केवल मूल्यांकनकर्ता के उपयोग हेतु!

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल 32 पृष्ठीय

केवल परीक्षक द्वारा भरा जावे। प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टी करे।

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)	प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)
1			17		
2			18		
3			19		
4			20		
5			21		
6			22		
7			23		
8			24		
9			25		
10			26		
11			27		
12			28		
13					
14					
15			कुल प्राप्तांक शब्दों में		कुल प्राप्तांक अंकों में
16					

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

→ परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे

प्रमाणित किया जाता है कि अन्दर के पृष्ठों के अनुरूप मुख्य पृष्ठ पर अंकों की प्रविष्टी एवं अंकों का योग सही है।

निर्धारित मुद्रा : नाम, पदनाम, मोबाईल नम्बर, परीक्षक क्रमांक एवं पदांकित संस्था के नाम की मुद्रा लगाएं।

उप मुख्य प[illegible]रित मुद्रा

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V.NO 4750

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Question (1) Choose the correct (Answers) :-

(i) Ans :- (g) 8 minutes

(ii) Ans :- (c) Maltase

(iii) Ans :- (g) Acidic

(iv) Ans :- (g) 0.5 M

(v) Ans :- (b) cm^{-1}

(vi) Ans :- (d) Ionisation isomerism

Question (2) Fill in the blanks (Answers) :-

(i) Ans :- hexadentate ligand.

(ii) Ans :- picric acid

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(iii) Ans :- HN_3

(iv) Ans :- more

(v) Ans :- Henry's law.

(vi) Ans :- 96500 C

D
S
E

Question :- 3 True or False (Answers) :-

(i) Ans :- True.

(ii) Ans :- False

(iii) Ans :- False

(iv) Ans :- True

(v) Ans :- False

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(vi) Ans:- Iron

Question (4) Match the pairs (Answers) :-

'A'		'B' (Answer)
(i) Vitamin 'D'	-	(d) Rickets
(ii) Diazonium salts	-	(e) $C_6H_5N_2Cl$
(iii) Hinsberg's reagent	-	(a) $C_6H_5SO_2Cl$
(iv) Vitamin 'B_{12}'	-	(f) Cobalt
(v) Protein	-	(b) Keratin

Question (5) Answer in one word (Answers) :-

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(i) Ans :- $(gm\ eq)^{-1}\ ohm^{-1}\ cm^2$

(ii) Ans :- $(n-2)f^{0-14}\ (n-1)d^{0-1}\ ns^2$

(iii) Ans :- Werner theory.

(iv) Ans :- Formalin is 40% formaldehyde, 56% H_2O and 4% methyl alcohol.

(v) Ans :- Molality is ~~no. of moles present in 1 litre of solution~~ Molality is no. of moles of solute present in 1 kg of sowent $m = \frac{n_B}{M_A(kg)}$

Question 6 (OR) Answer :-

Ionization isomerism :- When two compounds having same molecular mass, on ionization gives different ions in their aqueous solution, ionization isomerism takes place and the compounds are called ionization isomers.

Example :- $[Co(NH_3)_5Br]SO_4$ and $[Co(NH_3)_5SO_4]Br$.

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Question (7) OR Answer :-

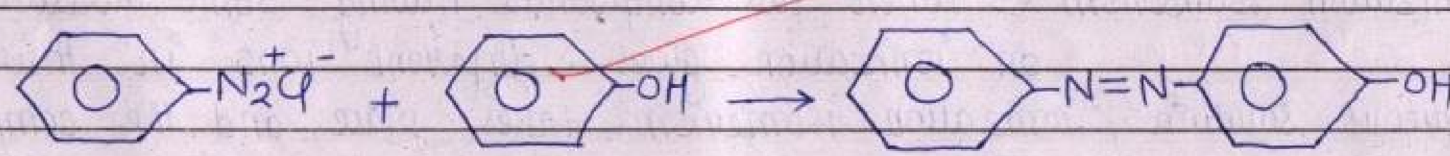
Uses of carbon tetrachloride are :-

1) It is used in the production of Freon (eg. CCl_2F_2) by Swarts reaction.
2) They are used as refrigerant
3) They are used in synthesizing compounds like chloroform, etc

Question (8) OR Answer :-

Coupling reaction of diazonium salt :-

(i) Diazonium salt is reacted with phenol in a suitable medium, then orange dye is obtained.



azo compound (orange)

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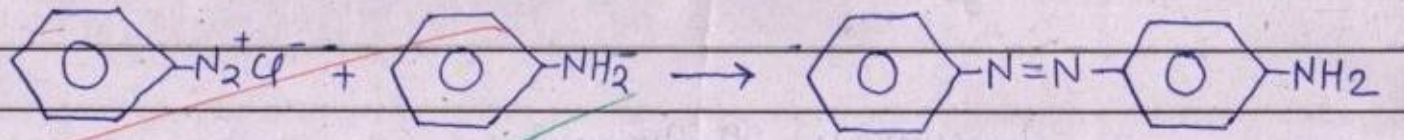
(2) Diazonium salt is reacted with aniline, then yellow dye is obtained



(azo compound)-

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Question (9) Answer :-

Resistivity :- Resistivity is the resistance offered in the path of current when the dimensions of conductor are; length is 1 m and area is $1 m^2$ i.e. dimensions of conductor is unity. It is represented by ρ. Unit of resistivity is ohm-m or Ω (Ω-m).

Question (10) OR Answer :-

Molecularity :- The number of particles (molecules) participating in a chemical reaction or the number of particles colliding effectively to proceed a chemical reaction is called molecularity.

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Molecularity of a reaction can never be zero or fractional (Zero molecularity means no reaction has taken place).

Question (11) OR Answer :-

Transition metals form coloured ions / compounds due to the availability of vacant d orbital due to which d-d transition takes place. The electrons gets excited to the high energy d-orbital and when it goes down it radiates energy of a definite frequency and the colour is shown. This is the reason transition metals form coloured ions / compounds.

Question (12) Answer :-

IUPAC names :-

(i) $K_2[Hg(I)_4]$ = Potassium tetraiodomercurate(II).

(ii) $[Cr(H_2O)_6]Cl_3$ = Hexaaquachromium(III) chloride

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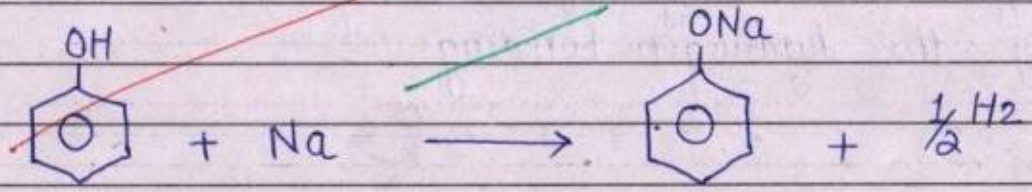
Question (13) Answer :-

(i) Reaction of phenols with sodium :-

Phenols on reacting with sodium metal forms sodium phenoxide and H_2 gas is liberated. This reaction shows the acidic nature of phenol.

Chemical Equation :-



Sodium phenoxide

(Q-13)

(ii) Rimer-Tiemann reaction :-

In this reaction phenol is treated with chloroform and alkaline solution of potassium hydroxide to form salicaldehyde. The attacking reagent in this reaction is the dichlorocarbene $:\ddot{C}Cl_2$. An intermediate is also formed which on hydrolysis gives salicaldehyde.

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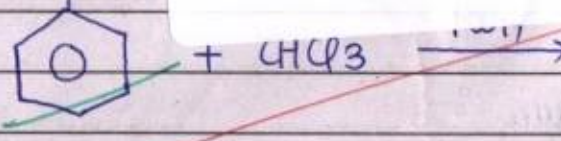
Chemical Equation :-



O-Salicalderyde
(Major)

O-Salicaldehyde is the major product of Riemer-Tiemann Reaction because of the hydrogen bonding.

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Question (14) Answers :-

Enzymes are important biomolecules which is required in body m for metabolism. Enzymes are protein molecules having Specific site for substrate to bind in it. Enzymes increases the rate of reaction drastically.

Properties of Enzymes :-

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(i) Enzymes have catalytic property.
(ii) Enzymes are required in trace quantity.
(iii) They work on the lock and key hypothesis.
(iv) Enzymes are specific in nature.
(v) They remain unchanged after the reaction.

Example :- (1) Enzyme invertase is used in the process inversion of cane sugar.

$$C_{12}H_{22}O_{11} \xrightarrow{\text{Invertase}} C_6H_{12}O_6 + C_6H_{12}O_6$$

Sucrose (Glucose) (Fructose)

(2) Enzyme maltase is used to decompose maltose into glucose.

$$\text{Maltose} \xrightarrow{\text{Maltase}} \text{Glucose}$$

Question (15) OR Answer :-

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Zero order reaction :- Rate does not depend on initial concentration of reactant

Integrated rate equation for zero order is :-

$$A_0 - A = Kt \quad - (i)$$

Here, A_0 = initial concentration of reactant
A = final concentration of reactant
K = rate constant
t = time

Now, Half life :- It is the time in which the conc. concentration ($t_{1/2}$) of reactant becomes half of its initial value.

$$\therefore \quad A = \frac{A_0}{2} \quad -(ii) \text{ in } (t_{1/2})$$

Putting the value of (ii) in eq. (i), we get.

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$$A_0 - \frac{A_0}{2} = Kt_{1/2}$$

$$\frac{A_0}{2} = Kt_{1/2}$$

$$\therefore \boxed{t_{1/2} = \frac{A_0}{2K}}$$

$$\therefore t_{1/2} \propto A_0$$

Hence, it is proved that for a zero order of chemical reaction, half life ($t_{1/2}$) is directly proportional to initial concentration of reactants.

Question (16) Answer :-

d-block elements :- These elements have vacant d-orbital, they are also called transition elements because they act as transit between s-block and p-block. These elements are generally metals. So, the elements having vacant d-orbital present in-between s-block and p-block in periodic table are called

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d-block elements. Zn, Cd, Hg are not considered transition element.

Characteristics of d-block elements :-

(1) d-block elements form coloured complex /ions because of the availability of vacant-d-orbital i.e. d-d transition can take place. Eg:- V^{3+} is green in colour

(2) Transition elements shows variable oxidation state. Eg: Mn shows oxidation state (+2 to +7).

(3) Transition elements form complex coordination compound because of two reasons :-
(i) availability of vacant d-orbital to accept electron-pair from ligand.
(ii) they have small size and more charge.

(4) They are generally metals.

Question (17) Answer :-

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(i) Oxidation of chloroform :-

Chloroform on coming in contact with oxygen and sunlight oxidises to a poisonous gas carbonyl chloride. This is the reason chloroform is kept in coloured bottles.

Chemical equation :- $CHCl_3 + \frac{1}{2}O_2 \xrightarrow{h\nu} COCl_2 + HCl$

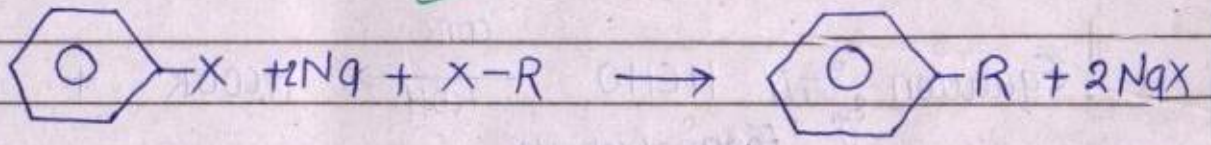
(phosgene)

$COCl_2$ (Carbonyl chloride) is called as phosgene.

(ii) Wurtz - Fittig reaction :-

Alkyl halide and aryl halide on reaction with sodium metal in presence of dry ether combines to form alkylated compound. This reaction is known as Wurtz-Fittig reaction.

Chemical equation :-



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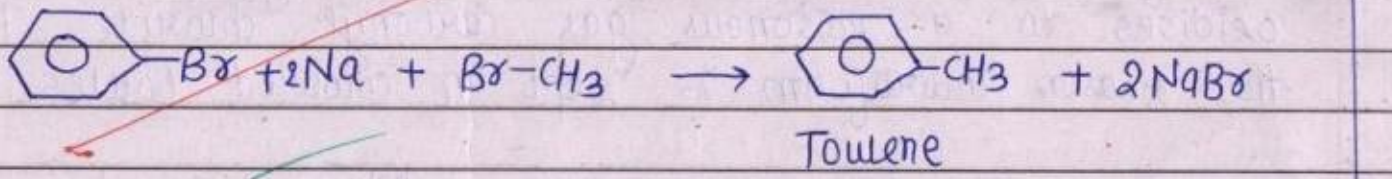
Example :- Bromobenzene reacts with Methyl bromide to give toluene.



Toluene

B S E

Question (18) Answer :-

(i) Cannizaro's reaction :-

In this reaction, carbonyl compound having no α-H on reaction with concentrated base like conc. KOH, 45% NaOH disproportionates i.e. it get oxidised to the corresponding salt and reduced to alcohol. This is a type of Redox reaction.

Equation :- (i) $HCHO \xrightarrow[KOH]{conc.} HCOOK + CH_3OH$

Formaldehyde

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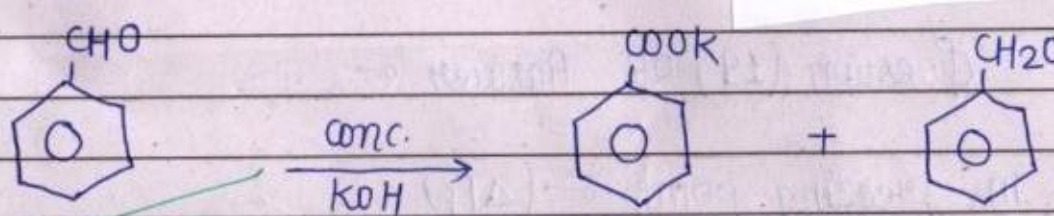
Eg (ii)



(Benzaldehyde)

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(ii) Rosenmound reaction :-

It is an important method of preparation of aldehyde. In this reaction carbonyl chloride is reduced with the help of H catalyst (Lindlar's catalyst) i.e. H2/Pd in to corresponding aldehyde. A po BaSO4 is used as poison to shift equilibrium on right side.

$$R-CH \quad R-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow[BaSO_4]{H_2/Pd} RCHO + HCl$$

Example :- $CH_3\overset{O}{\overset{\|}{C}}-Cl \xrightarrow[BaSO_4]{H_2/Pd} CH_3CHO + HCl$

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Question (19) OR Answer :-

Depression in freezing point :- (ΔT_f)

Whenever a non-volatile solute is mixed in a solution its freezing point decreases and become less than the freezing point of pure solution. This lowering in freezing point is called depression in freezing point.

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∵ The change in freezing point is directly proportional to the molality of solution

$$\therefore \Delta T_f \propto m$$

$$\Delta T_f = K_f m \quad \text{—(i)}$$

$$T_{f_0} - T_f = K_f m$$

Here,

T_{f_0} = freezing point of pure solution

T_f = freezing point after mixing.

K_f = cryoscopic constant

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Now,

$\because$ molality $(m) = \frac{\text{no. of moles of solute}}{\text{Mass of solvent (kg)}}$

$\because \quad m = \frac{n_B}{w_B \times w_A}$ (Here n_B = T

$m = \frac{M_B}{w_B \times w_A}$ — (ii) (Here M_B = molar mass of solute

w_B = Given mass of solute

w_A = molar mass ↳ Given mass of solvent)

Putting the value in eq (i) we get

$\Delta T_f = K_f m$

$$\boxed{\Delta T_f = \frac{K_f M_B}{w_B \times w_A}}$$

M_B = molecular mass of solute.

Here is the expression required.

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Question (20) Answer :—

Kohlrausch's law :—

This law states that at infinite dilution when all the ions dissociate completely, each ion contributes to the molar conductivity of the solution.

At infinite dilution molar conductivity of solution is the sum of molar conductivity of anion and molar conductivity of cation.

$$\Lambda_m^\infty = \Lambda_a^\infty + \Lambda_c^\infty$$

Here, Λ_m^∞ = molar conductivity of solution
Λ_a^∞ = molar conductivity of anion.
Λ_c^∞ = molar conductivity of cation.

Applications of Kohlrausch's law :—

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(1) To calculate molar ~~or molar~~ conductivity at infinite dilution of weak electrolyte :-

At infinite dilution weak electrolyte also dissociates completely into ion so as to calculate its molar conductivity we will take molar conductivity of strong electrolytes and add or subtract them as per requirement to get molar conductivity of weak electrolyte.

For example :- $CH_3COOH \longrightarrow CH_3COO^- + H^+$

$$\lambda_m^\infty(CH_3COOH) \longrightarrow \lambda_m^\infty(CH_3COO^-) + \lambda_m^\infty H^+$$

So we take three electrolytes :-

HCl, CH_3COONa and NaCl

$$\lambda_m^\infty(CH_3COOH) = \lambda_m^\infty(HCl) + \lambda_m^\infty(CH_3COONa) - \lambda_m^\infty(NaCl)$$

$$\therefore \quad \lambda_m^\infty(CH_3COOH) = \lambda_m^\infty(CH_3COO^-) + \lambda_m^\infty H^+$$

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(2) To calculate the dissociation constant for weak electrolytes :-

At infinite dilution = Λm^{∞}

At some concentration = Λm^{c}

let dissociation constant is α,

$$\alpha = \frac{\Lambda m^{c}}{\Lambda m^{\infty}}$$

and $K = c\alpha^2$.