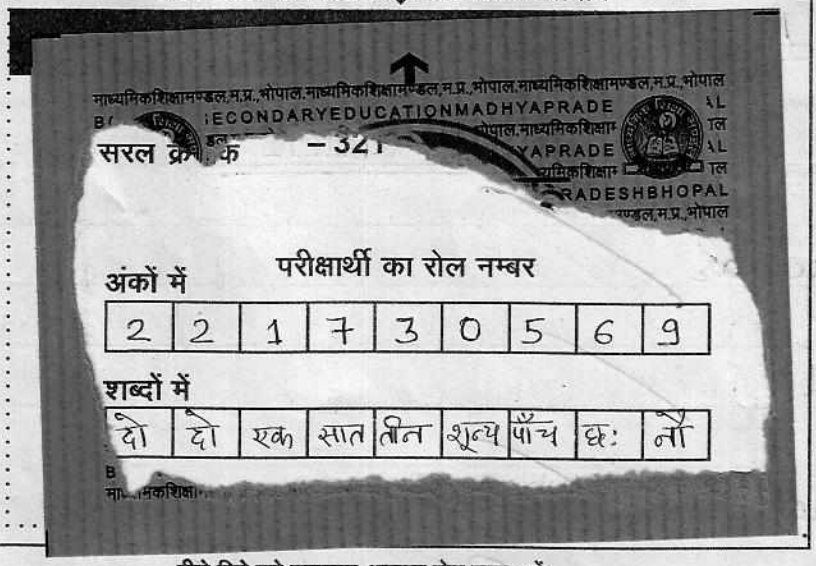
माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

वर्ष 2022

परीक्षार्थी द्वारा भरा जायें ↓

परीक्षा का विषय	विषय कोड			परीक्षा का माध्यम
Chemistry	2	2	0	English

स्टीकर तीर के निशान ↓ से मिलाकर लगायें



नीचे दिये गये उदाहरण अनुसार रोल नम्बर भरें।

उदाहरणार्थ	1	1	2	4	3	9	5	6	8
	एक	एक	दो	चार	तीन	नौ	पाँच	छः	आठ

क – पूरक उत्तर पुस्तिकाओं की संख्या अंको में [X] शब्दों में [X]

ख – परीक्षार्थी का कक्ष क्रमांक [30]

ग – परीक्षा की दिनांक [28] [02] [2022]

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

हायर सेकण्डरी परीक्षा

पर्यवेक्षक का नाम एवं हस्ताक्षर	केन्द्राध्यक्ष/सहायक केन्द्राध्यक्ष के हस्ताक्षर
Smt Neeta Pathak 28.02.22	

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जायें ↓

प्रमाणित किया जाता है कि मूल्यांकन के समय पूरक उत्तर पुस्तिकाओं की संख्या उपरोक्तनुसार सही पाई होलो क्राफ्ट स्टीकर क्षतिग्रस्त नहीं पाया गया अन्दर के पृष्ठों के अनुरुप मुख्य पृष्ठ पर अंकों की प्रविष्टी अंकों का योग सही है।
निर्धारित मुद्रा : नाम, पदनाम, मोबाईल नम्बर, परीक्षक क्रमांक एवं पदाकिंत संस्था के नाम की मुद्रा लगाएं।

उप मुख्य परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा	परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा
H. S. SISODIYA Senior Teacher Govt.H.S.S.Rewas Dewra	मुकेश सोनी वरिष्ठ अध्यापक शा. उ. मा. वि. धमनार

नोट :– ''हायर सेकेन्डरी संकाय के विषयों तथा हाईस्कूल परीक्षा में प्रायोगिक विषय को छो[ड़] [त] एवं स्वाध्यायी छात्रों के लिये प्रश्न पत्र 100 अंकों का होगा किन्[तु] [क] के प्राप्तांक का 80% [अ]
स्वाध्यायी छात्रों को 100 अं[क] [सू]चना में प्रदर्शित किये जायें

केवल परीक्षक द्वारा भरा जायें
प्रश्न क्रमांक के सम्मुख प्राप्ताकों की प्रविष्टी करें

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्ताक (अंको में)
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कुल प्राप्तांक शब्दों में | कुल प्राप्तांक [illegible]

विशेष नोट :– सिलाई खुली हुई अथवा क्षतिग्रस्त उत्तर पुस्तिका को न तो पर्यवेक्षक वितरण करे और न ही छात्र उपयोग में ले। ऐसी उत्तर पुस्तिका में लिखें उत्तरों का मूल्यांकन नहीं किया जायेगा।
परीक्षार्थी द्वारा भरा जायें ↓
केन्द्राध्यक्ष/सहायक केन्द्राध्यक्ष एवं पर्यवेक्षक द्वारा भरा जायें ↓
परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जायें ↓

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Answer of Q.1

choose and write correct options:

(i) (b) Molecular

(ii) (c) CsCl

(iii) (b) Gelatine.

(iv) (a) Hg_2Cl_2

(v) (c) OF_2

(vi) (a) Polyamide.

(vii) (a) Seconal.

Answer of Q.2

Fill in the blanks:

(i) Seven.

(ii) Directly proportional to

(iii) Peptization

(iv) CaF_2

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(v) Chlorine (Cl)

(vi) Tetrafluoroethene ($CF_2=CF_2$)

(vii) Anti Fertility.

Answer of Q.3

Match the pairs:

A		Answers
(i) Glass	-	(g) Amorphous solid.
(ii) Slag	-	(e) $CaSiO_3$
(iii) Square Planer	-	(a) XeF_4
(iv) Neutral ligand	-	(d) CO
(v) Spirit of wine	-	(h) C_2H_5OH
(vi) Primary Amine	-	(c) RNH_2
(vii) Glucose	-	(b) $C_6H_{12}O_6$

Answer of Q.4

Answer in one word/sentence:

(i) $K = Ae^{-Ea/RT}$

(ii) Radon (Rn)

(iii) Benzoin Condensation.

(iv) Because in tertiary amines, nitrogen does not contain any hydrogen atom.

(v) Keratin.

(vi) Ethene $(CH_2 = CH_2)$

(vii) Aspirin (Acetyl salicylic acid)

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Answer of Q.5 (OR)

Molarity -

Molarity is defined as the number of moles of solute present in one litre of solution. It is denoted by M and its unit is mol/Litre.

$$\text{Molarity (M)} = \frac{\text{Number of moles of solute}}{\text{Volume of solution in litre}}$$

$$M = \frac{W_B}{M_B} \times \frac{1}{V\,(\text{in L})} = \frac{W_B}{M_B} \times \frac{1000}{V\,(\text{in ml})}$$

where W_B = weight of solute

M_B = molar mass of solute.

Answer of Q.6 (OR)

Brownian movement -

The zig-zag and continuous motion of colloidal particles is known as Brownian movement. Such movement was first observed by Robert Brown in 1827. Hence, it is known as Brownian movement. According to Weiner, the cause of Brownian movement is the unbalanced collision between molecules of dispersed phase and that of dispersion medium.

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Answer of Q.7 (OR)

In one molecule of sulphur (S_8), there are 8 sulphur atoms. Its molecular mass is very high (256). Octa-atomic sulphur has a puckered ring structure. Hence, it exists in solid state in nature.

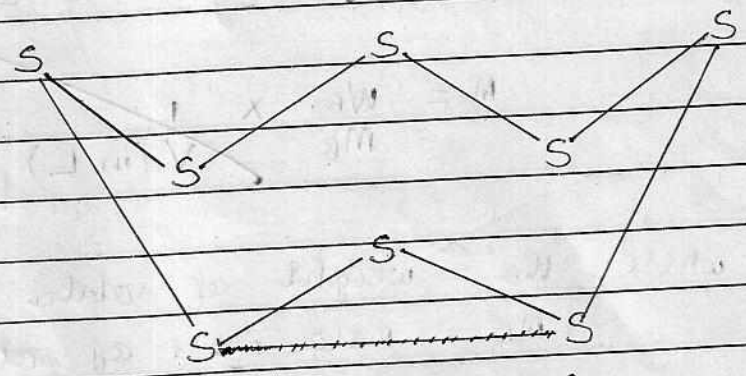

Fig. S_8 molecule

Answer of Q.8 (OR)

Noble gases are inert due to following reasons -

(1) Except Helium, all the noble gases have complete octet i.e, their outermost shells are complete due to which they are very stable. They do not react.

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(2) Noble gases have high ionisation energy. but their electronegativity and electron gain enthalpy are zero. Therefore, they neither accept electron nor release electron. That is why, Noble gases are inert.

Answer of Q.9

Double salt	Complex compound
(1) These dissociate into constituent ions in aqueous solution.	(1) When dissolved in water, they form complex ion.
(2) The physical and chemical properties are similar to properties of constituents.	(2) The physical and chemical properties are quite different from constituents.
(3) The nature of bond is ionic.	(3) There is always a coordinate bond between ligands and central metal ion.
Examples (1) Mohr's salt $FeSO_4.(NH_4)_2SO_4.6H_2O$ (2) $KCl.MgCl_2.6H_2O$ (Carnalite)	Examples: (1) $K_4[Fe(CN)_6]$ Potassium Hexacyanido-ferrate(II)

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Answer of Q.10

Examples of primary amines

(1) CH_3NH_2 (methyl amine or methanamine)

(2) $C_6H_5NH_2$ (Aniline)

(3) $CH_3CH_2NH_2$ (Ethyl amine or Ethanamine)

Examples of secondary amines

(1) $CH_3-NH-CH_3$ (N-methyl methanamine)

(2) $CH_3-CH_2-\underset{\underset{H}{|}}{N}-CH_3$ (N-methyl ethanamine)

Answer of Q.11 (OR)

DNA	RNA
(1) It mainly occurs in the nucleus of the cell.	(1) It occurs in the cytoplasm of the cell.
(2) It contains the sugar - deoxyribose	(2) It contains sugar ribose
(3) It is responsible for transmission of heredity characters.	(3) It helps in protein biosynthesis.

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Answer of Q.12

Two Antibiotics - Penicillin and chloramphenicol.

Answer of Q.13

Given:

Weight of NaCl, $W_B = 5.85$ gm

Weight of water, $W_A = 250$ gm

$\therefore$ moles of NaCl, $n_B = \frac{W_B}{M_B}$

where M_B = molar mass of NaCl

$M_B = 58.5$ g/mol

$$\therefore n_B = \frac{5.85}{58.5} = \frac{58.5}{58.5} \times 10^{-1} = 10^{-1} \text{ moles}$$

Therefore,

molality of solution, $m = \frac{n_B}{W_A} \times 1000$

$$m = \frac{10^{-1}}{250} \times 1000 = 10^{-1} \times 4 \text{ mol/kg}$$

$$\boxed{m = 0.4 \text{ mol/kg}}$$

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Answer of Q.14

Zero order reactions

The reactions in which the rate of reaction is independent of the concentration of reactants are called zero order reactions.

Consider a zero reaction,

$$A \rightarrow \text{Product}$$

Then, Rate of reaction $= K[A]^{0}$

Examples of zero order reactions

(1) $2NH_3(g) \xrightarrow[Pt]{1130K} N_2(g) + 3H_2(g)$

(2) $H_2(g) + Cl_2(g) \xrightarrow{h\nu} 2HCl(g)$

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Answer of Q.15 (OR)

Phenal	Alcohal
(1) It has characteristic phenolic odour and it is sparingly soluble in water.	(1) It has pleasant odour and it is fairly soluble in water.
(2) It is acidic in nature and reacts with base to form salt.	(2) It is neutral in nature and does not react with base.
$C_6H_5OH + NaOH \rightarrow C_6H_5ONa + H_2O$ Phenal	
(3) with PCl_5, It mainly forms triaryl phosphate.	(3) with PCl_5, It forms alkyl ~~halide~~ chloride.
$3C_6H_5OH + PCl_5 \longrightarrow (C_6H_5)_3PO_4$ (Major)	$R-OH + PCl_5 \longrightarrow R-Cl + POCl_3 + HCl$
(4) Violet colour complex is formed when it reacts $FeCl_3$	(4) It does not react with $FeCl_3$.

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Answer of Q.16 (OR)

(i) Perkin reaction

(1) C_6H_5CHO + $CH_3-\overset{O}{\overset{||}{C}}-O-\underset{||}{\underset{O}{C}}-CH_3$ $\xrightarrow{CH_3COONa}$

Benzaldehyde — Acetic anhydride

$C_6H_5CH=CH-COOH$

Cinnamic acid

(ii) Cannizaro reaction

(1) $2C_6H_5CHO$ + $NaOH$ ⟶

Benzaldehyde — Sodium hydroxide

C_6H_5COONa + $C_6H_5CH_2OH$

Sodium Benzoate — Benzyl alcohol

(2) $2H\overset{H}{\overset{|}{C}}O$ + $NaOH$ ⟶

Formaldehyde — Sodium hydroxide

$HCOONa$ + CH_3OH

Sodium Formate — Methyl alcohol

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(iii) Rosenmund reaction

$$R-\overset{O}{\overset{\|}{C}}-Cl + H_2 \xrightarrow[BaSO_4]{Pd} R-\overset{O}{\overset{\|}{C}}-H + HCl$$

Acid chloride — Hydrogen — Aldehyde — Hydrogen chloride

e.g.

$$CH_3-\overset{O}{\overset{\|}{C}}-Cl + H_2 \xrightarrow[BaSO_4]{Pd} CH_3-\overset{O}{\overset{\|}{C}}-H + HCl$$

Acetyl chloride — Acetaldehyde — Hydrogen chloride

Answer of Q.17 (OR)

(i) Fittig reaction

$$C_6H_5-X + 2Na + X-H_5C_6 \xrightarrow{\text{dry ether}}$$

Haloalkane — Sodium — Haloalkane

$$C_6H_5-C_6H_5 + 2NaX$$

Diphenyl — Sodium halide

$X = I, Br$

MPBSE

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(ii) Hunsdiecker reaction

$$C_6H_5-COOAg + Br_2 \xrightarrow{CCl_4} C_6H_5-Br + CO_2 + AgBr$$

Silver Benzoate — Bromine — Bromobenzene — carbon dioxide — Silver bromide

(iii) Sandmeyer's reaction

$$C_6H_5-N\equiv N-Cl + CuX \xrightarrow{HX} C_6H_5-X + N_2 + CuCl$$

Benzene diazonium chloride — cuprous halide — Halobenzene (haloarene) — Nitrogen — cuprous chloride

$X = Cl, Br$

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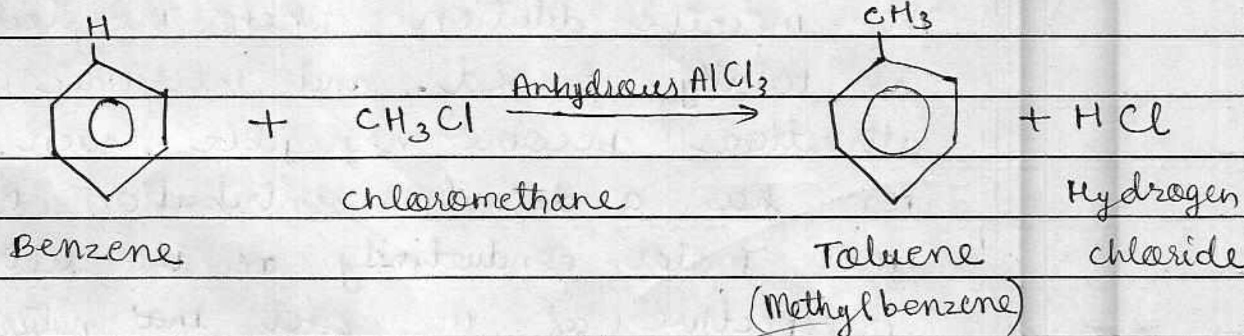
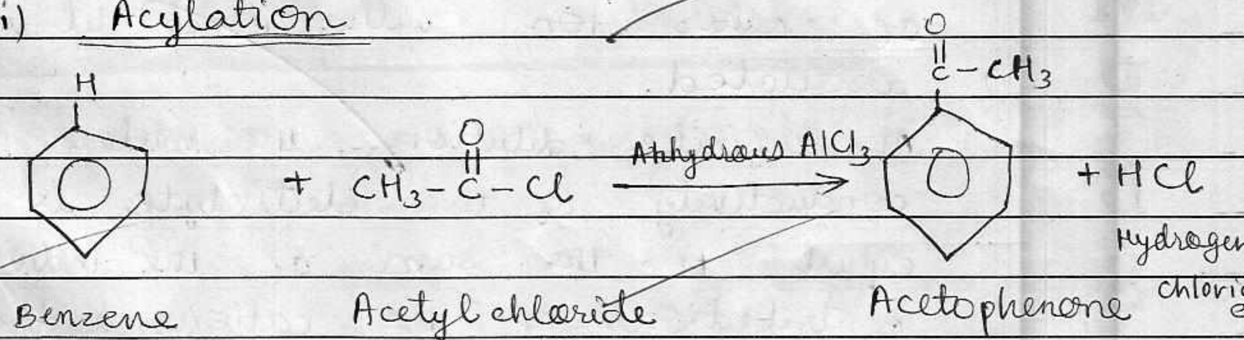
(iv) Friedel crafts reaction

(a) Alkylation



(ii) Acylation



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Answer of Q.18

Kohlrausch law :-

At infinite dilution, when the electrolyte is totally ionised and interionic attractions become negligible, each ion has a definite contribution to the molar conductivity of the electrolyte irrespective of the ~~fact that~~ nature of other ion with which it is associated.

At infinite dilution, the molar conductivity of the electrolyte is equal to the sum of the individual contributions of the cations and anions.

The molar conductivity of electrolyte at infinite dilution is known as limiting molar conductivity.

$$\Lambda^\circ_m = \nu_+ \lambda^\circ_+ + \nu_- \lambda^\circ_-$$

where Λ°_m = limiting molar conductivity of electrolyte or molar conductivity at infinite dilution

λ°_+ = limiting molar conductivity of cation.

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λ°_- = limiting molar conductivity of anion

V_+ = Number of cations

V_- = Number of anions.

This law is known as "Kohlraush law of independent migration of ions".

Applications of Kohlraush law

(1) To determine limiting molar conductivity of weak electrolyte.

The limiting molar conductivity of a weak electrolyte cannot be determined graphically by extrapolation method. But, by using Kohlraush law, the limiting molar conductivity of a weak electrolyte can be calculated from the limiting molar conductivities of strong electrolytes.

Example: The limiting molar conductivity of CH_3COOH (weak electrolyte) can be calculated from limiting molar conductivities of CH_3COONa, HCl and NaCl which are strong electrolytes.

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By Kohlraush law,

$$\Lambda^\circ_m (CH_3COOH) = \lambda^\circ_{CH_3COO^-} + \lambda^\circ_{H^+}$$

And,

$$\lambda^\circ_{CH_3COO^-} + \lambda^\circ_{H^+} = (\lambda^\circ_{CH_3COO^-} + \lambda^\circ_{Na^+}) + (\lambda^\circ_{H^+} + \lambda^\circ_{Cl^-}) - (\lambda^\circ_{Na^+} + \lambda^\circ_{Cl^-}$$

i.e.,

$$\Lambda^\circ_m(CH_3COOH) = \Lambda^\circ_m CH_3COONa + \Lambda^\circ_m (HCl) - \Lambda^\circ_m(NaCl$$

(2) To determine degree of dissociation -

degree of dissociation

$$= \frac{\text{molar conductivity at concentration C}}{\text{molar conductivity at infinite dilution or limiting molar conductivity}}$$

$$\alpha = \frac{\Lambda^c_m}{\Lambda^\circ_m}$$

By Kohlrausch law,

$$\Lambda^\circ_m = v_+ \lambda^\circ_+ + v_- \lambda^\circ_-$$

$$\alpha = \frac{\Lambda^c_m}{v_+ \lambda^\circ_+ + v_- \lambda^\circ_-}$$

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Other examples of Kohlrausch law -

(1) $\Lambda^\circ_{m(LiBr)} = \lambda^\circ_{Li^+} + \lambda^\circ_{Br^-}$

(2) $\Lambda^\circ_{m(NH_4OH)} = \lambda^\circ_{NH_4^+} + \lambda^\circ_{OH^-}$

Answer of Q.19

Lanthanoids	Actinoids
(1) Differentiating or last electron enters in 4f - subshell of (n-2) orbit.	(1) Differentiating or last electron enters in 5f - subshell of (n-2) orbit.
(2) These elements come after Lanthanum, so they are called Lanthanoids.	(2) these elements come after Actinium, so they are called Actinoids.
(3) common oxidation state is +3 and other oxidation states are +2 and +4.	(3) common oxidation state is +3 but other oxidation states are higher i.e, +4, +5, +6 and +7.
(4) Except Promethium (Pm), all the lanthanoids are non-radioactive	(4) All the ~~lanthanoids~~ Actinoids, are radioactive

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Lanthanaids	Actinaids
(5) They have poor tendency to form complexes.	(5) They have greater tendency to form complexes.
(6) They do not form oxocations.	(6) They form oxo-cations like UO^+, NpO^+, PuO^+ etc.
(7) Their compounds are less basic in nature.	(7) Their compounds are more basic in nature.
(8) Except Pm, they are found in nature in abundance.	(8) Most of them are not found in nature and are artificially prepared.
(9) Atomic or Ionic radius decreases gradually and this is called Lanthanaid contraction.	(9) Atomic or ionic radius decreases gradually and steadily and this is called Actinaid contraction.