(Part - A & Part - B)

Sl.No. 0400068

052 (E)

(MAY, 2021)

SCIENCE STREAM

(CLASS - XII)

(New Course)

Part - A : Time : 1 Hour / Marks : 50

Part - B : Time : 2 Hours / Marks : 50

(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) Which of the following compounds does not give Iodoform test?

(A) Acetophenone

(B) Methyl alcohol

(C) Acetone

(D) Isopropyl alcohol

Rough Work

1

2) Which of the following oxidising agents is used for preparation of benzaldehyde from methyl benzene?

(A) CrO_2Cl_2

(B) $KMnO_4/H_2SO_4$

(C) CrO_3^- H_2SO_4

(D) $K_2Cr_2O_7/H_2SO_4$

3) Which of the following amine compounds reacts with Hinsberg's reagent?

(A) $(CH_3CH_2)_2NCH_3$

(B) $C_6H_5NHCH_3$

(C) $C_6H_5N(CH_3)_2$

(D) $(CH_3)_3N$

4) When product of ammonolysis of benzyl chloride is reacted with two moles of CH_3Cl, what will be the final product?

(A) N,N - dimethyl phenyl methanamine

(B) N - phenyl methanamine

(C) Benzyl amine

(D) Benzenamine

5) Which type of isomerism is present in iso propyl amine and n-propyl amine?

(A) Functional group

(B) Chain

(C) Position

(D) Tautomerism

6) Which of the following compounds is used for preparation of one more carbon containing amine compound?

(A) Nitro compound

(B) Alkyl halide compound

(C) Amide compound

(D) Nitrile compound

7) Which of the following sentence is true?

(A) Glycogen is example of oligosaccharide

(B) Glucose is non reducing sugar

(C) On oxidation, gluconic acid gives saccharic acid

(D) On hydrolysis, starch gives glucose and fructose

8) Which of the following is the structure of D-Glyceraldehyde?

(A) CHO — H—OH — CH_2OH

(B) CHO — HO—H — CH_2OH

(C) Both

(D) None of these

9) Out of following, which property is shown by amino acids?

(A) Acidic

(B) Basic

(C) Neutral

(D) All three

10) Which of the following bases is not present in DNA?

(A) Thymine

(B) Adenine

(C) Cytosine

(D) Uracil

11) Total number of atoms present in Face Centred Cubic unit cell are _____.

(A) 3   (B) 4

(C) 2   (D) 1

12) Which of the following is not a characteristic of crystalline solid?

(A) Melts at a sharp and characteristic temperature

(B) Definite characteristic geometrical shape

(C) Anisotropic in nature

(D) Pseudo solids or super cooled liquids

EWL (04) (New)

4

13) A compound is formed by two elements P and Q. Atoms of the element Q (as anions) make CCP and those of the element P (as cations) occupy all the octahedral voids. What is the formula of the compound?

(A) PQ_2

(B) P_2Q

(C) PQ

(D) P_4Q_3

14) If axial distances $a = b = c$ and axial angles $\alpha = \beta = \gamma \neq 90°$, then crystal system is _____.

(A) Cubic

(B) Rhombohedral or Trigonal

(C) Hexagonal

(D) Triclinic

15) In which solution, solute is liquid and solvent is gas?

(A) Chloroform mixed with nitrogen gas

(B) Ethanol dissolved in water

(C) Camphor in nitrogen gas

(D) Solution of hydrogen in palladium

16) 1.00 g of a non electrolyte solute dissolved in 50g of benzene lowered the freezing point of benzene by 0.40 k. The freezing point depression constant of benzene is 5.12 k kg mol⁻¹. Find the molar mass of the solute.

(A) 280 g mol⁻¹

(B) 356 g mol⁻¹

(C) 562 g mol⁻¹

(D) 256 g mol⁻¹

17) The pressure required for the reverse osmosis is quite high. For this _____ membrane is used.

(A) Cellophane

(B) Parchment

(C) Cellulose acetate

(D) Pig's bladder

18) If 5 gm NaOH is dissolved in 450 ml solution, molarity of solution is _____.

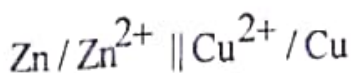$[Na = 23, O = 16, H = 1\ g\ mol^{-1}]$

(A) 27.8 M
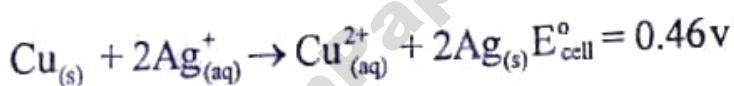
(B) 0.278 M

(C) 2.78 M

(D) 278 M

19) For the following cell, standard electrode potential $\left[E^0_{cell}\right]$ is _____.

$$\left[E^0_{Zn^{2+}/Zn} = -0.76v, E^0_{Cu^{2+}/Cu} = 0.34v\right]$$

$$Zn / Zn^{2+} \| Cu^{2+} / Cu$$

(A) 0.34 v

(B) − 0.76 v

(C) 1.10 v

(D) − 0.42 v

20) In the following reaction, what is the value of equilibrium constant?

$$Cu_{(s)} + 2Ag^+_{(aq)} \rightarrow Cu^{2+}_{(aq)} + 2Ag_{(s)} \quad E^0_{cell} = 0.46v$$

(A) 3.92×10^{10}

(B) 3.92×10^{15}

(C) 39.2×10^{15}

(D) 3.92×10^{14}

21) If a current of 0.5 ampere flows through a metallic wire for 2 hours, then how many coloumbs would have flown through the wire?

(A) 360 C

(B) 3000 C

(C) 36000 C

(D) 3600 C

22) The order of reaction for following value of rate constant is _____.

K = 2.3 × 10⁻⁵ L. Mol⁻¹ Sec⁻¹.

(A) First order

(B) Zero order

(C) Second order

(D) Third order

23) A first order reaction is found to have a rate constant, $K = 5.5 \times 10^{-14} S^{-1}$. The half life of reaction is _____.

(A) $1.26 \times 10^{13} S$

(B) $1.26 \times 10^{14} S$

(C) $6.93 \times 10^{14} S$

(D) $12.6 \times 10^{15} S$

24) What is the wrong equation of rate constant for zero order reaction?

(A) $K = \dfrac{[R]_0 - [R]}{t}$

(B) $[R] = -Kt + [R]_0$

(C) $-K = \dfrac{[R] - [R]_0}{t}$

(D) $[R]_0 + [R] = -Kt$

25) At 298 k temperature, in Nernst equation 0.059 value is of

(A) $\dfrac{RT}{2.303F}$

(B) $\dfrac{2.303RT}{F}$

(C) $\dfrac{RT}{F}$

(D) $\dfrac{2.303R}{TF}$

26) If 22 g benzene is dissolved in 222 g carbon tetra chloride, then concentration in W/W is _____.

(A) 9 %

(B) 90 %

(C) 0.9 %

(D) 0.09 %

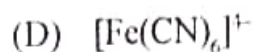**27)** Which of the following is example of sol?
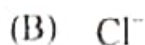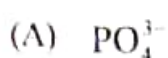
(A) Paint

(B) Fog

(C) Jellies

(D) Milk

28) On the basis of Hardy-Schulze rule, which of the following ion has highest coagulating power for positive sol?

   (A) PO_4^{3-}

   (B) Cl^-

   (C) SO_4^{2-}

   (D) $[Fe(CN)_6]^{4-}$

29) Find out positive charged sol:

   (A) Metal

   (B) Haemoglobin

   (C) Acid Dye stuffs

   (D) Sol of starch

30) Freundlich adsorption isotherm is given by expression:

   (A) $\frac{x}{m} = K$

   (B) $\frac{x}{m} = KP''$

   (C) $\frac{x}{m} = KP^{1/n}$

   (D) $\frac{x}{m} = P$

31) Zone refining method is used for purification of _____ & _____ metals.

   (A) Cu, Si

   (B) Fe, Ge

   (C) In, Ni

   (D) Ge, In

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32) Which of the following is used as depressant in froth floatation method?

(A) NaCN

(B) ZnS

(C) CuS

(D) HCN

33) Peroxo bond is present in

(A) H_2SO_4

(B) H_2SO_3

(C) $H_2S_2O_8$

(D) $H_2S_2O_7$

34) Which of the following compounds has square planar structure?

(A) XeF_4

(B) XeF_2

(C) XeF_6

(D) $XeOF_4$

35) Brown ring test is used for

(A) Cl^-

(B) Br^-

(C) NO_2^-

(D) NO_3^-

36) Cu^{2+} aqueous sol^n has _____ colour.

(A) Blue

(B) Violet

(C) Green

(D) Yellow

37) What is the electronic configuration of Cr?

    (A) $[Ar] 3d^4 4s^2$

    (B) $[Ar] 3d^5 4s^1$

    (C) $[Ar] 3d^5 4s^0$

    (D) $[Ar] 3d^4 4s^0$

38) Which of the following compounds does not show optical activity?

    (A) Cis-$[CrCl_2(OX)_2]^{3-}$

    (B) Cis-$[CoBr_2(en)_2]^+$

    (C) Cis-$[Fe(NH_3)_2(CN)_4]^-$

    (D) Cis-$[PtCl_2(en)_2]^{2+}$

39) Complexes $[Co(NH_3)_5 SO_4]Br$ and $[Co(NH_3)_5 Br]SO_4$ are example of _____ isomerism.

    (A) Ionisation

    (B) Linkage

    (C) Coordination

    (D) Solvate

EWL.

40) Which of the following is not a chelating Ligand?

(A) Oxalato

(B) NH_3

(C) EDTA

(D) Ethane-1,2-diamine

41) Predict the reactivity order of the following compounds towards the S_N^1 reaction.

i) $CH_3CH_2CH_2CH_2Br$

ii) $CH_3CH_2CH(Br)CH_3$

iii) $(CH_3)_3CBr$

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

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

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

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

42) Which of the following reagent is used in preparation of haloalkanes?

(A) $SOCl_2$

(B) KI

(C) $NaNO_2 + HCl$

(D) Cu_2Cl_2

43) What is the product of reaction between chloroethane and sodium metal in dry ether?

(A) Ethane

(B) Methane

(C) Propane

(D) Butane

44) Reaction for preparation of alkyl iodide from alkyl chloride is

(A) Finkelstein reaction

(B) Wurtz-Fittig reaction

(C) Fittig reaction

(D) Swartz reaction

45) From which of the following organic compounds phenol can not be prepared?

(A) Chloro benzene

(B) Isopropyl benzene

(C) Benzene sulphonic acid

(D) Toluene

46) Which of the following has highest value of pKa?

(A) phenol

(B) m-nitro phenol

(C) p-nitrophenol

(D) p-cresol

47) What is the product of Riemer-Tiemann reaction?

(A) Salicylaldehyde   (B) Salicylic acid

(C) Benzoquinone   (D) Picric acid

48) Which is the best reagent for gaining good product of aldehyde from primary alcohol?

(A) $KMnO_4$

(B) PCC

(C) CrO_3

(D) Heating with Cu at 573k

49) Out of the following compounds, which compound gives aldol condensation?

(A) Benzaldehyde

(B) Methanal

(C) 2-methyl pentanal

(D) 2,2- dimethyl butanal

50) What is the correct increasing order of acidity among the following?

(A) $FCH_2CH_2COOH < ClCH_2CH_2COOH < NO_2CH_2CH_2COOH < CH_3CH_2COOH$

(B) $NO_2CH_2CH_2COOH < CH_3CH_2COOH < FCH_2CH_2COOH < ClCH_2CH_2COOH$

(C) $NO_2CH_2CH_2COOH < FCH_2CH_2COOH < ClCH_2CH_2COOH < CH_3CH_2COOH$

(D) $CH_3CH_2COOH < ClCH_2CH_2COOH < FCH_2CH_2COOH < NO_2CH_2CH_2COOH$

052 (E)

(Part - B)

Time : 2 Hours]   [Maximum Marks : 50

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

■ Give answer of any 8 questions out of following question no. 1 to 12 as required. (Each question has 2 marks)   [16]

1) Explain Frankel defect with suitable examples. (Figure is not required)

2) Predict the products of electrolysis in each of the following:

   i)   An aqueous solution of $AgNO_3$ with silver electrodes.

   ii) A dilute solution of H_2SO_4 with platinum electrodes.

3) Write two differences between order of reaction and molecularity.

4) Explain : Brownian Movement.

5) Illustrate calcination method with equations.

6) Mention basicity and oxidation number of phosphorus in phosphinic acid phosphonic acid.

7) Calculate the magnetic moment of a trivalent ion in aqueous solution if its atomic number is 26.

8) Describe concentration of ores on the basis of magnetic property. (Figure is not required)

EWL (04) (New)

9) Write following conversion in two steps:
   Phenol to salicylic acid

10) Explain classification of proteins on the basis of their molecular shape.

11) Describe Hoffmann's bromamide degradation reaction.

12) What happens when D-glucose is treated with HI? Explain with suitable reaction.

SECTION - B

■ Give answer of any 6 questions out of following question no. 13 to 21 as required. (Each question has 3 marks) [18]

13) What is packing efficiency? Calculate packing efficiency in simple cubic lattice. (Figure is required)

14) Write the Nernst equation and calculate potential of the following cells at 298 k.

$Mg_{(s)}/Mg^{2+}$ (0.001M) $\|$ Cu^{2+}(0.0001M)/$Cu_{(s)}$

$E^{\circ}_{Mg^{2+}/Mg} = -2.36v$ and $E^{\circ}_{Cu^{2+}/Cu} = 0.34v$

15) Explain in detail: lyophilic colloids and lyophobic colloids.

16) Describe the preparation of potassium permanganate. How does the acidified permanganate solution react with oxalic acid? Write the ionic equations for the reactions.

17) Discuss the nature of bonding in $K_4[Fe(CN)_6]$ on the basis of valence bond theory.

18) Write the equations for the preparation of 1-iodobutane from
   i) 1-butanol   ii) 1-chlorobutane   iii) but-1-ene

19) Write chemical reactions to affect the following transformations.
   i)   Butanal to butanoic acid
   ii) Acetone to propane
   iii) Benzaldehyde to m-nitro benzaldehyde

20) Arrange the following in increasing order of their basic strength.
   i) $C_6H_5NH_2$, $C_6H_5N(CH_3)_2$, $(C_2H_5)_2NH$
   ii) Aniline, p-nitro aniline, p-toluidine
   iii) $C_6H_5NH_2$, $C_6H_5NHCH_3$, $C_6H_5CH_2NH_2$

21) Write the names of reagents and equations for the preparation of following ethers by Williamson's synthesis:
   i)   1-propoxy propane
   ii) Ethoxy benzene
   iii) 2-methoxy-2-methyl propane

EWL (04) (New)   (P.T.O.)

SECTION - C

■ Give answer of any 4 questions out of following question no. 22 to 27 as required. [16]
(Each question has 4 marks)

22) i) 18 g of glucose $C_6H_{12}O_6$, is dissolved in 1kg of water in a saucepan. At what temperature will the solution boil at 1.013 bar? K_b for water is 0.52 k kg mol^{-1}. [C = 12, H = 1, O =16 g mol^{-1}]

ii) 200 cm^3 of aqueous solution of a protein contains 1.26 g of the protein. The osmotic pressure of such a solution at 300k is found to be 2.57×10^{-3} bar. Calculate the molar mass of the protein.

23) During nuclear explosion, one of the products is ^{90}Sr with half-life of 28.1 years. If 1 μg of ^{90}Sr was absorbed in the bones of a newly born baby instead of calcium, how much of it will remain after 10 years and 60 years if it is not lost metabolically.

24) Describe Deacon's process and electrolytic process for manufacture of chlorine. Write chemical equation of chlorine's reaction with
   i) Cold and dilute NaOH
   ii) Hot and concentrate NaOH

25) Write down the IUPAC name of the following complexes and calculate their magnetic moment.
   i) $K_3[Co(C_2O_4)_3]$
   ii) $Cs[FeCl_4]$

26) Give the structures of A and B in the following reactions.

   i) $CH_3CH_2Br \xrightarrow{KCN} A \xrightarrow[\text{ii) } H_2O]{\text{i) DIBAL-H}} B$

   ii) $C_6H_5NO_2 \xrightarrow{Fe/HCl} A \xrightarrow[\text{Pyridine}]{(CH_3CO)_2O} B$

27) Explain:
   i) Lucas test
   ii) Cannizzaro reaction

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