

OBJECTIVE

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that bubble in front of that question number, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question. No credit will be awarded in case BUBBLES are not filled. Do not solve question on this sheet of OBJECTIVE PAPER.

Q.No.1

- (1) The chemist who synthesized urea from ammonium cyanate was:
 (A) Berzelius (B) Kolbe (C) Wholer (D) Lavoisier
- (2) Synthetic rubber is made by polymerization of:
 (A) Chloroform (B) Acetylene (C) chloroprene (D) Divinylacetylene
- (3) Which of the following acids can be used as a catalyst in Friedal-Craft reactions?
 (A) $AlCl_3$ (B) HNO_3 (C) $BeCl_2$ (D) $NaCl$
- (4) The rate of $E1$ reaction depends upon:
 (A) The concentration of substrate (B) The concentration of nucleophile
 (C) The concentration of substrate as well as nucleophile (D) None of these
- (5) Which compound will have maximum repulsion with water?
 (A) CH_3CH_2OH (B) $CH_3CH_2CH_2-OH$ (C) C_6H_5-OH (D) C_6H_6
- (6) Cannizzarro's reaction is not given by:
 (A) Formaldehyde (B) Acetaldehyde (C) Benzaldehyde (D) Trimethylacetaldehyde
- (7) Which of the following compounds will react with Tollen's Reagent?
 (A) CH_3COH (B) CH_3COCH_3 (C) CH_3COOH (D) $CH_3 \cdot CO \cdot CH_2 \cdot CH_3$
- (8) The solution of which acid is used for seasoning of food?
 (A) Formic acid (B) Benzoic acid (C) Acetic acid (D) Butanoic acid
- (9) A carboxylic acid contains:
 (A) A carboxylic group (B) A hydroxyl group (C) Alcoholic group (D) Keto group
- (10) For which crop, ammonium nitrate fertilizer is not used:
 (A) Sugar cane (B) Paddy Rice (C) Cotton (D) Wheat
- (11) Mark the correct statement:
 (A) Metallic character remains same down the group
 (B) Metallic character remains the same from left to right along a period
 (C) Metallic character increases from left to right along a period
 (D) Metallic character increases down the group
- (12) Chile saltpetre has the chemical formula:
 (A) $NaNO_3$ (B) KNO_3 (C) KNO_2 (D) KNO
- (13) Which metal is used in the thermit process because of its reactivity?
 (A) Iron (B) Zinc (C) Aluminium (D) Copper
- (14) Out of all the elements of group VA the highest ionization energy is possessed by:
 (A) N (B) P (C) Sb (D) Bi
- (15) Which of the following hydrogen halide is the weakest acid in the solution?
 (A) HF (B) HBr (C) HI (D) HCl
- (16) Hydrogen Bond is the strongest between the molecules of:
 (A) HI (B) HF (C) HCl (D) HBr
- (17) Which of the following is a non-typical transition element?
 (A) Cr (B) Mn (C) Zn (D) Fe

SUBJECTIVE

NOTE: Write same question number and its part number on answer book,
as given in the question paper.

MTN-41-21
SECTION-I

2. Attempt any eight parts. 8 × 2 = 16
- (i) Define electron affinity with example.
 - (ii) Give two resemblances of Hydrogen with group-IV elements.
 - (iii) Give chemical formula of Chrysoberyl and Asbestos.
 - (iv) Give two advantages of Down's Cell.
 - (v) Write two similarities between Carbon and Silicon.
 - (vi) Which property of Aluminium is useful in flash photography?
 - (vii) Discuss the Chemistry of Borax Bead Test.
 - (viii) How Aqua Regia reacts with Gold?
 - (ix) How Arsenic is removed in contact process?
 - (x) Which raw material is used in the manufacturing of Cement?
 - (xi) Give two benefits of Phosphatic fertilizers.
 - (xii) Why 2% Gypsum is added into Cement?

3. Attempt any eight parts. 8 × 2 = 16
- (i) Name the factors affecting the oxidizing power of halogens.
 - (ii) Write any four properties of HF.
 - (iii) Give reaction of chlorine with cold and hot NaOH.
 - (iv) Define paramagnetic and diamagnetic substances.
 - (v) What are d-d transitions in complexes?
 - (vi) Write objections to Kekule's formula of Benzene.
 - (vii) How is benzene prepared from acetylene?
 - (viii) Give any two applications of iodoform test.
 - (ix) Write two uses of Formaldehyde.
 - (x) What happens when the following compounds are heated?
(a) Calcium Acetate (b) Ammonium Acetate
 - (xi) How acetic acid is converted to ethanol and ethane?
 - (xii) Give reaction to prepare carboxylic acid from Grignard's reagent.

4. Attempt any six parts. 6 × 2 = 12
- (i) What are alicyclic and aromatic compounds, give one example of each.
 - (ii) Define Metamerism, give an example.
 - (iii) State Markownikov's rule. Give one example.
 - (iv) Give the formation of 1, 1 - Dibromoethane from alkyne.
 - (v) How would you prepare the following compounds from ethyl bromide?
(a) Ethyl alcohol (b) Ethyl Cyanide
 - (vi) Define electrophile. Give its examples.
 - (vii) Write down two reactions of alcohol in which C - O bond is broken.
 - (viii) What is Lucas test?
 - (ix) What is Raney Nickel? How it can be prepared?

SECTION-II

- NOTE: Attempt any three questions. 8 × 3 = 24
- 5.(a) Justify the position of hydrogen at top of group IA and IVA. 4
 - (b) Describe occurrence of alkali metals and alkaline earth metals in nature. 4
 - 6.(a) Explain Electrochemical Theory about Corrosion. 4
 - (b) How Sulphuric acid is prepared on commercial scale by contact process? 4
 - 7.(a) What is meant by orbital hybridization? Explain SP³ Hybridization with an example. 4
 - (b) What types of aldehydes give Cannizzaro's reaction? Give its mechanism. 4
 - 8.(a) Describe Kolbe's Electrolytic method with mechanism for the preparation of Ethane. 4
 - (b) Differentiate between S_N1 and S_N2 reactions. 4
 - 9.(a) Explain modern structure of Benzene with atomic orbital treatment. 4
 - (b) How C₂H₅OH is prepared from molasses and starch? Write with balance equation. 4

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Q.No.1

- (1) Which one of the following does not belong to alkaline earth metals?
 (A) *Be* (B) *Ra* (C) *Ba* (D) *Rn*
- (2) Which element forms an ion with charge +3?
 (A) *Be* (B) *Al* (C) *C* (D) *Si*
- (3) Oxidation of *NO* in air produces:
 (A) *N₂O* (B) *N₂O₃* (C) *N₂O₄* (D) *N₂O₅*
- (4) Chlorine heptaoxide (*Cl₂O₇*) reacts with water to form:
 (A) Hypochlorous acid (B) Chloric acid (C) Perchloric acid (D) Chlorine and oxygen
- (5) The anhydride of *HClO₄* is:
 (A) *ClO₃* (B) *ClO₂* (C) *Cl₂O₅* (D) *Cl₂O₇*
- (6) Which of the following is a non-typical transition element?
 (A) *Cr* (B) *Mn* (C) *Zn* (D) *Fe*
- (7) Ethers show the phenomenon of:
 (A) Position isomerism (B) Functional group isomerism (C) Metamerism (D) Cis-trans isomerism
- (8) Preparation of vegetable ghee involves:
 (A) Halogenation (B) Hydrogenation (C) Hydroxylation (D) Dehydrogenation
- (9) Which of the following acid can be used as a catalyst in Friedal-Crafts reactions?
 (A) *AlCl₃* (B) *HNO₃* (C) *BeCl₂* (D) *NaCl*
- (10) For which mechanisms, the first step involved is the same?
 (A) *E₁* and *E₂* (B) *E₂* and *S_N2* (C) *S_N1* and *E₂* (D) *E₁* and *S_N1*
- (11) Which compound is more soluble in water?
 (A) *C₂H₅OH* (B) *C₆H₅OH* (C) *CH₃COCH₃* (D) *n*-Hexanol
- (12) Which of the following will have the highest boiling point?
 (A) Methanal (B) Ethanal (C) Propanal (D) 2-Hexanone
- (13) Which of the following reagents will react with both aldehydes and ketones?
 (A) Grignard's reagent (B) Tollen's reagent (C) Fehling's reagent (D) Benedict's reagent
- (14) Which reagent is used to reduce a carboxylic group to an alcohol?
 (A) $\frac{H_2}{Ni}$ (B) $\frac{H_2}{Pt}$ (C) *NaBH₄* (D) *LiAlH₄*
- (15) Alkanenitriles can be prepared by treating alkyl halide with:
 (A) Alcoholic *KOH* (B) Alcoholic *KCN* (C) Aqueous *KOH* (D) Aqueous *KNO₃*
- (16) Most concentrated solid nitrogen fertilizer is:
 (A) *NH₃* (B) *(NH₄)₂HPO₄* (C) *(NH₂)₂CO* (D) *NH₄NO₃*
- (17) Mark the correct statement.
 (A) *Na⁺* is smaller than *Na* atom (B) *Na⁺* is larger than *Na* atom
 (C) *Cl⁻* is smaller than *Cl* atom (D) *Cl⁻* ion and *Cl* atom are equal in size

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MTN-92-21
SECTION-I

2. **Attempt any eight parts.** $8 \times 2 = 16$
- (i) The first electron affinity of oxygen is negative but the second is positive. Justify it.
 - (ii) Why diamond is bad conductor of electricity but graphite is fairly good conductor of electricity?
 - (iii) What is the significance of KO_2 for mountaineers?
 - (iv) Why is the aqueous solution of Na_2CO_3 is alkaline in nature?
 - (v) How boric acid can be prepared on commercial scale?
 - (vi) Give the names and formulas of different acids of boron.
 - (vii) How does Aluminium react with the following (a) Cl_2 (b) H_2
 - (viii) H_2SO_4 acts as dehydrating agent. Justify giving two reactions.
 - (ix) Complete and balance the following chemical equations:
(a) $KNO_3 + H_2SO_4 \longrightarrow ?$ (b) $NO + Cl_2 \longrightarrow ?$
 - (x) What are macronutrients? Give examples.
 - (xi) Give essential qualities of good fertilizers.
 - (xii) Write the reactions involved in preparation of urea fertilizer.
3. **Attempt any eight parts.** $8 \times 2 = 16$
- (i) Write down the factors on which oxidizing power of halogens depends.
 - (ii) How are HF and HCl prepared?
 - (iii) Complete the following reactions:
(a) $HIO_3 \xrightarrow{240^\circ C}$ (b) $HgO + Br_2 \xrightarrow{50^\circ C}$
 - (iv) Why transition elements have variable oxidation state?
 - (v) What is anode coating?
 - (vi) Write names and formulas of two fused ring hydrocarbons.
 - (vii) Convert benzene into (a) Toluene (b) Cyclohexane
 - (viii) Convert ethene into ethanal.
 - (ix) Distinguish between ethanal and propanone by two chemical tests.
 - (x) Draw formulae for Malonic acid and Phthalic acid.
 - (xi) Write names of esters for Banana and Orange flavours.
 - (xii) What is glacial acetic acid?
4. **Attempt any six parts.** $6 \times 2 = 12$
- (i) Give the importance of catalytic cracking.
 - (ii) What is octane number? How can it be improved?
 - (iii) Give the reaction of Methane with nitric acid.
 - (iv) Discuss the reactivity of Pi-bond.
 - (v) Explain the acidic behaviour of acetylene.
 - (vi) Prepare n -butane by Wurtz Synthesis.
 - (vii) Give the reaction of Alcohol with $SOCl_2$.
 - (viii) Prepare phenol by Dow's Method.
 - (ix) How iodoform reaction helps to distinguish between Methanol and ethanol?

SECTION-II

- NOTE: **Attempt any three questions.** $8 \times 3 = 24$
- 5.(a) Give the differences of Hydrogen with group IA, IVA and VIIA elements in the periodic table. 4
 - (b) Describe the process for the preparation of Sodium Hydroxide on commercial scale. 4
 - 6.(a) Give manufacture of Nitric acid with diagram by Birkeland and Eyde's process. 4
 - (b) What is Corrosion? Explain Electrochemical theory of Corrosion. 4
 - 7.(a) Define Atomic Orbital Hybridization. Explain sp^3 Hybridization. 4
 - (b) Write equations for the reactions of acetaldehyde with: 4
(i) $NaHSO_3$ (ii) $NH_2 - OH$ (iii) $C_2H_5 - OH$ (iv) $NH_2 - NH - C_6H_5$
 - 8.(a) Write down four methods for the preparation of alkenes. 4
 - (b) What are Nucleophilic substitution reactions? Explain S_N2 mechanism. 4
 - 9.(a) Discuss sulphonation and nitration of Benzene with mechanism. 4
 - (b) Discuss industrial preparation of methanol. 4