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ERNAKULAM REGION
FIRST PRE BOARD EXAMINATION (2018-19)
SUBJECT : CHEMISTRY (043)

CLASS : XII Max.Marks : 70

Time Allowed: 3hrs

General Instructions:

(a) All questions are compulsory.
(b) Section A: Q.no. 1 to 5 are very short answer questions and carry 1 mark each.
(c) Section B: Q.no. 6 to 12 are short answer questions and carry 2 marks each.
(d) Section C: Q.no. 13 to 24 are also short answer questions and carry 3 marks each.
(e) Section D: Q.no. 25 to 27 are long answer questions and carry 5 marks each.
(f) There is no overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
(g) Use of log tables if necessary, use of calculators is not allowed.

Section - A

1. Arrange the following in the increasing order of their pKb values : **1**

   $C_6H_5NH_2$, $C_2H_5NH_2$, $C_6H_5NHCH_3$

2. CO (g) and H_2 (g) react to give different products in the presence of different catalysts. **1**
   Which ability of the catalyst is shown by these reactions?

   OR

   What happens when filter paper is soaked in 4% solution of nitro cellulose in a mixture of ether and alcohol?

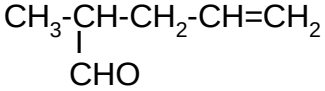
3. Write one chemical test to distinguish between ethanol and methanol. **1**

4. What type of magnetism is shown by a substance if magnetic moments of domains are arranged in same direction? **1**

5. Write the structure of : 4 - methylpent - 3 - en - 2 - one **1**

   OR

   Write IUPAC name of the following compound:



Section - B

6. Account for the following: **2**

   a) Cu^+ ion is not stable in aqueous solutions.

   b) The enthalpies of atomization of the transition metals are high.

OR

Write one similarity and one difference between the chemistry of lanthanoid and actinoid elements:

7. a) Write the chemical equation for the preparation of toluene by Wurtz-Fittig reaction. **2**

   b) Explain why n-butyl bromide has higher boiling point than tert-butyl bromide?

8. (i) Name the branched chain component of starch. **2**

   (ii)Write the name of the linkage joining two nucleotides.

9. State Raoult's law for the solution containing volatile components. Write one difference between an ideal solution and a non-ideal solution. **2**

10. A 0.05M sodium hydroxide solution offered a resistance of 31.6Ω in a conductivity cell at 298K. If the cell constant of the conductivity cell is 0.367 cm^{-1}, find out the conductivity and molar conductivity of the sodium hydroxide solution. **2**

11. a) Write one difference between α-helix and β-pleated sheet structures of protein. **2**

    b) Write the name of the disease caused by the deficiency of vitamin B_{12}.

OR

a) What are the hydrolysis products of Lactose?

b) Why must vitamin C be supplied regularly in diet?

12. Which alkyl halide from the following pair is a) Chiral and b) undergoes faster towards S_N2 reactions? And why? **2**

$$C_6H_5 - CH_2\text{-}Br \quad \text{and} \quad C_6H_5 - \underset{\displaystyle CH_3}{\underset{|}{CH}}\text{-}Br$$

Section - C

13. Write the names and structures of the monomers of the following polymers : **3**

    (i) Terylene (ii) Buna-S (iii) Neoprene

14. An element with density 10 g cm^{-3} forms a cubic unit cell with edge length of $3A^0$. **3**

    What is the nature of the cubic unit cell if the atomic mass of the element is 81u?

15. a) Complete the following reaction and suggest a suitable mechanism for the reaction: **3**

$$CH_3CH_2\text{-}OH \xrightarrow{H^+,\ 443K}$$

    b) Why ortho nitro phenol is steam volatile while para nitro phenol is less volatile.

16. Calculate the time to deposit 1.5 g of silver at cathode when a current of 1.5 A was passed through the solution of $AgNO_3$. (Molar mass of Ag = 108 g mol^{-1}, 1 F = 96500 C mol^{-1}) **3**

17. Outline the principles of refining of metals by the following methods : **3**

(i) Distillation (ii) Zone refining (iii) Electrolysis

OR

(i) Name the method used for refining of titanium.

(ii) What is the role of dilute NaCN in the extraction of gold?

(iii) What is the composition of 'copper matte'?

18. Calculate the freezing point of an aqueous solution containing 10.5 g of Magnesium bromide in 200 g of water, assuming complete dissociation of Magnesium bromide. **3**

(Molar mass of Magnesium bromide = 184 g mol^{-1}, K_f for water = 1.86 K kg mol^{-1}).

19. Explain the following terms with a suitable example for each : **3**

(i) Disinfectants

(ii) Antacids

(iii) Food preservatives

OR

Write the therapeutic action of following on human body and mention the class of drugs to which each of these belong:

(i) Ranitidine (ii) Morphine (iii) Equanil

20. Arrange the following in the order of property indicated for each set: **3**

a) H_3PO_3, H_3PO_4, H_3PO_2 - Increasing reducing character

b) NH_3, PH_3, AsH_3, SbH_3, BiH_3 – Increasing base strength

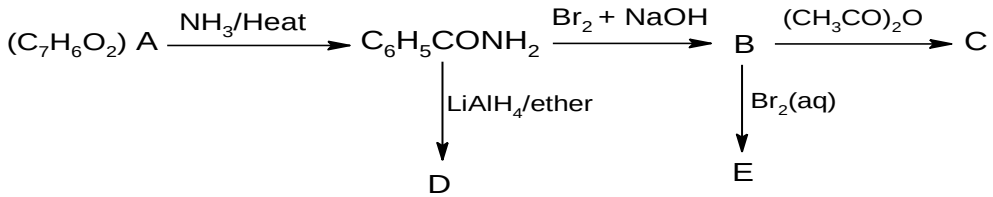
c) F_2, Cl_2, Br_2, I_2 – Increasing bond dissociation enthalpy.

21. Write the structures of the main products when benzene diazonium chloride reacts with the following reagents : **3**

(i) KI (ii) CH_3CH_2OH (iii) Cu/HCl

OR

An aromatic compound 'A' of molecular formula $C_7H_6O_2$ undergoes a series of reactions as shown below. Write the structures of A, B, C, D and E in the following reactions:



22. a) How is double salt different from a complex? **3**

b) Write IUPAC name of the following: i) $K_3[Fe(C_2O_4)_3]$ ii) $[Pt(NH_3)_6]Cl_4$

c) Draw the structure of Cis-isomer of $[Co(NH_3)_4Cl_2]^+$

OR

a) Using IUPAC norms write the formulae for the following coordination compounds:

i) Tetracarbonylnickel (0) ii) Potassium tetracyanidoferrate (II).

b) Using valence bond theory explain the geometry and magnetic behavior of $[Cr(H_2O)_6]^{3+}$ (Atomic No. of Cr = 24)

23. a) Complete the following equation. **3**

i) $4FeCr_2O_4 + 8Na_2CO_3 + 7O_2 \rightarrow$

ii) $Cr_2O_7^{2-} + H_2S \rightarrow$

b) What is lanthanoid contraction?

24. a) Explain what is observed **3**

i) When animal hide is soaked in tannin.

ii) When a beam of light is passed through a gold sol.

b) Name the temperature above which the formation of micelles takes place.

Section - D

25. a) In the reaction: aA + bB → Products; if concentration of A is doubled (keeping B constant), the initial rate becomes four times and if B is doubled (keeping A constant), the rate becomes double. What is the rate law equation and order of the equation? **5**

b) A first order reaction takes 30minutes for 50% completion. Calculate the time required for 90% completion of this reaction. (log2 = 0.3010)

OR

a) Show that in case of a first order reaction, the time required for 99.9% of the reaction to take place is about ten times than that required for half the reaction.

b) The rate of a reaction quadruples when the temperature changes from 293K to 313K. Calculate the energy of activation of the reaction assuming that it does not change with temperature.

26. a) Draw the structure of the following molecules: **5**

i) BrF_3 (ii) $H_2S_2O_7$

b) Assign a reason for each of the following statements.

i) $R_3P{=}O$ exist but $R_3N{=}O$ does not.

ii) Helium is used in diving equipment.

iii) Sulphur has a greater tendency for catenation than oxygen

OR

a) Complete the following chemical reaction equation:

i) $CaF_2 + H_2SO_4 \rightarrow$

ii) $P_{4(s)} + NaOH + H_2O \rightarrow$

iii) $XeF_6 + H_2O_{(excess)} \rightarrow$

b) Draw the structure of the following:

i) $H_2S_2O_8$ ii) $XeOF_4$

27. a) Write the reaction involved in the following : **5**

i) Etard reaction ii) Wolff-Kishner reduction

b) Do the following conversions in not more than two steps:

i) Propene to Acetone

ii) Propanoic acid to 2-hydroxy propanoic acid

iii) Benzoic acid to Benzaldehyde

OR

a) Write the reagents used in the following reactions:

(i) $C_6H_5 - CO - CH_3 \longrightarrow C_6H_5 - CH_2 - CH_3$

(ii) $CH_3 - COOH \longrightarrow CH_3 - COCl$

(iii) $CH_3 - COONa \longrightarrow CH_4$

b) Arrange the following compounds in increasing order of their property as indicated:

(i) CH_3COCH_3, $C_6H_5–CO–C_6H_5$, CH_3CHO (reactivity towards nucleophilic addition reaction)

(ii) 2, 4-Dinitrobenzoic acid, 4-Methoxybenzoic acid, 4-Nitrobenzoic acid (acidic character)