Ankit Gupta Classes

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GENERAL INSTRUCTIONS:

1) All questions are compulsory.
2) Question No: 1 to 8 are very short answer questions of 1 mark each. They are to be answered in one sentence.
3) Question No: 9 to 18 are short answer questions of 2 **marks each.** They are to be answered in about 30 words each.
4) Question No: 19 to 27 are short answer questions of 3 marks each. They are to be answered in about 50 words each.
5) Question No: 28 to 30 are long answer questions of 5 marks each. They are to be answered in about 70 words each.
6) Use log tables if necessary. Use of calculator is not permitted.

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1) What is the co-ordination number of an atom in a: (1 mark)

   a) Cubic Close-Packed Structure.
   b) Body-centred Cubic Structure.

2) How is the presence of SO_2 detected? (1 mark)

3) Why is H_2SO_4 not used during the reaction of alcohols with KI? (1 mark)

4) Write the product in the following reaction: (1 mark)

$$CH_3—\underset{\displaystyle CH_3}{\underset{|}{CH}}—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_3 \xrightarrow{HBr} \ ?$$

5) Arrange the following in the increasing order of their acidity. (1 mark)

$CH_3—COOH$, $CH_3—CH_2—COOH$, $C_6H_5—CH_2—COOH$, $C_6H_5—COOH$

6) Why are aliphatic amines stronger bases than aromatic amines? (1 mark)

7) What are the monomers of Buna—N? (1 mark)

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8) What are the main constituents of dettol? (1 mark)

9) Write chemical reactions involved in a dry cell. (2 marks)

10) The decomposition of NH_3 on platinum surface is zero order reaction. What are the rates of production of N_2 and H_2 if $K = 2.5 \times 10^{-4}$ mole^{-1} L S^{-1}? (2 marks)

11) What is an adsorption isotherm? Explain Freundlich adsorption isotherm. (2 marks)

12) Explain: (2 marks)

a) Coagulation
b) Dialysis.

13) Bond angle in PH_4 is higher than that in PH_3 why? (2 marks)

14) Actinoid Contraction is greater from element to element than lanthanoid contraction. Why? (2 marks)

15) What are nucleic acids? Mention their two important functions. (2 marks)

16) How do you explain the amphoteric behaviour of amino acids? (2 marks)

"OR"

What happens when D-glucose is treated with (a) HI (b) HNO_3?

17) Write any two differences between addition polymerisation and condensation polymerisation. (2 marks)

18) Explain the following terms with suitable examples: (2 marks)

a) Cationic detergents
b) Anionic detergents

19) An element has a body centred cubic (bcc) structure with a cell edge of 288pm. The density of the element is 7.2 g/cm^3. How many atoms are present in 208 g. of the element? (3 marks)

20) A solution of $Ni(NO_3)_2$ is electrolysed between platinum electrodes using a current of 5 amperes for 20 minutes. What mass of Ni is deposited at the cathode? (3 marks)

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21) The half life for radio active decay of ^{14}C is 5730 years. An archaeological artifact containing wood had only 80% of the ^{14}C found in a living tree. Estimate the age of the sample. (3 marks)

22) Explain zone refining method for the purification of germanium. (3 marks)

23) Explain giving reasons: (3 marks)

a) Transition metals and many of their compounds show paramagnetic behaviour.

b) The transition metals generally form coloured compounds.

"OR"

Explain the preparation of $K_2Cr_2O_7$ from Chromite ore.

24) Aqueous Copper Sulphate solution gives (a) a green precipitate with aqueous potassium fluoride and (b) a bright green solution with aqueous KCℓ. Explain these experimental results. (3 marks)

25) What happens when: (3 marks)

a) n-butyl chloride is treated with alcoholic KOH.

b) Bromo benzene is treated with Mg in the presence of dry ether.

c) Methyl bromide is treated with sodium in the presence of dry ether.

26) Explain the following: (3 marks)

a) Orthonitro Phenol is more acidic than Orthonitro Methoxy Phenol.

b) Ethanol has higher boiling point than methoxy methane.

27) Account for the following: (3 marks)

a) PK_b of aniline is more than that of Methyl amine.

b) Aniline does not undergo Friedel–Crafts reaction.

c) Ethyl amine is soluble in water whereas aniline is not.

28) a) Define Raoult's law. What is meant by positive and negative deviations from Raoult's law and how is the sign of $\Delta_{mix}H$ related to positive and negative deviations from Raoult's law. (4+1=5 marks)

b) What are Colligative Properties? Give an example.

"OR"

a) Boiling point of water at 750mm Hg is 99.63°C; How much sucrose is to be added to 500g. of water such that it boils at 100°C. (3+2=5 marks)

b) What role does the molecular interaction play in a solution of alcohol and water?

29) a) Write balanced chemical equations for the following: (2+3=5 marks)

i) $NaC\ell$ is heated with H_2SO_4 in the presence of MnO_2
ii) $C\ell_2$ gas is passed into a solution of NaI in water

b) Explain the following:

i) Nitrogen gas is chemically inert.
ii) NH_3 form hydrogen bond but PH_3 does not.
iii) O_2 is a gas but sulphur is a solid.

"OR"

a) Give two examples to show that anomalous behaviour of fluorine. (2 marks)

b) H_2S is less acidic than H_2Te. Why? (1 mark)

c) Why is H_2O a liquid and H_2S a gas? (1 mark)

d) Why does NO_2 dimerise? (1 mark)

30) i) Convert the following: (1½x2=3 marks)

a) Ethanol to 3–Hydroxy butanal
b) Benzoic acid to Benzal dehyde.

ii) How will you distinguish between; (2 marks)

a) Propanal and Propanone
b) Phenol and Benzoic acid.

"OR"

i) Give plausible explanation for each of the following: (1½x2=3 marks)

a) Cyclohexazone forms Cyanohydrin in good yield but 2, 2, 6–trimethyl cyclohexanone does not.
b) There are two $-NH_2$ groups in Semicarbazide. However, only one is involved in the formation of Semicarbazones.

ii) Explain aldol condensation with an example. (2 marks)