



ગુજરાત માધ્યમિક અને ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ, ગાંધીનગર

For Academic year 2020-21 STD.-12 (SCIENCE STREAM) CHEMISTRY (052) ANNUAL EXAM

TIME : 3 Hours

SCHEME OF QUESTION PAPER

Total Marks - 100

NOTE : This blueprint is for the guidance of students, Teachers, Examiners, Moderators etc. The moderators, Teachers and experts in higher secondary of the respective subject may do essential changes keeping the objectives in mind.

Weightage as per objective :

Objectives	Knowledge (K)	Understanding (U)	Application (A)	Higher order thinking skill		Total Marks
				Synthesis Analysis	Inference Evaluative	
Part-A Mark	05	13	17	08	07	50
Part-B Mark	05	15	15	08	07	50
Total Mark (%)	10	28	32	16	14	100

Weightage as per type of question : PART-A

No.	Type of Question	No. of Question	Total Marks
1.	Multiple choice questions (MCQs)	50	50

Weightage as per type of question : PART-B

No.	Type of Question	No. of Question		Total Marks
1.	Short Answer Type (SA-I)	08	12	16
2.	Short Answer Type (SA-II)	06	09	18
3.	Long Answer Type (LA)	04	06	16
	Total	18	27	50

Weightage as per Chapter :

No.	Name of Chapter	Chapterwise Weightage			Unitwise Weightage
		PART-A Mark	PART-B		
			General	Optional	
1.	The Solid State	4	3	5	Unit-1 36
2.	Solutions	5	4	4	
3.	Electrochemistry	4	5	5	
4.	General Principles and Processes of Isolation of Elements	2	2	4	
5.	The p-Block Elements	3	4	6	
6.	Haloalkanes and Haloarenes	4	5	5	Unit-2 26
7.	Alcohols, Phenols and Ethers	4	3	7	
	PART - II				
1.	Chemical Kinetics	3	2	6	Unit-3 38
2.	Surface Chemistry	4	2	5	
3.	The d-and f-Block Elements	2	3	5	
4.	Coordination Compounds (Complex salts)	3	7	7	
5.	Aldehydes, Ketones and Caboxylic Acids	4	4	7	
6.	Amines (N-containing compounds)	4	2	5	
7.	Biomolecules	4	4	4	
8.	Polymers	-	-	-	
9.	Chemistry in Everyday Life	-	-	-	
	Total Marks	50	50	75	100

Note : Chapter weightage may be change for different question paper. But unit weightage can not be change.



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ANNUAL EXAM

TIME : 3 Hours

SCHEME OF QUESTION PAPER

Total Marks - 100

No. Of Question	Information of Section and Question	Marks
1 to 50	PART - A Multiple choice type 50 questions of 1 mark each	50
1 to 12	PART - B	16
	SECTION - A	
	Short Answer Type Questions (SA-I) Write any 8 out of 12 questions (Each of 2 marks)	
13 to 21	SECTION - B	18
	Short Answer Type Questions (SA-II) Write any 6 out of 9 questions (Each of 3 marks)	
22 to 27	SECTION - C	16
	Long Answer type questions (LA) Write any 4 out of 6 questions (Each of 4 marks)	
	Total Marks	100

- Note :**
- Time first one hour for Part-A
 - Time remaining two hours for Part-B
 - Questions from cancelled syllabus/topics not to be asked for the year 2020-21.



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For Academic year 2020-21 STD.-12 (SCIENCE STREAM) CHEMISTRY (052) ANNUAL EXAM

Time : 3 Hour

SCHEME OF QUESTION PAPER

Total Marks : 100

Time : 1 Hour

PART - A

Total Marks : 50

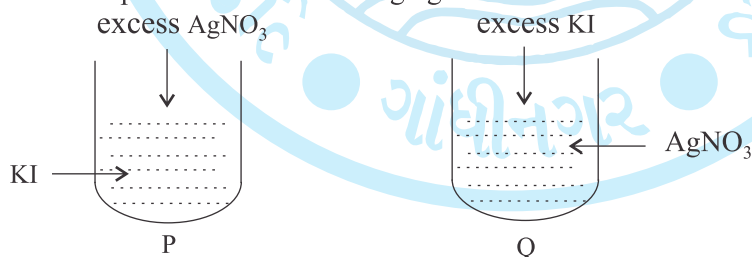
- Instructions:**
- (1) There are 50 objective type (M.C.Q.) questions in Part-A and all questions are compulsory.
 - (2) The questions are serially numbered form 1 to 50 and each carries 1 mark.
 - (3) Read each question carefully, select proper option and answer in the OMR Sheet.
 - (4) The OMR Sheet is given for answering the questions. The answer of each question is represented by (A) O, (B) O, (C) O, (D) O. Darken the circle ● of the correct answer with ball-pen.
 - (5) Rough work is to be done in the space provided for this purpose in the Test Booklet only.
 - (6) Set No. of question paper printed on the upper-most right side of the question paper is to be written in the column provided in the OMR Sheet.
 - (7) Use of simple calculator and log table is allowed if required.
 - (8) Notations used in this question paper have proper meaning.

● **Select proper choice from the given multiple choices. Each of one mark.**

- (1) An Ionic Solid A^+B^- Crystallise like rock salt if all atoms along one body diagonal are removed then what is the formula of substance ?
(A) $A_{12}B_{15}$ (B) $A_{12}B_{17}$ (C) $A_{13}B_{15}$ (D) $A_{13}B_{14}$
- (2) Which of the following defect is not exhibited by NaCl ?
(A) Schottky defect (B) F Center (C) Impurity defect (D) Frenkel defect
- (3) In which of the following compounds crystal have axial distance relation is different from others ?
(A) KNO_3 (B) HgS (C) $K_2Cr_2O_7$ (D) $S_8(m)$
- (4) In Which pair both compounds are amorphous solids.
(A) Teflon and Naphthalene (B) Iodine and quartz
(C) Polyurethane and fiber glass (C) Dry ice and Ammonium sulphate
- (5) What will be osmotic pressure (bar) of 3 % W/V aqueous solution of urea (molar mass 60 g mol^{-1}) at 300 K ?
(A) 1.23 (B) 24.6 (C) 0.082 (D) 12.3
- (6) Which of the following solution has highest freezing point under identical conditions ?
(A) 0.05 m Urea (B) 0.02 m Urea (C) 0.1 m Urea (D) 0.2 m Urea
- (7) What will be the molefraction of I_2 in 0.2 m I_2 nonaqueous solution in benzene ?
(A) 0.015 (B) 0.20 (C) 0.85 (D) 0.025
- (8) Which value changes with change in temperature for solution having nonvolatile solute ?
(A) % w/w (B) Molality (C) Molarity (D) Molefraction
- (9) The % w/w of solvent in 40 % w/w NaOH solution is
(A) 60 % (B) 66.6 % (C) 40 % (D) 44.8 %
- (10) How many Faradays are needed to reduce 10 mole of $Cr_2O_7^{2-}$ to Cr^{3+}
(A) 60 (B) 30 (C) 10 (D) 5
- (11) The Saturated solution of which salt can be filled in salt bridge ?
(A) KNO_2 (B) $AgNO_3$ (C) $LiNO_3$ (D) KNO_3




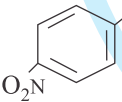
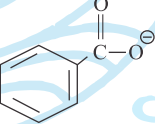
- (12) The value of E° cell of following cell reaction will be expressed as.
 $2\text{Ag} + \text{Cu}^{2+} \rightarrow 2\text{Ag}^{1+} + \text{Cu}$
 $E^\circ \text{Ag}^+/\text{Ag} = x \text{ V}$ and $E^\circ \text{Cu}^{2+}/\text{Cu} = y \text{ V}$
 (A) $y - x$ (B) $y - 2x$ (C) $2x - y$ (D) $x - y$
- (13) In which metal vessel a CuSO_4 be filled ?
 $E^\circ \text{Cu}/\text{Cu}^{2+} = -0.34 \text{ V}$, $E^\circ \text{Ag}/\text{Ag}^+ = -0.80 \text{ V}$, $E^\circ \text{Zn}^{2+}/\text{Zn} = -0.76 \text{ V}$,
 $E^\circ \text{Ni}^{2+}/\text{Ni} = -0.25 \text{ V}$, $E^\circ \text{Fe}^{2+}/\text{Fe} = -0.44 \text{ V}$
 (A) Ag (B) Zn (C) Fe (D) Ni
- (14) For a molecularity of reaction, the acceptable value is :
 (A) 0 (B) -2 (C) 1.5 (D) 2
- (15) If the value of rate constant of certain reaction is $1.75 \times 10^2 \text{ mol}^{-2} \text{ L S}^{-1}$ then, its order of reaction will be :
 (A) Zero (B) First (C) Second (D) Third
- (16) The rate of a gaseous reaction is expressed as : $\text{Rate} = k[\text{A}]^2[\text{B}]^0$. If this is a gaseous reaction and its volume is suddenly doubled at constant temperature, then its rate will change as.
 (A) Decreases four times (B) Increases two times
 (C) Increases eight times (D) Decreases two times
- (17) Which of the following is an example of adsorption ?
 (A) NH_3 gas in contact with water (B) Piece of cotton cloth in contact with water
 (C) Anhy CaCl_2 in contact with water (D) Silica gel in contact with water vapours
- (18) Under similar conditions, which gas will be adsorbed maximum on activated charcoal ?
 (A) CO_2 (B) NH_3 (C) HCL (D) H_2
- (19) Chese is a type of colloid solution.
 (A) Solid-Liquid (B) Liquid-Solid (C) Solid-Solid (D) Liquid-Liquid
- (20) Select correct option based on following figure.



If the colloid particles of AgI will be obtained, Then.....

- (A) In vessel-P, charge on colloid is +ve (B) In vessel-Q, charge on colloid is -ve
 (C) In vessel-P, charge on colloid is -ve (D) Both (A) and (B)
- (21) In metallurgy of extraction of Ag and Au by using NaCN, the oxidizing agent used is :
 (A) Air (O_2) (B) KNO_3 (C) Zn (D) H_2O_2
- (22) Which of the following metal can be refined by liquation method ?
 (A) Sn (B) Zn (C) Zr (D) Ni
- (23) The correct order of b. Pt. of hydrides is :
 (A) $\text{PH}_3 < \text{AsH}_3 < \text{NH}_3 < \text{PH}_3$ (B) $\text{H}_2\text{O} < \text{H}_2\text{Se} < \text{H}_2\text{S} < \text{H}_2\text{Te}$
 (C) $\text{HF} > \text{HI} > \text{HBr} > \text{HCL}$ (D) $\text{HF} > \text{H}_2\text{O} > \text{NH}_3 > \text{PH}_3$

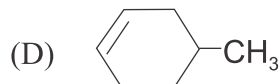
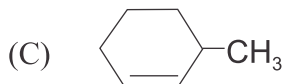
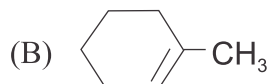
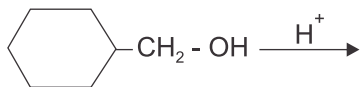


- (24) Which halide can undergo hydrolysis with water ?
(A) NF_3 (B) SF_6 (C) PF_3 (D) IF_3
- (25) Geometrical shape of XeO_3 is :
(A) Trigonal Pyramidal (B) Planar Triangular
(C) Square Pyramid (D) Tetrahedral
- (26) The correct order of paramagnetic moment is :
(A) $Cr^{3+} < Mn^{3+} < Fe^{3+}$ (B) $Cu^{2+} > Zn^{2+} > Co^{2+}$
(C) $Ti^{2+} < V^{2+} < Co^{2+}$ (D) $Cr^{2+} < Cr^{3+} < Cr^{4+}$
- (27) Which element is not considered as transitional element ?
(A) Fe (B) Cu (C) Zn (D) Sc
- (28) The correct hybridisation of transition metal ion / atom in given complexes is :
(A) $K_4[Ni(CN)_4] \rightarrow sp^3$ (B) $[Ni(NH_3)_6]^{2+} \rightarrow d^2 sp^3$
(C) $[Fe(CO)_5] \rightarrow sp^3 d$ (D) $[Fe(CN)_6]^{4-} \rightarrow sp^3 d^2$
- (29) is a chelating ligand
(A) O^{2-} (B) N^{3-} (C) OX^{2-} (D) CH_3COO^-
- (30) Which compound shows facial isomerism ?
(A) $[Co(NH_3)_6]^{3+}$ (B) $[Co(NH_3)_2Cl_4]^{1-}$
(C) $[Co(NH_3)_4Cl_2]^+$ (D) $[Co(NH_3)_3Cl_3]$
- (31) The maximum stabilization energy is associated with :
(A)  (B) $CH_2=CH-CH_2^-$
(C)  (D) 
- (32) Which of the following cannot act as an electrophile ?
(A) CH_3^+ (B) NO_2^+ (C) BF_3 (D) CH_3C^+O
- (33) The most stable product obtained in following reaction is :
$$CH_3 - \underset{\substack{| \\ CH_3}}{CH} - CH = CH_2 \xrightarrow{HBr} (?)$$

(A) $CH_3 - \underset{\substack{| \\ CH_3}}{CH} - \underset{\substack{| \\ Br}}{CH} - CH_3$ (C) $CH_3 - \underset{\substack{| \\ CH_3}}{CH} - CH_2 - \underset{\substack{| \\ Br}}{CH_2}$
(B) $CH_3 - \underset{\substack{| \\ CH_3}}{C} - \underset{\substack{| \\ Br}}{CH_2} - CH_3$ (D) $CH_3 - \underset{\substack{| \\ CH_2Br}}{C} - CH_2 - CH_3$
- (34) Which compound does not show optical activity ?
(A) Picric acid (B) Cumene (C) Aspirin (D) Given all



(35) The most stable product of dehydration of:



(36) The number of possible aromatic ethers of compound C₈H₁₀O is:

- (A) 4 (B) 5 (C) 6 (D) 3

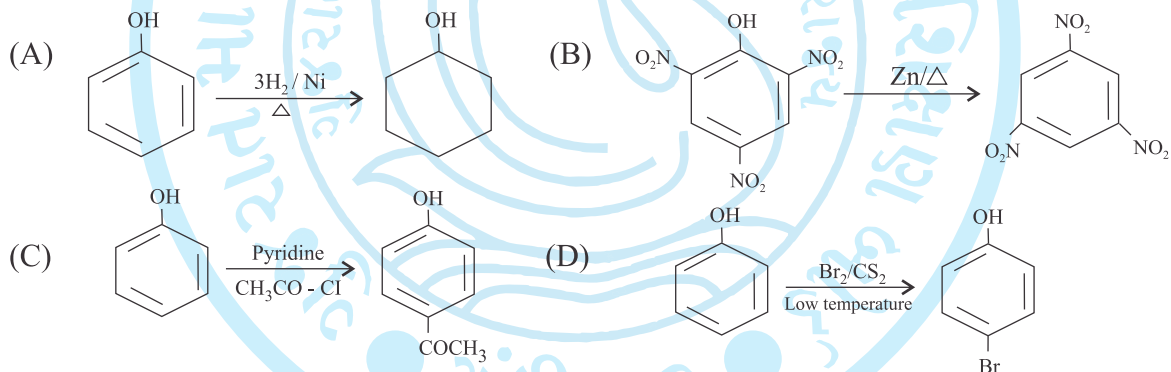
(37) is an example of allylic alcohol.

- (A) prop-2-en-1-ol (B) ethenol
(C) But-2-en-2-ol (D) But-3-en-1-ol

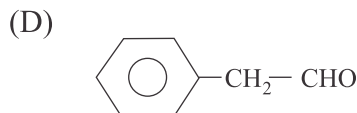
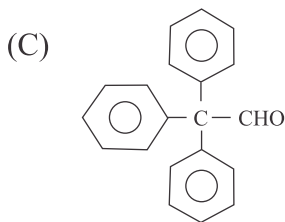
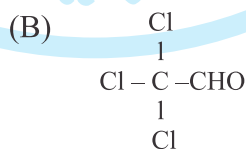
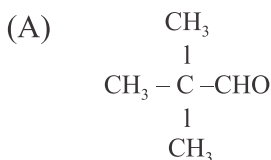
(38) Which statement is correct regarding the end product obtained in Reimer-Tiemann reaction?

- (A) It's IUPAC name is 2-hydroxy phenyl carbaldehyde.
(B) The product obtained when it is heated with Zn dust does not respond towards fehling test.
(C) It's reduction by H₂/Pd gives catachol (D) Its principal functional group is – OH

(39) In which reaction, product is mentioned incorrectly?



(40) Which compound does not give Cannizzaro reaction?



(41) Which acid has highest value of PKa?

- (A) CH₃COOH (B) C₆H₅COOH (C) HCOOH (D) ClCH₂COOH



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- (42) The number of σ and π bonds in isophthalaldehyde molecule respectively are.
(A) 10, 3 (B) 15, 4 (C) 10, 5 (D) 16, 5
- (43) Which compound responds towards carbylamine test ?
(A) p - methyl benzylamine (B) N - methyl - O - methyl ethanamine
(C) N - ethyl - N - methyl ethanamine (D) N, N - dimethyl benzenamine
- (44) Find product "Y" in given reaction.
$$\text{CH}_3\text{CONH}_2 \xrightarrow{\text{Br}_2/\text{KOH}} \text{X} \xrightarrow[\Delta]{\text{CHCl}_3/\text{KOH}} \text{Y}$$

(A) $\text{CH}_3\text{CH}_2\text{CN}$ (B) CH_3CN (C) CH_3NC (D) $\text{CH}_3\text{CH}_2\text{NC}$
- (45) Which of the following amine compound does not give acylation reaction.
(A) $\text{C}_6\text{H}_5\text{NH}_2$ (B) $\text{C}_6\text{H}_5\text{NHCH}_3$ (C) $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)_2$ (D) $\text{C}_2\text{H}_5\text{NHCH}_3$
- (46) $\text{C}_4\text{H}_{11}\text{N} + \text{HNO}_2 \rightarrow \text{C}_4\text{H}_{10}\text{O}$ (1° alcohol) then the compound $\text{C}_4\text{H}_{10}\text{N}$ will give reaction.
(A) Diazotisation (B) Hoffman (C) Ammonolysis (D) Isocyanide
- (47) Number of chiral -C - atoms in glucose molecule is: _____
(A) 4 (B) 5 (C) 3 (D) 6
- (48) Which amino acid does not have primary amine group ?
(A) Proline (B) Glycine (C) Alanine (D) Glutamic acid
- (49) Which hetero cyclic base is absent in DNA?
(A) Adanine (B) Guanine (C) Uracil (D) Thymine
- (50) Glucose does not react with.....
(A) HCN (B) NaHSO_3 (C) NH_4OH (D) $\text{C}_6\text{H}_5\text{NHNH}_2$



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Time : 2 hours

PART - B

Total Marks :50

- Instruction :** (1) Write in a clear legible handwriting.
(2) There are total three sections in A, B and C in Part-B.
(3) All the section are compulsory and general options are given in each section.
(4) The numbers at right side represent the marks of the question.
(5) Start new section on new page.
(6) Maintain sequence of questions in the section.
(7) Use of simple calculator and log table is allowed if required.

Section - A

- **Write answer of any 8 questions out 12. (Each of 2 marks)** [16]
- (1) State two difference of points between metallic and ionic crystalline solid.
 - (2) Write the equation of reaction at electrodes during electrolysis of aq. CuCl_2 between Pt electrodes.
 - (3) Explain pseudo first order reaction with one illustration.
 - (4) Give four characteristics of lyophilic colloid.
 - (5) Explain method of vapour phase refining of Ni metal with equation.
 - (6) Draw the geometrical structures of pyrophosphoric acid and peroxodisulphasic acid.
 - (7) Give reason : aq. solution of CuSO_4 is coloured. While aq. solution of ZnSO_4 is colourless.
 - (8) Describe the method used for concentration of sulphur containing ores.
 - (9) Give equation of reaction of preparation of benzyl alcohol from toluene in two steps.
 - (10) Prove the presence of -CHO group in glucose molecule by giving equation.
 - (11) Explain : Carbylamine reaction with one illustration.
 - (12) State the structures of two different dipeptides obtained from glycine and alanine.

Section - B

- **Write answers of any 6 questions of bearing the number 13 to 21. (Each of 3 marks)** [18]
- (13) Derive the value of packing efficiency of BCC in three dimension.
 - (14) Calculate cell potential at 298 K of following cell. (Cell reaction is necessary)
$$\text{Pt} \mid \text{Br}_2(l) \mid \text{Br}^-(0.01 \text{ M}) \mid \text{H}^+(0.03 \text{ M}) \mid \text{H}_{2(g)} \mid \text{Pt} \quad E^\ominus \text{Br}_2 / \text{Br}^- = 1.09 \text{ V.}$$

1bar
 - (15) Give the six points of comparison between physical and chemical adsorption.
 - (16) Write balanced chemical equations for the followings.
(I) Preparation of Potassium manganate (ii) Effect of heat on potassium permanganate
(iii) Reaction of potassium permanganate with I_2 in alkaline medium.
 - (17) Explain giving reason : $[\text{Cr}(\text{NH}_3)_6]^{3+}$ is paramagnetic where as $[\text{Ni}(\text{CN})_4]^{4-}$ is diamagnetic.
 - (18) Write chemical reaction of ethyl chloride with following reagents.
(I) KCN (ii) AgCN (iii) KNO_2
 - (19) Give the equations of preparation of ethanal from given compounds.
(I) Propene (ii) Ethan nitrile (iii) Methyl ethanoate



- (20) Give IUPAC name of following compounds.
(I) $C_6H_5NHCOCH_2CH_3$ (ii) $(CH_3)_3CNH_2$ (iii) $C_6H_5CH_2NH_2$
- (21) Write only the reaction of HI with give compound
(I) 1-Propanoic acid (ii) Methoxybenzene (iii) Benzyl ethyl ether

Section - C

- Write answers of any 4 questions as asked from question number 22 to 27. [16]
(Each of 4 marks)

(22) The vapour pressures of chloroform $CHCl_3$ (119.5 g mol^{-1}) and dichloromethane CH_2Cl_2 (85 g mol^{-1}) at 298 K are 200 mm Hg and 415 mm Hg respectively. Calculate the vapour pressure of resulting solution by mixing 25.5 g of $CHCl_3$ and 40 g of CH_2Cl_2 at 298 K.

(23) The following data were obtained for first order reaction of thermal decomposition of $N_2O_5(g)$ at constant volume: $N_2O_5(g) \rightarrow N_2O_4(g) + \frac{1}{2} O_2(g)$

Sr.No.	Time/S	Total pressure (atm)
1.	0	0.50
2.	100	0.51

Calculate the rate constant.

- (24) (I) Explain : why electron gain enthalpy of chlorine is more than that of fluorine ?
(ii) Why are pentahalides more co valent than that of trihalides of group-15 elements.
- (25) Answer the following regarding $(NH_4)_2 [Pt(NH_2)_2(OX)_2]$ complex salt.
(I) Give IUPAC name of this complex. (ii) Write the co-ordination number of metal
(iii) State number of optical isomers. (iv) State geometrical shape of complex ion
- (26) Write only structures of products A, B, C and D formed in following sequential reaction.



- (27) (I) Write equation of reaction of production of phenol from cumene.
(ii) Write the equation of reaction to prepare
(a) Propan-1-ol from formaldehyde
(b) Propan-2-ol from acetaldehyde