R are true but R is not the correct explanation of A
	      (c) A is true but R is false
	      (d) A is false but R is true	

16)	Assertion:- Cu^{2+} iodide is not known
	
	 Reason:- Cu^{2+} oxidises I^- to iodine
	
	      (a) Both A and R are true and R is the correct explanation of A
	      (b) Both A and R are true but R is not the correct explanation of A
	      (c) (c)A is true but R is false
	      (d) A is false but R is true.
		1

17	When kept in water,raisin swells in size.Name and explain the phenomenon involved? OR Why is it advised to add ethylene glycol to water in a car radiator while driving in hill station	2
18	Complete the following $$2\,CrO_4^{2-} + 2H^+ \rightarrow$$ $$2MnO_4^- + H_2O + I^- \longrightarrow$$	2

19	Write the name of the complex $[Co(en)_2(NO_2)Cl]^+$ and which type of isomerism is shown by this complex?	2
20	Out of the following pairs which one will undergo SN1 faster and why? Cl $\bigwedge$ and Cl	2

21			2

Compound	Formula	pKₐ
o-Nitrophenol	$o-O_2N-C_6H_4-OH$	7.2
m-Nitrophenol	$m-O_2N-C_6H_4-OH$	8.3
p-Nitrophenol	$p-O_2N-C_6H_4-OH$	7.1
Phenol	C_6H_5-OH	10.0
o-Cresol	$o-CH_3-C_6H_4-OH$	10.2

PKa values of some compounds given below, analyse it and find the answer

1) Which is the most acidic compound in the above list
2) What is the reason behind 10.2 PKa value for o-cresol

22	(1) Why it is very essential to cool liquid ammonia bottle before opening it	1
	(2) When 19.5 g of F-CH₂-COOH (molar mass=78g/mol) is dissolved in 500 g of water, the depression in freezing point is observed to be 1°C.Calculate the degree of dissociation of F-CH₂-COOH(K_f of water =1.86 K Kg/Mol)?	2
	<center>OR</center>	
	(1) Account for the reason, marine life like fish prefers to stay at a lower level and stay away from the upper layer of water.	1
	(2) Why freezing/melting point of a substance used as a criterion for testing the purity of a substance?	1
	(3) Account for the reason for preservation of fruits against bacterial action by adding sugar.	1
23	In Appolo space programme NASA never use lead storage batteries but they use Fuel cell. Why fuel cells are more common in space programmes, Write its two advantages? Write its Anode and cathode reactions?	3
24	a) Zr and Hf are having almost similar atomic/ionic size what is the scientific reason behind this	1
	b) Actinoid contraction is more powerful than lanthanoid contraction why	1
	c) First ionisation enthalpy of Cr is lower than that of Zn	1

25	a) $[Ti(H_2O)_6]Cl_3$ on heating becomes colourless.	1
	b) $[Co(NH_3)_5(NO_2)]Cl_2$ and $[Co(NH_3)_5(ONO)]Cl_2$-Type of isomerism shown by these complexes is	1
	c) Why chelate complexes are more stable than complexes with unidentate ligands	1
26	a) Why is it necessary to avoid even traces of moisture during the use of a Grignard reagent?	1
	b) Why can aryl halides not be prepared by reaction of phenol with HCl in the presence of $ZnCl_2$?	1
	c) Convert chlorobezene to byphenyl	1
27	a) Arrange the following acids in the increasing order of acidity $NO_2CH_2COOH, FCH_2COOH, NC-CH_2COOH, CHCl_2COOH$	2
	b) Identify the product in the reaction given below 	1
28	Answer the following….	
	a) Why body cannot store Vitamin C	1
	b) Where does the water present in egg go after boiling the egg	1
	c) What is a primary structure of protein	1
	CASE BASED QUESTIONS	
29		

$$Cu^+ + e^- \rightarrow Cu(s) \quad 0.52$$
$$Cu^{2+} + 2e^- \rightarrow Cu(s) \quad 0.34$$
$$AgCl(s) + e^- \rightarrow Ag(s) + Cl^- \quad 0.22$$
$$AgBr(s) + e^- \rightarrow Ag(s) + Br^- \quad 0.10$$
$$\mathbf{2H^+ + 2e^- \rightarrow H_2(g) \quad 0.00}$$
$$Pb^{2+} + 2e^- \rightarrow Pb(s) \quad -0.13$$
$$Sn^{2+} + 2e^- \rightarrow Sn(s) \quad -0.14$$
$$Ni^{2+} + 2e^- \rightarrow Ni(s) \quad -0.25$$
$$Fe^{2+} + 2e^- \rightarrow Fe(s) \quad -0.44$$
$$Cr^{3+} + 3e^- \rightarrow Cr(s) \quad -0.74$$
$$Zn^{2+} + 2e^- \rightarrow Zn(s) \quad -0.76$$
$$2H_2O + 2e^- \rightarrow H_2(g) + 2OH^-(aq) \quad -0.83$$
$$Al^{3+} + 3e^- \rightarrow Al(s) \quad -1.66$$
$$Mg^{2+} + 2e^- \rightarrow Mg(s) \quad -2.36$$
$$Na^+ + e^- \rightarrow Na(s) \quad -2.71$$
$$Ca^{2+} + 2e^- \rightarrow Ca(s) \quad -2.87$$

Increasing strength of

	Observe the above table containing reduction potential values of some elements and the questions given below		
	a) When lead and chromium metal clubbed to form a cell then which one will act as anode	1	
	b) Anu took copper sulphate solution in an aluminium vessel, based on reduction potential value given in table above what change will occur there	1	
	c) Aluminium metal is extracted by the process called electrolysis, can you specify reason based on reduction potential value given above	2	
	OR		
	Calculate the emf of the cell when a Zinc rod and Iron rod are clubbed together	2	
30	Source based question:-		
	Read the passage given below and answer the following questions:		
	Both alcohols and phenols are acidic in nature, but phenols are more acidic than alcohols. Acidic strength of alcohol mainly depends upon the inductive effect.		
	Acidic strength of phenols depends upon a combination of both inductive effect and resonance effects of the substituent and its position on the benzene ring. Electron withdrawing groups increases the acidic strength of phenols whereas electron donating groups decreases the acidic strength of phenols. Phenol is a weaker acid than carboxylic acid.		
	a) Arrange the following compounds in increasing order of their acidstrength propan-1-ol, 2,4,6-trinitrophenol, 3-nitrophenol, 3,5-dinitrophenol, phenol, 4-methylphenol		
	b) Alcohols act as Bronsted bases also. Explain		
	c) Draw the resonating structures of phenol and phenoxide ions		
	OR		
	Explain why phenoxide ion is more stable than phenol		
	LONG ANSWER TYPE		
31	a) Write any two difference between order and molecularity of a reaction	2	
	b) For the reaction A + B →products, the following initial rates were obtained at various given initial concentrations. Determine the overall order of a reaction	3	

S.No.	[A] mol / L	[B] mol / L	Initial rate M/s
1.	0.1	0.1	0.05
2.	0.2	0.1	0.10
3.	0.1	0.2	0.05

	OR		
	a) A reaction is first order in A and second order in B		
	1) Write the differential rate equation	1	

	2) How is the rate affected on increasing the concentration of B three times	1
	3) How is the rate affected when the concentration of both A and B are doubled	
	b) For a first order reaction ,show that time required for 99% completion is twice the time required for the completion of 90% of reaction	1
		2
32)	a) An organic compound A with molecular formula $C_4H_8O_2$ undergoes acid hydrolysis to form two compounds B and C.Oxidation of C with acidified potassium permanganate also produces B.Sodium salt of B on heating with soda lime gives methane	
	(1) Identify A,B and C	3
	(2) Out of B and C which will have a higher boiling point?Give reason	2
	OR	
	a) Explain with suitable chemical equation	
	1) HVZ reaction	1
	2) Rosenmonds reduction	1
	3) Clemmensons reduction	1
	b) Distinguish between	1
	1) Benzophenone and acetophenone	1
	2) Propanone and propanal	
33	(a) Observe the reaction chart and find the compound A,B,C,D,E also write names	5
	OR	
	(a) Give reason for the following	
	(1) Aliphatic amines are more basic than aromatic amines	
	(2) Ethyl amine is soluble in water but aniline is insoluble	
	(3) Aniline does not undergo Friedel-crafts reaction	
	(b) Arrange the following in the decreasing order of pKb values	
	$C_2H_5NH_2,C_6H_5NHCH_3,(C_2H_5)_2NH$ and $C_6H_5NH_2$	