This Question Paper contains 20 printed pages
(Part - A & Part - B)

Sl.No.

052 (E)

(MARCH, 2024)
SCIENCE STREAM
(CLASS - XII)

Part - A : Time : 1 Hour / Marks : 50
Part - B : Time : 2 Hours / Marks : 50

પ્રશ્ન પેપરનો સેટ નંબર જેની સામેનું વર્તુળ OMR શીટમાં ઘટ્ટ કરવાનું રહે છે.
Set No. of Question Paper, circle against which is to be darken in OMR sheet.

12

(Part - A)

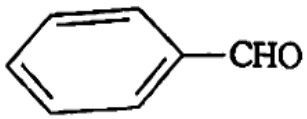
Time : 1 Hour] *[Maximum Marks : 50*

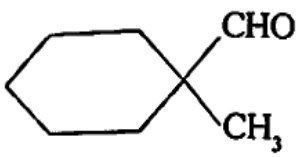
Instructions :

1) There are 50 objective type (M.C.Q.) questions in Part - A and all questions are compulsory.
2) The questions are serially numbered from 1 to 50 and each carries 1 mark.
3) Read each question carefully, select proper alternative and answer in the O.M.R. 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) Signs used in question Paper have usual meaning.

1) Cannizaro reaction is not given by _____.

(A) HCHO

(B) 

(C) 

(D) CH_3CHO

Rough Work

2) Which Product is obtain when cyclopentanone reacts with Hydroxyl amine in acidic medium?

(A) Cyclopentanoneoxime

(B) Cyclopentanol

(C) Cyclopentanone Hydrazone

(D) Cyclopentenamide

3) Which of the following compound gives Iodoform reaction?

(A) Propanal

(B) Acetone

(C) Pent - 3 - one

(D) Benzophenone

4) Which of the following compound has highest K_a Value?

(A) NO_2CH_2COOH

(B) $Br\,CH_2COOH$

(C) CCl_3COOH

(D) CH_3COOH

5) Which product is obtained on heating sodium acetate with sodalime?

(A) Butane

(B) Propane

(C) Ethane

(D) Methane

6) Which of the following compound gives carbyl amine test?

(A) Isopropylamine

(B) Methylamine

(C) Ethanamide

(D) Trimethylamine

7) Which reagent is used to distinguish between secondary and tertiary amines?

(A) Nessler reagent

(B) Tollens reagent

(C) Hinsberg's reagent

(D) Schiff's reagent

8) Which order for solubility in water of the following compounds is correct?

(A) $C_6H_5NH_2 < C_2H_5NH_2 < (C_2H_5)_2NH$

(B) $C_2H_5NH_2 < (C_2H_5)_2NH < C_6H_5NH_2$

(C) $(C_2H_5)_2NH < C_6H_5NH_2 < C_2H_5NH_2$

(D) $C_6H_5NH_2 < (C_2H_5)_2NH < C_2H_5NH_2$

9) Give IUPAC name of the product due to acetylation of Aniline

(A) Acetyle benzene

(B) N - Phenylethanamide

(C) Acetanilide

(D) N - methylbenzamide

10) Which Product is not obtain by Sandmeyer reaction?

(A) Chlorobenzene

(B) Bromobenzene

(C) Iodobenzene

(D) Cynobenzene

11) Which amide gives propanamine by Hoffmann bromamide reaction?

(A) Butanamide

(B) Ethenamide

(C) Propanamide

(D) Pentanamide

12) What is the hydrolysis product of Lactose?

(A) Glucose and Glucose

(B) Glucose and Fructose

(C) Galactose and Glucose

(D) Galactose and Fructose

13) Which of the following acid is Vitamin?

(A) Ascorbic acid

(B) Picric acid

(C) Adipic acid

(D) Aspartic acid

14) Hydrogen bond is present in which two pair of bases in double helix structure of DNA? R

(A) Guanine and Thymine

(B) Adenine and Thymine

(C) Adenine and cytosine

(D) Cytosine and Thymine

15) Which amino acid is not optically active?

(A) Leucine

(B) Alanine

(C) Glycine

(D) Valine

16) Which one is an example of solid solution?

(A) Copper dissolved in gold

(B) Glucose dissolved in water

(C) Camphor in nitrogen gas

(D) Ethanol dissolved in water

17) If 22 gm of benzene (C_6H_6) dissolved in 122 gm of carbon tetrachloride (CCl_4), calculate the mass percentage of benzene.

(A) 84.72%

(B) 18.03%

(C) 15.28%

(D) 28.20%

18) We have three aqueous solutions of NaCl labelled as 'A', 'B' and 'C' with concentrations 0.1M, 0.01M, 0.001M respectively. The value of Von't Hoff factor for these solution will be in the order _____

(A) $i_A = i_B = i_C$

(B) $i_A > i_B > i_C$

(C) $i_A < i_B < i_C$

(D) $i_A < i_B > i_C$

19) For 1 molal aqueous solution of glucose which one is correct?

(A) $\Delta T_b \neq K_b$

(B) $\Delta T_b < K_b$

(C) $\Delta T_b > K_b$

(D) $\Delta T_b = K_b$

20) Which one is an example of Ideal solution of the following?

(A) Chloroform and acetone

(B) Benzene and Toluene

(C) Ethanol and Acetone

(D) Water and Ethanol

21) An unripe mango placed in a concentrated salt solution to prepare pickle, shrivels because _____.

(A) It gains water due to reverse osmosis

(B) It loses water due to reverse osmosis

(C) It gains water due to osmosis

(D) It loses water due to osmosis

22) An electrochemical cell can be behave like an electrolytic cell when _____.

(A) $E_{ext} > E_{cell}$

(B) $E_{cell} > E_{ext}$

(C) $E_{cell} = 0$

(D) $E_{cell} = E_{ext}$

23) The standard electrode potential for Daniell cell is 1.1V. What will be the value of standard Gibbs energy for the reaction :

$Zn_{(s)} + Cu^{2+}_{(aq)} \longrightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$ (1F = 96487 C mol^{-1})

(A) -106.14 $KJmol^{-1}$

(B) 212.27 $KJmol^{-1}$

(C) -212.27 $KJmol^{-1}$

(D) 106.14 $KJmol^{-1}$

24) The quantity of charge required to obtain 2 mole of aluminium from Al_2O_3

(A) 3 F

(B) 6 F

(C) 1 F

(D) 2 F

25) In Mercury cell which of the following acts as a Cathode?

(A) Paste of ZnO and Carbon

(B) Zinc and mercury amalgam

(C) Paste of HgO and Carbon

(D) Paste of NH_4Cl and $ZnCl_2$

26) Λ°_{m} for NaCl, HCl and NaAc are 126.4, 425.9 and 91.0 Scm^2mol^{-1} respectively. Calculate Λ° for HAc.

(A) 461.3 Scm^2mol^{-1}

(B) 208.5 Scm^2mol^{-1}

(C) 643.3 Scm^2mol^{-1}

(D) 390.5 Scm^2mol^{-1}

27) Which Nernst equation is correct for the following cell?

$$Al_{(s)} \mid Al^{3+}_{(aq)} \parallel Zn^{2+}_{(aq)} \mid Zn_{(s)}$$

(A) $E_{cell} = E^{0}_{cell} - \frac{0.059}{6} \log \frac{[Al^{3+}]^2}{[Zn^{2+}]^3}$

(B) $E_{cell} = E^{0}_{cell} - \frac{0.059}{6} \log \frac{[Zn^{2+}]^3}{[Al^{3+}]^2}$

(C) $E_{cell} = E^{0}_{cell} - \frac{0.059}{3} \log \frac{[Al^{3+}]^3}{[Zn^{2+}]^2}$

(D) $E_{cell} = E^{0}_{cell} - \frac{0.059}{2} \log \frac{[Al^{3+}]^2}{[Zn^{2+}]^3}$

28) If value of rate constant $K = 2.3 \times 10^{-5}\ L\ mol^{-1}S^{-1}$, then identify the reaction order :

(A) Second order

(B) Third order

(C) First order

(D) Zero order

29) What is the slop of plot between $ln K \rightarrow \frac{1}{T}$ according to Arrhenius equation?

(A) $\frac{-2.303 E_a}{R}$

(B) $\frac{K}{2.303}$

(C) $\frac{-E_a}{R}$

(D) $ln A$

30) A reaction is first order in A and second order in B, How many times the rate constant affected on increasing the concentration of B three times.

(A) 9 times decreases

(B) 9 times increases

(C) 6 times increases

(D) 6 times decreases

31) Which statement is true with respect to catalyst?

(A) Does not alter Gibbs energy

(B) It increases equillibrium constant

(C) It increases value of activation energy

(D) It increases potential energy barrier

32) Which of the relation is correct for zero order reaction?

(A) $t_{\frac{1}{2}} \propto [R]_0^2$

(B) $t_{\frac{1}{2}} \propto \frac{1}{[R]_0^2}$

(C) $t_{\frac{1}{2}} \propto \frac{1}{[R]_0}$

(D) $t_{\frac{1}{2}} \propto [R]_0$

33) What is the magnetic moment of a divalent ion in aqueous solution if its atomic number is 28

(A) 3.87 BM

(B) 2.84 BM

(C) 1.73 BM

(D) 4.90 BM

34) Which transition element does not exhibit variable oxidation states?

(A) Chromium

(B) Nickel

(C) Copper

(D) Scandium

35) What is the formula of Manganate ion?

(A) MnO_2^-

(B) MnO_4^-

(C) MnO_4^{2-}

(D) Mn^{2+}

36) When acidified $K_2Cr_2O_7$ solution is added to Sn^{2+} salt then Sn^{2+} changes to _____.

(A) Sn^{4+}

(B) Sn^{3+}

(C) Sn

(D) Sn^{+}

37) Primary and Secondary valancy of Co in the complex compound $[Co(en)_3]Cl_3$ is respectively _____.

(A) 2, 3

(B) 3, 6

(C) 3, 3

(D) 4, 6

38) $[Co(NH_3)_5Cl]SO_4$ and $[Co(NH_3)_5SO_4]Cl$ are which type of isomers?

(A) Ionisation isomer

(B) Linkage isomer

(C) Solvate isomer

(D) Coordination isomer

39) How many number of unpaired electrons are there in comple: ion $[Ni(CN)_4]^{2-}$

(A) 4

(B) 3

(C) 2

(D) 0

40) Which of the following is an ambidentate ligand?

(A) H_2O

(B) $C_2O_4^{2-}$

(C) SCN^-

(D) $[EDTA]^{4-}$

41) Amongest the following, the most stable complex is _____.

(A) $[Fe(C_2O_4)_3]^{3-}$

(B) $[Fe(NH_3)_6]^{3+}$

(C) $[Fe(H_2O)_6]^{3+}$

(D) $[FeCl_6]^{3-}$

42) Predict the order of reactivity of the following compounds in S_N1 reaction

(i) $CH_3CH_2CH(Br)CH_3$

(ii) $(CH_3)_2CHCH_2Br$

(iii) $(CH_3)_3CBr$

(A) (iii) < (ii) < (i)

(B) (ii) < (i) < (iii)

(C) (i) < (ii) < (iii)

(D) (iii) < (i) < (ii)

43) Which reagent is not used in swartz reaction

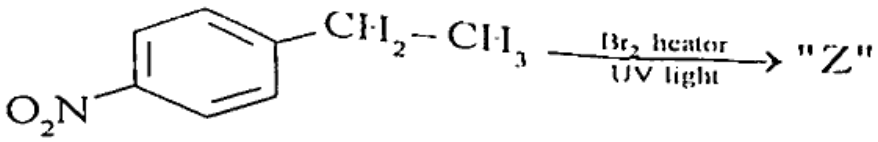
(A) HF

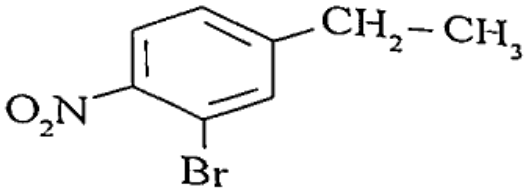
(B) SbF_3

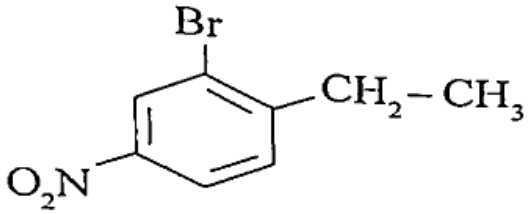
(C) AgF

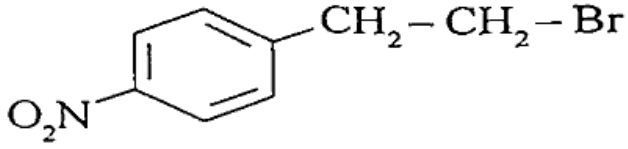
(D) CoF_2

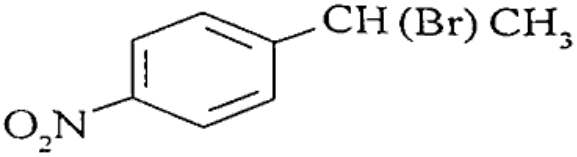
44) Which is the major product "Z" in the following reaction?



(A) 

(B) 

(C) 

(D) 

45) Name the following compounds according to IUPAC system

$(CH_3)_2-CH-CH_2-CH(OH)-CH-(CH_2OH)-CH_3$

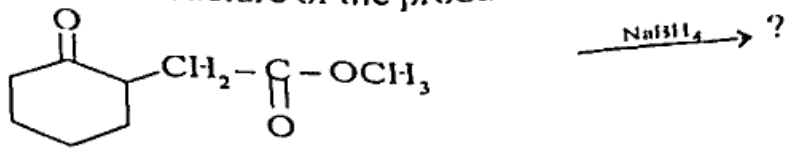
(A) 2, 5 - dimethyl - Hexane - 1, 3 - diol

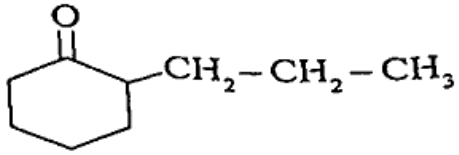
(B) 2 - methyl - 4 - Hydroxy - 5 - (methyl alcohol) Hexane

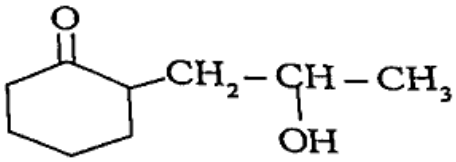
(C) 2, 5 dimethyl - Hexane - 4, 6, diol

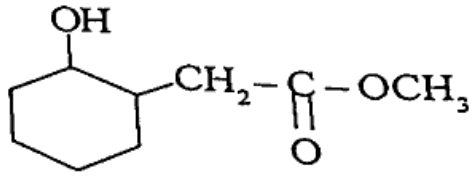
(D) 5 methyl - 3 - Hydroxy - (methyl alcohol) Hexane

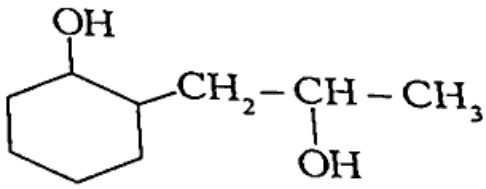
46) Write the structure of the product of the following reaction



(A) 

(B) 

(C) 

(D) 

47) Number of σ (sigma) and π (Pi) bonds are there in Aspirin respectively _____.

(A) 22 and 4

(B) 22 and 5

(C) 21 and 4

(D) 21 and 5

48) Which is the final product of Reimer-Tiemann reaction?

(A) Salicylaldehyde

(B) Aspirin

(C) Salicylic acid

(D) Phenol

49) Predict the products 'X' and 'Y' of the following reaction respectively

$$(CH_3)_3C-OC_2H_5 \xrightarrow{HI} X + Y$$

(A) $(CH_3)_3C-OH + C_2H_5I$

(B) $(CH_3)_3C-I + C_2H_5OH$

(C) $C_4H_{10} + C_2H_6$

(D) $(CH_3)_3C-I + CH_3OH$

50) Which reagent is used in preparation of benzene to benzaldehyde by Gatterman - Koch reaction?

(A) CH_3COCl and anhydrous $AlCl_3$

(B) $SnCl_2$ and HCl

(C) CO, HCl and anhydrous $AlCl_3$

(D) CrO_2Cl_2 and CS_2

052 (E)

(MARCH, 2024)
SCIENCE STREAM
(CLASS - XII)

(Part - B) [Maximum Marks : 50

Time : 2 Hours]

Instructions :

1) Write in a clear legible handwriting.
2) There are three sections in Part - B of the question paper and total 1 to 27 questions are there.
3) All the questions are compulsory. Internal options are given.
4) The numbers at right side represent the marks of the question.
5) Start new section on new page.
6) Maintain sequence.
7) Use of Simple Calculator and log table is allowed, if required.

SECTION - A

■ **Answer any 8 Questions from the following Q.No. 1 to 12 in brief.** **[16]**

(2 marks for each question)

1) Write reaction equation occurs at anode and cathode in Dry Cell.

2) The initial concentration of N_2O_5 in the following first order reaction

$N_2O_{5(g)} \longrightarrow 2NO_{2(g)} + \frac{1}{2}O_{2(g)}$ was 1.24×10^{-2} mol L^{-1} at 318 K. The concentration of N_2O_5 after 60 minutes was 0.20×10^{-2} molL^{-1}. Calculate the rate constant of the reaction at 318K.

3) Explain Lanthanoid contraction.

4) What are iterstitial compounds. Write its any two characteristics.

5) Write main postulates of Werner's theory of coordination compounds.

6) Write the IUPAC names of the following coordination compounds.

i) $K_3[Cr(C_2O_4)_3]$

ii) $[CoCl_2(en)_2]Cl$

7) Explain Finkelstein reaction.

8) Write two step conversion from Benzene to Diphenyl.

9) Explain production of phenol from Cumene.

10) Explain reactivity of aldehyde and Ketones in nucleophilic addition reaction.

11) Explain presence of Five –OH group in structure of glucose.

12) Differentiate between Globular protein and fibrous protein.

SECTION - B

Answer any 6 Questions from the following Q.No. 13 to 21 in detail.

(3 marks for each question) **[18]**

13) Derive equation of Raoult's law for vapour pressure of liquid-liquid solution and give its conclusion.

14) Write the Nernst equation and calculate emf of the following cell at 298K :

$$Pt_{(s)} \left| H_{2(g)} \right| H^{+}_{(0.030M)} \parallel Br^{-}_{(0.010M)} \left| Br_{2(l)} \right| Pt_{(s)}$$

1bar

$$E^{0}_{Br_2|Br^-} = 1.09 \text{ volt}$$

15) The rate constants of a reaction at 500 K and 700K are 0.02 S^{-1} and 0.07S^{-1} respectively. Calculate the values of E_a and A.

[R = 8.314 $JK^{-1}mol^{-1}$]

16) Describe the preparation of potassium dichromate from iron chromite ore. What is the effect of increasing pH on a solution of potassium dichromate.

17) Primary alkyl halide C_4H_9Br (a) reacted with alcoholic KOH to give compound (b). Compound (b) is reacted with HBr to give (c) which is an isomer of (a). When (a) is reacted with sodium metal it gives compound (d), C_8H_{18} which is different from the compound formed when n-butyl bromide is reacted with sodium. Give the structural formula of (a) and write the equations for all the reactions.

18) Write only chemical equation of method of preparation of 1°, 2° and 3° alcohol from Grignard reagent.

19) What is Cross aldol condensation. Write structural formula and name of four possible aldol condensation products from Propanal and Ethanol.

20) Explain Gabriel pthalimide synthesis.

21) Explain reaction of nitrous acid with primary aliphetic Amine and Primary aromatic amine.

SECTION - C

■ **Answer any four Questions from the following Q.No. 22 to 27 in detail.** **[16]**

(4 marks for each question)

22) 4g of benzoic acid (C_6H_5COOH) dissolved in 50g of benzene shows a depression in freezing point equal to 1.62K. Molal depression constant for benzene is 4.9 K $Kgmol^{-1}$. What is the percentage association of acid if it forms dimer in solution? (Molar mass of benzoic acid is = 122 $gmol^{-1}$)

23) What is corrosion. Explain chemistry of corrosion of iron and give its prevention.

24) Derive the formula for Rate constant (K) and half life period ($t_{½}$) for first order reaction.

25) $[CoF_6]^{3-}$ is paramagnetic while $[Ni(CN)_4]^{2-}$ is diamagnetic, explain on the basis of valance bond theory.

26) Give equations of the following reactions

i) When tertiary alcohol heated at 573K inpresence of Copper (Cu)

ii) Bromine in CS_2 with phenol

iii) Dilute HNO_3 with phenol

iv) Oxidation of phenol with chromic acid.

27) Write short note on :

i) Fehling Test

ii) Hell - Volhard - Zelinsky reaction.