

DELHI PUBLIC SCHOOL

SAIL Township, Ranchi MOCK TEST PAPER

CENTRAL BOARD OF SENIOR SECONDARY EXAMINATION

SET-1

Series CPC

Code No. **16/1/C**

Roll No.

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Candidates must write the Code on
the title page of the answer-book

- Please check that this question paper contains 6 printed pages.
- Code number 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 check that this question paper contains **30** questions.
- Please write down the Serial Number of the question 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:

1. All questions are compulsory.
 2. Question no. 1 to 8 are **very short answer questions** and carry **1 mark** each.
 3. Question no. 9 to 18 are **short answer questions** and carry **2 marks** each.
 4. Question no. 19 to 27 are **also short answer questions** and carry **3 marks** each.
 5. Question no. 28 to 30 are **long answer questions** and carry **5 marks** each
 6. Use log tables if necessary, use of calculators is not allowed.
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Very short answer type question (Q.1 to Q.8)

- Q.1** A and B liquids on mixing produce a warm solution. Which type deviation from Raoult's law is there ? [1]
- Q.2** Why is Ferric chloride preferred over Potassium Chloride in case of a cut leading to bleeding ? [1]
- Q.3** What happens when cane sugar is hydrolysed ? [1]
- Q.4** In solid state PCl_5 behaves as an ionic species give reason [1]
- Q.5** Mention two froth stabilizers used in froth floatation process [1]
- Q.6** Why is sulphuric acid not used during the reaction of alcohols with KI ? [1]
- Q.7** Give the equations of reactions for the preparation of phenol from cumene. [1]
- Q.8** Write the structural formula of 1- phenylpentan-1-one [1]

Short answer type question (Q. 9 to Q.18)

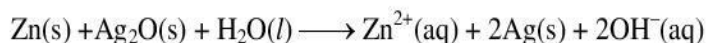
- Q.9** Classify each of the following as being either a p-type or an n-type semi-conductor. Give reason- [2]
(a) Si doped with In (b) Si doped with P
- Q.10** Describe the construction of a H_2-O_2 fuel cell and the reactions taking place in it. [2]
- OR**
- Define the terms given below-
- (a) Conductivity
(b) Molar conductivity
What are their units ?
- Q.11** On dissolving 19.5 g of CH_2FCOOH in 500g of water, a depression of $1^\circ C$ in freezing point of water is observed. Calculate the Van't Hoff factor and dissociation constant of fluoro acetic acid. [2]
Given $K_f = 1.86 K kg mol^{-1}$
- Q.12** (a) Heat of adsorption is greater for chemisorption than for physisorption. Why ? [2]
(b) Mention two common properties of sol and emulsions
(c) Differentiate between electrophoresis and electro-osmosis
- Q.13** Determine the molarity of an antifreeze solution containing 250 g water mixed with 222 g ethylene glycol ($C_2H_6O_2$). The density of this solution is 1.07 g/ml. [2]
- Q.14** (a) State the role of silica in the metallurgy of copper. [2]
(b) Differentiate between roasting and calcinations
- Q.15** Draw the shapes of the following compounds: [2]
(a) SF_4 (b) XeF_2
- Q.16** Explain giving reason [2]
(a) The enthalpies of atomization of the transition metals are high
(b) Transition metals in their many compounds act as good catalyst
- Q.17** Predict, giving reasons, the order of basicity of the following compounds in (i) gaseous phase and (ii) in aqueous solutions [2]
 $(CH_3)_3 N$, $(CH_3)_2 (NH)$, CH_3NH_2 , NH_3
- Q.18** Account for the following : [2]
(a) Aniline does not undergo Friedel Crafts alkylation
(b) Although- NH_2 group is an ortho and para-directing group, nitration of aniline gives alongwith ortho and para-derivatives meta-derivative also.

Short answer type question (Q. 19 to Q.27)

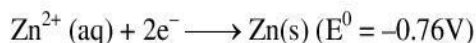
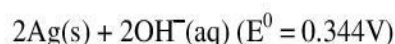
- Q.19** (a) Two electrolytic cells containing silver nitrate solution and dilute sulphuric acid solution were connected in series. A steady current of 2.5 amp was passed through them till 1.078 g of silver was deposited. [$\text{Ag} = 107.8 \text{g mol}^{-1}$, $F = 96,500 \text{C}$]
- (i) How much electricity was consumed ?
(ii) What was the weight of oxygen gas liberated ?
- (b) Give reason-
- (i) The equilibrium constant K is related to E_{cell}^0 and not E_{cell} .
(ii) Conductivity of an electrolytic solution decreases with the decreases in concentration [3]

OR

- (a) What is a fuel cell ? What is its main advantage ?
(b) What are the reactions occurring at the cathode and anode of a Leclanche cell ?
(c) In the button cell widely used for watches and other devices, the following reaction takes place-



Give the cell representation and determine the value of K_c for the above reaction using the following data-



- Q.20** (a) Give one main difference between lyophilic and lyophobic colloids
(b) What is observed when
(i) A beam of light is passed through a colloidal solution.
(ii) Electric current is passed through a colloid solution. [3]

- Q.21** (A) What is denaturation of protein
(B) What is difference between nucleotide & nucleoside
(C) What is isoelectric point [3]

- Q.22** (A) Define the terms thermoset polymer and thermoplastic. Give one example of each
(B) How will you prepare the following ? Give chemical reaction only
(i) PVC (ii) PAN (iii) Terylene (iv) Buna-S [3]

- Q.23** (A) Write the structural formula of the following compounds- [3]
(i) Aspirin (ii) Paracetamol (iii) Bithionol (iv) Chloroxylenol
(B) What are antacids? List some compounds which are used as antacids ?

- Q.24** (a) Among ionic species Sc^{+3} , Ce^{+4} and Eu^{+2} , which one is a good oxidizing agent
 (b) Complete the following reactions: [3]
 (i) $\text{Cr}^{2+} \text{O}_7^{2-} + \text{Sn}^{+2} + \text{H}^+ \rightarrow$
 (ii) $\text{MnO}_4^- + \text{Fe}^{+2} + \text{H}^+ \rightarrow$

- Q.25** (a) Which isomer of $[\text{Co}(\text{en})_2 \text{Cl}_2]^+$ does not show optical isomerism ?
 (b) $[\text{NiCl}_4]^{2-}$ is paramagnetic while $[\text{Ni}(\text{CO})_4]$ is diamagnetic though both are tetrahedral why ? [3]

- Q.26** Explain as to why haloarenes are much less reactive than haloalkanes towards nucleophilic substitution reactions. [3]

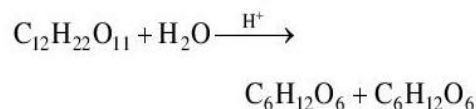
OR

Which compound in each of the following pairs will react faster in $\text{S}_{\text{N}}2$ reaction with OH^- ? Why ?

- (i) CH_3Br or CH_3I
 (ii) $(\text{CH}_3)_3\text{CCl}$ or CH_3Cl
- Q.27** Give chemical tests to distinguish between compounds in each of the following pairs [3]
 (i) Phenol and Benzyl alcohol
 (ii) Butane-2-ol and 2-Methyl propan-2-ol

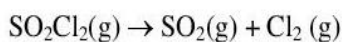
Long answer type question (Q.28 to Q.30)

- Q.28** For the reaction



Write :

- (i) Rate of reaction expression (ii) rate law equation
 (iii) molecularity (iv) order of reaction
 (b) The following data were obtained during the first order thermal decomposition of SO_2Cl_2 at constant volume-



Experiment	Time/s	Total pressure/atm
1	0	0.5
2	100	0.6

Calculate the rate of reaction when total pressure is 0.65 atm. [5]

OR

- (a) Illustrate graphically the effect of catalyst on activation energy.
 (b) Catalysts have no effect on the equilibrium constant. Why ?
 (c) The decomposition of A into product has value of k as $4.5 \times 10^3 \text{ s}^{-1}$ at 10°C and activation energy is 60 kJ mol^{-1} . Calculate the temperature at which the value of k will be $1.5 \times 10^4 \text{ s}^{-1}$

Q.29 (a) Assign reasons for the following: **[5]**

(i) The acidic strengths of acids increases in the order: $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$

(ii) H_3PO_2 behaves as a monoprotic acid

(b) Complete following reactions:

(i) $\text{Pb}(\text{NO}_3)_2 \xrightarrow{\Delta}$

(ii) $\text{XeF}_2 + \text{H}_2\text{O} \longrightarrow$

(iii) $\text{Ca}_3\text{P}_2 + \text{H}_2\text{O} \longrightarrow$

Q.30 (a) How will you bring about the following conversions ?

(i) Ethanol to 3-hydroxybutanal

(ii) Benzaldehyde to Benzophenone

(b) An organic compound A has the molecular formula $\text{C}_8\text{H}_{16}\text{O}_2$. It gets hydrolysed with dilute sulphuric acid and gives a carboxylic acid B and an alcohol C. Oxidation of C with chromic acid also produced B. C on dehydration reaction gives but-1-ene. Write equations for the reactions involved. **[5]**