CHEMISTRY

BOOKS - FULL MARKS CHEMISTRY (TAMIL ENGLISH)

SAMPLE PAPER - 3

Part I Choose The Correct Answer

1. Gibbs free energy change for the electrolysis process is expressed by ..... .

A. $\Delta G^{\circ} = -nFE^{\circ}$

B. $\Delta G^{\circ} = -nF$

C. $\Delta G^{\circ} = -nE^{\circ}$

D. $\Delta G^{\circ} = nFE^{\circ}$

Answer:

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2. Match items in column -I with the items of column -II and assign the correct code,

Column-I		Column-II
A Borazole	1.	$B(OH)_3$
B Boric acid	2.	$B_3N_3H_6$
C Quartz	3.	$Na_2\left[B_4O_5(OH)_4\right]8H_2O$
D Borax	4.	SiO_2

A. $\begin{matrix} A & B & C & D \\ 2 & 1 & 4 & 3 \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ 1 & 2 & 4 & 3 \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ 1 & 2 & 4 & 3 \end{matrix}$

D. None of these

Answer:

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3. Shape of ClF_3 is

A. Linear

B. T-shape

C. Pyrimidal

D. Square planar

Answer:

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4. The catalytic behaviour of transition metals and their compounds is ascribed mainly due to

A. their magnetic behaviour

B. their unfilled d orbitals

C. their ability to adopt variable oxidation states

D. their chemical reactivity

Answer:

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5. Which one of the following pairs represents linkage isomers?

A. $\left[Cu(NH_3)_4\right]\left[PtCl_4\right]$ and $\left[Pt(NH_3)_4\right]\left[CuCl_4\right]$

B.

$\left[Co(NH_3)_5(NO_3)\right]SO_4$ and $\left[Co(NH_3)_5(ONO)\right]$

C.

$\left[Co(NH_3)_4(NCS)_2\right]Cl$ and $\left[Co(NH_3)_4(SCN)_2\right]Cl$

D. both (b) and (c)

Answer:

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6. Each atom in the corner of the cubic unit cell is shared by how many unit cells?

A. (a) 8

B. (b) 6

C. (c) 1

D. (d) 12

Answer:

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7. The rate constant of a reaction is $5.8 \times 10^{-2} s^{-1}$. The order of the reaction is

A. First order

B. zero order

C. Second order

D. Third order

Answer:

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8. The hydrogen ion concentration of a buffer solution consisting of a week acid and its salts is given by

A. $\left[H^{+}\right]=\frac{K_a[\text{acid}]}{[\text{salt}]}$

B. $\left[H^{+}\right]=K_a[\text{salt}]$

C. $\left[H^{+}\right]=K_a[\text{acid}]$

D. $\left[H^{+}\right]=\frac{K_a[\text{salt}]}{[\text{acid}]}$

Answer:

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9. Kohlrausch's law is applied to calculate .....

A. (a) Molar conductance at infinite dilution of a weak electrolyte.

B. (b) Degree of dissociation of weak electrolyte.

C. (c) solubility of a sparingly soluble salt.

D. (d) All the above.

Answer:

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10. For freundlich isotherm a graph of $\log\frac{x}{m}$ is plotted against log P. The slope of the line and its y-axis intercept respectively corresponds to ..... .

A. (a) $1/n, k$

B. (b) $\log 1/n, k$

C. (c) $1/n, \log k$

D. (d) $\log 1/n, \log k$

Answer:

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11. The reaction of sodium methoxide with ethyl bromide follows .....

A. (a) S_N1 mechanism

B. (b) S_N2 mechanism

C. (c) E_1 reaction

D. (d) E_2 reaction

Answer:

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12. In which of the following reactions new carbon - carbon bond is not formed?

A. Aldol condensation

B. Friedel craft reaction

C. Kolbe's reaction

D. Wolf kishner reduction

Answer:

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13. The reagent used to convert Nitromethane to methyl amine is ..... .

A. (a) Zn / NH_4Cl

B. (b) Sn / HCl

C. (c) H_2SO_4

D. (d) $H_2S_2O_8$

Answer:

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14. If one strand of the DNA has the sequence 'ATGCTTGX, then the sequence of complementary strand

would be

A. TACGAACT

B. TCCGAACT

C. TACGTACT

D. TACGRAGT

Answer:

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15. The ratio between the maximum tolerated dose of a drug and minimum curative dose is called ..... .

A. (a) Iso electric point

B. (b) therapeutic index

C. (c) Critical point

D. (d) Isothermal point

Answer:

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Part Ii Answer The Questions

1. Describe the role of Sodium cyanide in froth floatation.

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2. Which is more stables ? Fe^{3+} or Fe^{2+} - explain .

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3. Write brifly about of the applications of coordination compouds in volumetric analysis.

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4. Classify the following solids

(a) P_4

(b) Brass

(c) Diamond

(d) NaCl

(e) Iodine

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5. A lab assistant prepared a solution by adding a calculated quantity of HCI gas $25^{\circ}C$ to get a solution with $\left[H_3O^{+}\right] = 4 \times 10^{-5}$M. Is the solution neutral (or) acidic (or) basic.

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6. 0.1M copper sulphate solution in which copper electrode is dipped at $25^{\circ}C$. Calculate the electrode

potential of copper.

[Given: $E^{\circ}_{Cu^{2+}|Cu} = 0.34$]

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7. Can we use nucleophiles such as NH_3, CH_3O for the Nucleophilic substitution of alcohols.

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8. Aniline does not undergo Friedel - Crafts reaction. Explain.

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9. What are hormones? Give examples.

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Part Iii Answer The Questions

1. Write a note on zeolites.

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2. What is Royal water? Mention its uses.

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3. $\left[Ni(CN)_4\right]^{2-}$ is diamagnetic ,while $\left[NiCl_4\right]^{2}-$ is paramagnetic ,explain using crystal field theory.

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4. Calculate the number of atoms per unit cell of bcc type.

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5. Identify the order for the following reactions

(i) Rusting of Iron

(ii) Radioactive disintegration of $_{92}U^{238}$

(iii) $2A + B \rightarrow$ products, rate $= k[A]^{1/2}[B]^{2}$

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6. Calculate the (i) hydrolysis constant, (ii) degree of hydrolysis and (iii) pH of 0.05M sodium carbonate solution pK_a for HCO_3^- is 10.26.

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7. Write the structure of the aldehyde, carboxylic acid and ester that yield 4-methylpent-2-en-1-ol.

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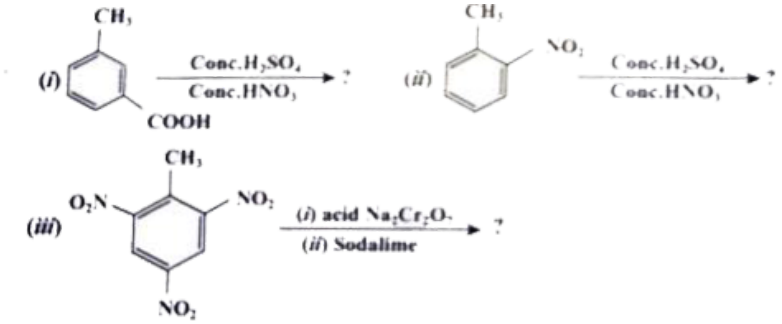
8. Predict the major product that would be obtained on nitration of the following compounds.



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9. What are the biological functions of nucleic acids?

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Part Iv Answer The Questions

1. (i) Explain the observations from the Ellingham diagram.

(ii) Write a short note on anamolous properties of the first element of p-block.

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2. (i) Write the products formed in the reaction of concentrated nitric acid with zinc.

(ii) d-block elements readily form complexes. Give reason.

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3. (i) Write the IUPAC names for the following complexes.

1. $Na_2[Ni(EDTA)]$ 2. $\left[Co(en)_3\right]_2(SO_4)_3$

(ii) What is meant by piezo electricity?

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4. (i) Consider the oxidation of nitric oxide to form NO_2

$2NO_{(g)} + O_{2(g)} \rightarrow 2NO_{2(g)}$

(a) Express the rate of the reaction in terms of changes in the concentration of NO, O_2 and NO_2.

(b) At a particular instant, when $[O_2]$ is decreasing at 0.2mol $L^{-1}s^{-1}$ at what rate is $[NO_2]$ increasing at that instant?

(ii) Classify the following as acid (or) base using

Arrhenius concept

1. HNO_3 2. $Ba(OH)_2$ 3. H_3PO_4 4. CH_3COOH

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5. Derive an expression for Nernst equation.

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6. Describe adsorption theory of catalysis.

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7. (i) What is the major product obtained when two moles of ethyl magnesium bromide is treated with methyl benzoate followed by acid hydrolysis.

(ii) What are essential and non-essential amino acids? Give one example of each type.

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8. How are the following conversions effected

1. propanal into butanone

2. Hex-3-yne hexan-3-one

3. phenylmethanal into benzoic acid

4. phenylmethanal into benzoin

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9. Identify A to E in the following frequency of reactions.

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10. (i) What are the biological importance of proteins?

(ii) Name one substance which can act as both analgesic and antipyretic.

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