International Indian School Dammam
Preliminary Examination 2013
Class: XII Subject: Chemistry
SET: A

Time: 3 Hrs **Max Marks: 70**

General Instructions:

i. *All questions are compulsory.*
ii. *Questions 1 to 8 are very short answer type carrying 1 mark each. Answer them in one sentence each.*
iii. *Questions 9 to 18 are short answer type carrying 2 marks each. Answer each of them in about 30 words.*
iv. *Questions 19 to 27 are also short answer type carrying 3 marks each. Answer each of them in about 40 words.*
v. *Questions 28, 29 & 30 are long answer type carrying 5 marks each. Answer each of them in about 70 words.*
vi. *Calculators are not permitted. Use log tables if necessary.*

1 What are F- centres? 1

2 How does slag formation in the blast furnace help extraction of iron from haematite? 1

3 Draw the shape of $(HPO_3)_3$. 1

4 Name the following complex according to IUPAC system: 1
$[Cr\ Cl_2\ (en)_2\ ]_2\ SO_4$

5 Write an example of Finkelstein reaction. 1

6 Arrange the isomeric alcohols having molecular formula $C_4H_{10}O$ in the increasing order of their acidic strength. 1

7 Draw structure of propane 1,2,3 – tri carboxylic acid. 1

8 Name the linkage that joins two monomers in: 1
(i) DNA (ii) Starch

9 100 mg of a protein is dissolved in just enough water to make 10 mL of solution. If this solution has an osmotic pressure of 13.3 mm Hg at 25^0C, what is the molar mass of the protein? ($R = 0.0821\ L\ atm\ K^{-1}\ mol^{-1}$) 2

10 (i) Draw diagram to show variation of molar conductivity with concentration for the electrolytes KCl and CH_3COOH. 2
(ii) Galvanizing iron articles by zinc is preferred to that by tin. Why?

11 (a) Write two differences between Physisorption and Chemisorption. 2
(b) Illustrate the 'selectivity' of a catalyst by using an example.

12 (a) What is the role of graphite rod in the electrometallurgy of aluminium? 2

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24 Arun lives in a township about 10 km away from the Nuclear Pow... t 3
Kalpakkam, Tamilnadu. His friend, Tarun, from Chennai warned him ... health problems due to the power plant. He advised Arun to shift his family to ... place. Answer the following:

(a) Name two fuels which are used in Nuclear power plant.

(b) Name the series where these elements are located in the periodic table.

(c) Why the chemistry of the elements of the above series is complicated?

(d) What are the hazards of nuclear energy on the environment?

(e) What are the values associated with Tarun's advice to Arun?

25 (a) Write two advantages of $H_2 - O_2$ fuel cell over dry cell. 3

(b) Silver is electrodeposited on a metallic vessel of total surface area 900 cm^2 by passing a current of 0.5A for two hours. Calculate the thickness of silver deposited. Given density of silver = 10.5 gcm^{-3}, atomic mass of silver = 108 g mol^{-1} & F =96500 C.

26 (i) Why does sea water have a lower freezing point than fresh water? 3

(ii) Name the mixture and its constituents used in car radiators in very cold places.

(iii) What is the Van't Hoff factor for an organic tribasic acid which is 60% associated?

27 (a) Explain how doping of silicon can produce 'n' and 'p' type semiconductors? 3

(b) Calculate the value of Avogadro's number from the following data:
Rock salt has a typical CCP structure. The distance between Na^+ and Cl^- ions is 281 pm and its density is 2.165 g cm^{-3}. Formula mass of NaCl = 58.5 g mol^{-1}.

OR

(i) In a face centred lattice of X and Y, X atoms are present at the corners while Y atoms are at the face centres. What would be the formula of the compound if one of the X atoms is missing from a corner in each unit cell?

(ii) Ferrous oxide (FeO) has a cubic lattice with a unit cell edge length of 493 pm. Find the number of Fe^{2+} and O^{2-} ions in each unit cell. Formula mass of FeO = 72 g mol^{-1}. Density of FeO is 4.0 g cm^{-3} ; $N_A = 6.02 \times 10^{23}$ mol^{-1}

28 (a) How do you distinguish between acetophenone and benzophenone? 5
(b) Arrange the following in the decreasing order of boiling points:
Butanal, Butan-1-ol, Propanoic acid, n-Pentane, Ethoxy ethane, Butan-2-ol

(c) How would you convert ethanal to?
(i) Propanone (ii) n-Butane (iii) Cinnamaldehyde

OR

(i) Write reactions of cyclohexane carbaldehyde with the following:
(a) PhMgBr and then H_3O^+ (b) Tollen's Reagent
(c) Hydrazine then KOH in boiling glycol.
(ii) Give reasons

29 (a) A poly atomic yellow solid (A) on heating at 1000K gives a paramagnetic speci
(B) which on burning produces a choking compound (C). When (C) is heated in a
in the presence of a heterogeneous catalyst, compound (D) is obtained which is
mixed with (E) to form (F). Dilution of (F) with water produces (E).
Identify (A) to (F).

(b) Give reasons:

(i) Unlike Phosphorus, nitrogen can form several oxides.

(ii) Noble gases are known to form compounds with Fluorine and Oxygen only.

OR

(i) Arrange the following in the increasing order of property indicated:

(a) HOCl, HOBr, HOI ---- Acid strength

(b) NH_3, PH_3, BiH_3, SbH_3 AsH_3 - Reducing character

(ii) Explain the commercial preparation of Nitric acid by Ostwald process.

(iii) Why the preparation of ozone from dioxygen requires silent electrical discharge?

30 (i) What is known as activation energy? How it is related to rate of a reaction? 5

(ii) How the activation energy of a reaction is affected by:

(a) the use of a catalyst and (b) a rise in temperature?

(iii) The decomposition of phosphine proceeds according to the following equation:
$4PH_3 \longrightarrow P_4(g) + 6H_2(g)$ The reaction follows the rate law,
Rate = k $[PH_3]$. The half- life period of PH_3 is 37.9 seconds at 120 ^{0}C.

(a) How much time is required for ¾ of PH_3 to decompose?

(b) What fraction of the original sample of PH_3 remains behind after 1 minute?

OR

(a) Write two differences between order and molecularity.

(b) Exemplify a pseudo first order reaction?

(c) The activation energy of a first order reaction at 300K is 60 kJ mol^{-1}. In the presence of catalyst, the activation energy gets lowered to 50 kJ mol^{-1} at 300K. How many times the reaction rate changes in the presence of catalyst at the same temperature?
[R = 8.314 JK^{-1} mol^{-1}]

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