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

Sl.No. 1100053

052 (E)

(JULY, 2022)
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.

11

(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 compound possess Zwitter ion?

(A) Sulphanilic acid

(B) Salicylic acid

(C) Picric acid

(D) Glutaric acid

Rough Work

2) Which reaction will prove the presence of aldehyde group in glucose?

(A) $C_6H_{12}O_6 + HCN \longrightarrow$

(B) $C_6H_{12}O_6 + HI \xrightarrow{\Delta}$

(C) $C_6H_{12}O_6 + Br_2 \xrightarrow{H_2O}$

(D) $C_6H_{12}O_6 + (CH_3CO)_2O \longrightarrow$

3) _____ is not reducing sugar?

(A) Maltose

(B) Sucrose

(C) Lactose

(D) Amylose

4) Which base is not present in RNA?

(A) Thymine

(B) Adenin

(C) Guanine

(D) Cytosine

Rough Work

5) Which of the following is water soluble vitamin?

(A) A

(B) D

(C) B

(D) K

6) Which polymer is used for non-stick surface coated utensils?

(A) Nylon

(B) Polyacrylonitrile

(C) Teflon

(D) Bakelite

7) Which of the following is semi-synthetic polymer?

(A) Polythene

(B) Buna -S

(C) Cellulose nitrate

(D) Starch

Rough Work

8) Which of the following is true structure of nylon 6,6.

(A) $\left\{NH-(CH_2)_6-NH-CO-(CH_2)_4-CO\right\}_n$

(B) $\left\{CO-(CH_2)_5-NH\right\}_n$

(C) $\left\{NH-(CH_2)_5-NH-CO-(CH_2)_4-CO\right\}_n$

(D) $\left\{NH-CH_2-CO-NH-(CH_2)_5-CONH\right\}_n$

9) Which detergent is used in toothpaste?

(A) Cationic detergent

(B) Non-ionic detergent

(C) Anionic detergent

(D) (A) and (B) both

10) Which type of solid P_4O_{10} is?

(A) Molecular

(B) Ionic

(C) Metallic

(D) Covalent

Rough Work

11) Which of the following is correct for orthorhombic crystal system.

(A) $a = b = c$

(B) $a = b \neq c$

(C) $a \neq b \neq c$

(D) $a \neq b = c$

Rough Work

12) A compound is formed by two elements M and N. The element N forms CCP and atoms of M occupy $\frac{1}{3}$ rd of tetrahedral voids. What is the formula of the compound?

(A) M_3N_2

(B) MN

(C) M_3N

(D) M_2N_3

13) Which compound has following schematic alignment of magnetic moments?

(A) CrO_2

(B) MnO

(C) Fe_3O_4

(D) H_2O

Rough Work

14) 30mL, 0.5M NaOH diluted to 500mL by adding water. What will be molarity of that diluted solution?

(A) 0.05

(B) 0.025

(C) 0.03

(D) 0.015

15) Which of the following is non-ideal solution?

(A) Phenol + Aniline

(B) Benzene + Touene

(C) n-hexane + n-heptane

(D) Bromo ethane + chloro ethane

16) Which solution is isotonic with 0.2M H_2SO_4?

(A) 0.4M HCl

(B) 0.3M HCl

(C) 0.1M HNO_3

(D) 0.2M HNO_3

17) From following which is the example of solution in which solute is gas and solvent is solid?

(A) Aqueous solution of oxygen

(B) Chloroform mixed with nitrogen gas

(C) Camphor in nitrogen gas

(D) Solution of hydrogen in palladium

18) The molar conductivity of 0.025M methanoic acid is 46.1 scm^2mol^{-1}. Calculate its degree of dissociation.
($\lambda°(H^+) = 349.6\ scm^2mol^{-1}$ and $\lambda°(HCOO^-) = 54.6\ scm^2mol^{-1}$)

(A) 0.414

(B) 0.114

(C) 8.767

(D) 7.867

Rough Work

19) How much electricity is required in Faraday to produce 40.0g of Al from molten Al_2O_3? (Atomic mass of Al= 27 g mol^{-1})

(A) 4.44 (B) 2.96

(C) 0.225 (D) 1.48

20) Which compound acts as an oxidising agent in dry cell?

(A) MnO_2

(B) Zn

(C) Mn_2O_3

(D) NH_4Cl

21) Identify the reaction order for which rate constant $K = 2.3 \times 10^{-5}\ Lmol^{-1}s^{-1}$.

(A) Zero

(B) First

(C) Second

(D) Third

Rough Work

22) Which of the following is bimolecular reaction?

(A) $N_2 + 3H_2 \rightarrow 2NH_3$

(B) $2NH_3 \rightarrow N_2 + 3H_2$

(C) $NH_4NO_2 \rightarrow N_2 + 2H_2O$

(D) $2NO + O_2 \rightarrow 2NO_2$

23) What is the slope of the graph $\log\frac{x}{m} \rightarrow \log P$.

(A) $\frac{1}{n}$

(B) n

(C) $\frac{x}{m}$

(D) K

24) Which catalyst is used to get methanal from H_2 and CO?

(A) Ni

(B) $Cu/ZnO - Cr_2O_3$

(C) Cu

(D) Pt

25) Colour of colloidal solution depends on -------

(A) Size of particles

(B) Nature of particles

(C) Position of observer

(D) A, B, C all

Rough Work

26) From following ions which has highest coagulating power for coagulation of As_2S_3?

(A) Na^+

(B) K^+

(C) Ba^{2+}

(D) Al^{3+}

27) Which method is used for purification of Sn metal?

(A) Zone refining

(B) Liquation

(C) Distillation

(D) Vapour phase refining

28) Which impurity is not present in bauxite?

(A) Titanium oxide

(B) Iron oxide

(C) Silicon oxide

(D) Calcium oxide

29) From the following which is strongest reducing agent?

(A) PH_3

(B) NH_3

(C) BiH_3

(D) SbH_3

Rough Work

30) Which oxide of nitrogen is neutral and colourless?

(A) N_2O

(B) N_2O_3

(C) N_2O_4

(D) N_2O_5

31) What is geometric shape of $XeOF_4$?

(A) Distorted octahedral

(B) Square pyramidal

(C) Trigonal bipyramidal

(D) Pyramidal

32) Which catalyst is used in Deacon's process for manufacture of chlorine?

(A) CrO_3

(B) $CuCl_2$

(C) $ZnCl_2$

(D) Sn / HCl

33) From the following which ion has lowest magnetic moment?

(A) Ti^{3+}

(B) Co^{3+}

(C) Cr^{3+}

(D) Fe^{3+}

Rough Wor

34) Which compound's aqueous solution is colourless?

(A) $CuSO_4$

(B) $MnSO_4$

(C) $NiSO_4$

(D) $ZnSO_4$

35) Which ion has highest ionisation enthalpy?

(A) Ti^+

(B) V^+

(C) Cr^+

(D) Mn^+

36) In which complex wavelength of absorbed light is lowest?

(A) $[CO\,Cl\,(NH_3)_5]^{2+}$

(B) $[CO\,(NH_3)_6]^{3+}$

(C) $[CO\,(CN)_6]^{3-}$

(D) $[CO\,(NH_3)_5H_2O]^{3+}$

37) Which type of isomerism is possessed by complexes $[CO\,(NH_3)_5\,SO_4]Br$ and $[CO\,(NH_3)_5Br]SO_4$?

(A) Optical

(B) Geometric

(C) Ionisation

(D) Coordination

Rough Work

8) How many total number of ions will be obtained by ionisation of Iron (III) hexacyanidoferrate (II)?

(A) 4

(B) 7

(C) 5

(D) 3

39) Which compound is optical active?

(A) 2 - bromo butane

(B) 1 - bromo butane

(C) 2 - bromo propane

(D) 1- bromo propane

40) From following which is not allylic halide?

(A) 1 - bromo but - 2 - ene

(B) 3 - bromo - 2 - methyl propene

(C) 1 - bromo - 2 - methyl but - 2 - ene

(D) 4 - bromo but - 1 - ene

41) $CH_3Br + AgF \rightarrow$ Product

What is the name of this reaction?

(A) Finkelstein

(B) Wurtz

(C) Grignard

(D) Swarts

Rough Work

42) Which compound was used as fire extinguisher?

(A) $CHCl_3$

(B) CCl_4

(C) CH_2Cl_2

(D) CH_3Cl

43) Which will be the final product by reaction of formaldehyde with ethyl magnesium bromide?

(A) propane - 1 - ol

(B) propane - 2 - ol

(C) butane - 2 - ol

(D) 2 - methyl propane - 2 - ol

44) With alcoxide ion , which compound will give best result in Williamson synthesis reaction?

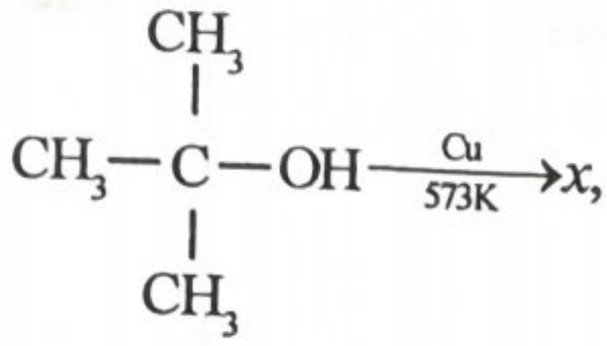
(A) CH_3CH_2Cl

(B) $(CH_3)_2CHCl$

(C) $(CH_3)_3CCl$

(D) $(CH_3CH_2)_2CHCl$

Rough Work

45)  here what will be x product?

(A) 2 - methyl propane -1- ol

(B) propene

(C) 2 - methyl propene

(D) propane -1- ol

46) Which of the following is Cannizzaro reaction?

(A) $2CH_3CHO + \text{dil. } NaOH \longrightarrow$

(B) $2HCHO + \text{conc. } NaOH \xrightarrow{\Delta}$

(C) $2CH_3Cl + 2Na \xrightarrow{\text{ether}}$

(D) $2CH_3OH + Na \longrightarrow$

47) What is common name of $HOOC-(CH_2)_3-COOH$?

(A) Malonic acid

(B) Succinic acid

(C) Glutaric acid

(D) Adipic acid

48) Which of the following is tertiary amine?

(A) $(C_2H_5)_4N^+$

(B) $(C_2H_5)_3N$

(C) $(C_2H_5)_2NH$

(D) $(C_2H_5)_2CHNH_2$

49) For following compounds which is true decreasing order for pKb value?

(A) $C_2H_5NH_2 > C_6H_5NHCH_3 > (C_2H_5)_2NH > C_6H_5NH_2$

(B) $C_2H_5NH_2 > C_6H_5NH_2 > C_6H_5NHCH_3 > (C_2H_5)_2NH$

(C) $C_6H_5NHCH_3 > (C_2H_5)_2NH > C_6H_5NH_2 > C_2H_5NH_2$

(D) $C_6H_5NH_2 > C_6H_5NHCH_3 > C_2H_5NH_2 > (C_2H_5)_2NH$

50) How many Sigma and Pi bonds are present in orange azo dye respectively?

(A) 25, 6

(B) 27, 7

(C) 26, 6

(D) 26, 7

Rough Work

052 (E)

(JULY, 2022)
SCIENCE STREAM
(CLASS - XII)

(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 sections are compulsory. Each section has its general options.
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) Write two differences between Frankel and Schottky defect.

2) Calculate equilibrium constant for the reaction occurring in the following cell at 298 K temperature.

$$Co|Co^{2+}_{(aq)}\|Ni^{2+}_{(aq)}|Ni$$

$$E^{\circ}_{Co^{2+}/Co} = -0.28\,V \quad E^{\circ}_{Ni^{2+}/Ni} = -0.25\,V$$

3) Explain pseudo first order reaction.

4) Describe zone refining method. (Figure is not required)

5) Write Froth floatation method for concentration of ores. (Figure is not required)

6) Draw the geometrical isomers of $[CoCl_2(en)_2]$.

7) Give conversion: Ethene into butane.

8) Give IUPAC name of the following compounds.

i) $CH_3-\underset{\underset{CH_3}{|}}{CH}-\underset{\underset{CH_3}{|}}{N}-CH_3$

ii) $CH_3-CH_2-NHCOCH_3$

9) Write the classification of protein according to molecular shape. 0.5

10) Write reaction to prepare PHBV.

11) Mention the names of monomers of bakelite and its uses. 0.5

12) Explain antioxidants in food. 0.5

SECTION - B

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

3 13) Calculate the efficiency of packing in Body centred cubic structures.

2 14) Derive equation of rate constant for first order reaction.

2 15) Explain dialysis and electrodialysis for purification of colloidal solutions (Figure not required)

16) Draw the structures of orthophosphorous acid, pyrosulphuric acid and chloric acid.

17) Complete the following reactions.

i) $P_4 + HNO_3 \rightarrow$

ii) $C + H_2SO_4 \rightarrow$

iii) $Cl_2 + NaOH$ (Cold and dilute) $\rightarrow$

18) Write reaction to prepare $KMnO_4$ and its two properties. \

19) Explain the reaction Hydroboration oxidation to prepare propan-1-o1 from propene. 0.5

20) Write reactions to obtain acetic acid from ethanenitrile, acetyl chloride and ethyl ethonoate.

21) Give conversion (three steps)

Aniline into 4-Bromo aniline. \

SECTION - C

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

4 22) 2g of benzoic acid (C_6H_5COOH) dissolved in 25g of benzene shows a depression in freezing point equal to 1.62K molal depression constant for benzene is 4.9K kg mol^{-1}. What is the percentage association of acid if it forms dimer in solution? (Molecular mass of benzoic acid is122 $gmol^{-1}$)

1 23) Explain chemistry of corrosion and state two methods to stop corrosion.

24) The rate constant of a reaction at 500K and 700K are 0.02 s^{-1} and 0.07 s^{-1} . respectively. Calculate the value of Ea and what will be the rate constant at 600 K temperature.

1 25) Write Kolbe and Reimer Tiemann reaction of phenol.

26) Explain on the basis of valence bond theory that $[Ni(CN)_4]^{2-}$ ion with square planar structure is diamagnetic and the $[NiCl_4]^{2-}$ ion with tetrahedral geometry is paramagnetic.

2 27) Write the self aldol and cross aldol products of ethanal and propan - 2 - one.

OOOO

23, 25 .