

18/08/2022

Slot-1



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Answers & Solutions

Time : 45 min.

M.M. : 200

for CUET UG-2022

(Chemistry)

IMPORTANT INSTRUCTIONS:

1. The test is of 45 Minutes duration.
2. The test contains 50 Questions out of which 40 questions need to be attempted.
3. Marking Scheme of the test:
 - a. Correct answer or the most appropriate answer: Five marks (+5)
 - b. Any incorrect option marked will be given minus one mark (–1).
 - c. Unanswered/Marked for Review will be given no mark (0).

Choose the correct answer :

Question ID: 692731

Atoms of B forms fcc lattice and those of element A occupy alternate tetrahedral voids. The formula of the compound formed by elements A and B

- (A) AB_2 (B) A_2B
(C) AB (D) A_2B_3

Answer (C)

Sol. $B \text{ (FCC)} = \frac{1}{8} \times 8 + \frac{1}{2} \times 6 = 4$

A (alternate tetrahedral voids) = 1×4

A : B

4 : 4

\therefore Formula of compound is AB.

Question ID: 692732

Which amongst the following compounds is a diamagnetic compound?

C_6H_6 , CrO_2 , MnO , $MgFe_2O_4$

- (A) CrO_2 (B) C_6H_6
(C) MnO (D) $MgFe_2O_4$

Answer (B)

Sol. CrO_2 : Ferromagnetic

C_6H_6 : Diamagnetic

MnO : Antiferromagnetic

$MgFe_2O_4$: Ferrimagnetic

Question ID: 692733

Match list I with list II.

	List-I Type of unit cell		List-II Number of lattice points
A.	Primitive unit cell	I.	9
B.	Body centred unit cell	II.	8
C.	Face centred unit cell	III.	10
D.	End centred unit cell	IV.	14

Choose the correct answer from the option given below.

- (A) A-II, B-IV, C-I, D-III (B) A-II, B-I, C-IV, D-III
(C) A-III, B-I, C-IV, D-II (D) A-IV, B-I, C-II, D-III

Answer (B)

Sol.	Unit cell	Atoms present at	Lattice points
	Primitive unit cell	Corners	8
	Body centred unit cell	Corners + body centre	9
	Face centred unit cell	Corners + face centre	14
	End centred unit cell	Corners + alternate face centres	10

Question ID: 692734

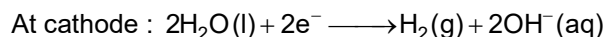
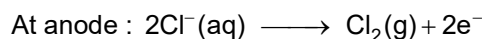
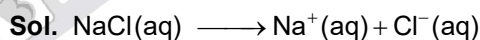
During electrolysis of aqueous sodium chloride

- A. Sodium metal is obtained at anode
B. Hydrogen is evolved at cathode
C. Oxygen is evolved at anode
D. Oxygen is evolved at cathode
E. Chlorine is evolved at anode

Choose the correct answer from the option given below.

- (A) B, E only (B) A, E only
(C) B, D only (D) B, C only

Answer (A)



Question ID: 692735

When a lead storage battery is recharged

- A. Pb acts as cathode
B. PbO_2 acts as anode
C. H_2SO_4 is produced
D. 38% NH_4Cl is used as electrolyte
E. Lead storage cell has a longer life than nickel-cadmium cell

Choose the correct answer from the option given below.

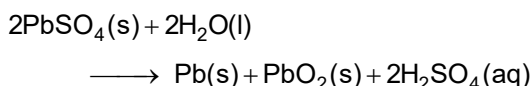
- (A) A only (B) B only
(C) C only (D) D, E only

Answer (C)

Sol. On recharging lead storage battery,

Cathode and anode \rightarrow PbSO_4

Net reaction :



Electrolyte \rightarrow 38% H_2SO_4 solution

- Nickel - cadmium cell has longer life than lead - storage cell.

Question ID: 692736

Molar conductivity of _____ increases drastically on dilution.

- (A) NH_4Cl (B) NaCl
(C) CH_3COOH (D) CH_3COONa

Answer (C)

Sol. • Molar conductivity of weak electrolyte (CH_3COOH) increases drastically on dilution because of increase in number of ions.

- All salts are strong electrolyte.

Question ID: 692737

When temperature changes from 293 K to 313 K, the rate of reaction

- (A) Remains same (B) Gets halved
(C) Gets doubles (D) Gets quadruples

Answer (D)

Sol. Temperature is increased from 293 K to 313 K

$$n = \frac{313 - 293}{10} = 2$$

$$\text{Rate} = 2^n = 2^2 = 4 \text{ times}$$

Question ID: 692738

The decomposition of dimethyl ether leads to formation of CH_4 , H_2 and CO . The reaction rate is given by

$$\text{Rate} = k[\text{PCH}_3\text{OCH}_3]^{3/2}$$

If pressure is measured in bar and time in minutes, what is the unit of rate constant?

- (A) $\text{bar}^{-1/2} \text{min}^{-1}$ (B) $\text{bar}^{3/2} \text{min}^{-1}$
(C) $\text{bar}^{-1} \text{min}^{-1}$ (D) $\text{bar}^{-3/2} \text{min}^{-1}$

Answer (A)

$$\text{Sol. Rate} = k[\text{PCH}_3\text{OCH}_3]^{3/2}$$

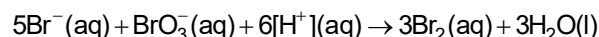
$$\text{Order of reaction} = \frac{3}{2}$$

$$\text{Unit of } k = \frac{\text{bar}}{\text{min}} \frac{1}{\text{bar}^n} = \frac{\text{bar}}{\text{min}} \frac{1}{\text{bar}^{3/2}}$$

$$k = \text{bar}^{-1/2} \text{min}^{-1}$$

Question ID: 692739

Which of the following expression is correct for the rate of reaction given below:



$$(A) \frac{\Delta[\text{Br}^-]}{\Delta t} = 5 \frac{\Delta[\text{H}^+]}{\Delta t}$$

$$(B) \frac{\Delta[\text{Br}^-]}{\Delta t} = \frac{6}{5} \frac{\Delta[\text{H}^+]}{\Delta t}$$

$$(C) \frac{\Delta[\text{Br}^-]}{\Delta t} = \frac{5}{6} \frac{\Delta[\text{H}^+]}{\Delta t}$$

$$(D) \frac{\Delta[\text{Br}^-]}{\Delta t} = 6 \frac{\Delta[\text{H}^+]}{\Delta t}$$

Answer (C)

$$\text{Sol. Rate} = \frac{-1}{5} \frac{\Delta[\text{Br}^-]}{\Delta t} = \frac{-\Delta[\text{BrO}_3^-]}{\Delta t} = \frac{-1}{6} \frac{\Delta[\text{H}^+]}{\Delta t}$$

$$= \frac{1}{3} \frac{\Delta[\text{Br}_2]}{\Delta t} = \frac{1}{3} \frac{\Delta[\text{H}_2\text{O}]}{\Delta t}$$

$$\frac{\Delta[\text{Br}^-]}{\Delta t} = \frac{5}{6} \frac{\Delta[\text{H}^+]}{\Delta t}$$

Question ID: 6927310

Which of the following will not cause coagulation of a colloid?

- (A) Electrophoresis
(B) Addition of peptizing agent
(C) Boiling
(D) Persistent dialysis

Answer (B)

Sol. Peptizing agent is the electrolyte used for converting a precipitate into colloidal sol and this method is used to prepare colloidal solution.

Question ID:6927311

Match List-I with List-II.

	List-I State of dispersed phase and dispersion medium		List-II Example of colloidal system
a.	Dispersed phase : Solid Dispersion medium : Liquid	I.	Soap lather
b.	Dispersed phase : Liquid Dispersion medium : Solid	II.	Paints
c.	Dispersed phase : Gas Dispersion medium : Liquid	III.	Pumice stone
d.	Dispersed phase : Gas Dispersion medium : Solid	IV.	Jellies

Choose the correct answer from the options given below:

- (A) a-III, b-IV, c-II, d-I (B) a-IV, b-I, c-III, d-II
(C) a-II, b-IV, c-I, d-III (D) a-I, b-II, c-IV, d-III

Answer (C)

Sol.

Dispersed phase	Dispersion medium	Example
Solid	Liquid	Paints
Liquid	Solid	Jellies
Gas	Liquid	Soap lather
Gas	Solid	Pumice stone

Question ID: 6927312

A gas that is readily adsorbed on 1 g of activated charcoal by physical adsorption

- (A) Dihydrogen (critical temperature 33 K)
(B) Helium (critical temperature 2.15 K)
(C) Methane (critical temperature 190 K)
(D) Sulphur Dioxide (critical temperature 630 K)

Answer (D)

Sol. Greater the critical temperature, greater is the ease of liquefaction, greater is the adsorption.

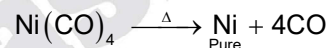
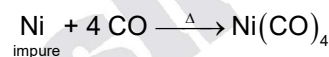
Question ID 6927313

Nickel is refined by

- (A) Zone Refining
(B) Electrolytic Refining
(C) Van Arkel Method for Refining
(D) Mond Process for Refining

Answer (D)

Sol. Mond process is used for refining of nickel

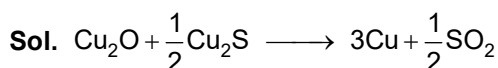


Question ID 6927314

Which of the following reaction is an example of autoreduction?

- (A) $\text{Fe}_3\text{O}_4 + 4\text{CO} \rightarrow 3\text{Fe} + 4\text{CO}_2$
(B) $\text{Cu}_2\text{O} + \text{C} \rightarrow 2\text{Cu} + \text{CO}$
(C) $\text{Cu}^{2+}(\text{aq}) + \text{Fe}(\text{s}) \rightarrow \text{Cu} + \text{Fe}^{3+}(\text{aq})$
(D) $\text{Cu}_2\text{O} + \frac{1}{2}\text{Cu}_2\text{S} \rightarrow 3\text{Cu} + \frac{1}{2}\text{SO}_2$

Answer (D)



Since copper is reduced by itself, therefore, it is a autoreduction reaction.

Question ID 6927315

Which of the following oxoacids of chlorine is most acidic?

- (A) HClO (B) HClO_2
(C) HClO_3 (D) HClO_4

Answer (D)

Sol. Acidic strength : $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$

Question ID 6927316

Bond dissociation enthalpy of (E-H) (E=element) are given below. Which of the following compounds is strongest reducing agent?

Compound	NH ₃	PH ₃	AsH ₃	SbH ₃
$\Delta_{\text{diss}}(\text{E-H})/\text{kJ mol}^{-1}$	389	322	297	255

- (A) NH₃ (B) PH₃
(C) AsH₃ (D) SbH₃

Answer (D)

Sol. With decrease in (E – H) bond dissociation enthalpy from NH₃ to SbH₃, the reducing character is increasing.

Question ID 6927317

Identify the one that does not exist

- (A) XeOF₄ (B) NeF₂
(C) XeF₂ (D) XeF₆

Answer (B)

Sol. No true compound of Ne is yet known.

Question ID 6927318

Highest oxidation state of Manganese in fluorides is +4(MnF₄) but highest oxidation state in oxides is +7(Mn₂O₇) because _____.

- (A) Fluorine is more electronegative than oxygen
(B) Fluorine does not possess d-orbitals
(C) Fluorine stabilises lower oxidation state
(D) In covalent compounds, fluorine can form single bond only while oxygen form double bond

Answer (D)

Sol. Highest Mn fluoride is MnF₄ whereas Mn oxide is Mn₂O₇ because of ability of oxygen to form multiple bonds.

Question ID: 6927319

Ziegler Natta catalyst is

- (A) Cu₂Cl₂ (B) V₂O₅
(C) TiCl₄ + Al(CH₃)₃ (D) Ni in presence of Iron

Answer (C)

Sol. Ziegler Natta catalyst : TiCl₄ + Al(CH₃)₃

Question ID: 6927320

Element of 3d series with highest melting point is

- (A) Cr (B) Mn
(C) Fe (D) Co

Answer (A)

Sol. Cr has highest melting point in 3d series due to greater number of unpaired electrons to participate in interatomic bonding.

Question ID: 6927321

A type of isomerism in co-ordination compound that arises when the counter ion in a complex salt is itself a potential ligand and can displace a ligand which can then become a counter ion

- (A) Linkage Isomerism
(B) Co-ordination Isomerism
(C) Ionisation Isomerism
(D) Solvate Isomerism

Answer (C)

Sol. Ionisation isomerism arises when the counter ion in a complex salt is itself a potential ligand and can displace a ligand which can then become the counter ion

Question ID: 6927322

Identify the most stable complex species

- (A) [Fe(CO)₅] (B) [Fe(CN)₆]³⁻
(C) [Fe(C₂O₄)₃]³⁻ (D) [Fe(H₂O)₆]³⁺

Answer (C)

Sol. C₂O₄²⁻ is bidentate chelating ligand and increases the stability of complex due to chelation effect.

Question ID: 6927323

The CFSE for octahedral [CoCl₆]⁴⁻ is 18,000 cm⁻¹. The CFSE for tetrahedral [CoCl₄]²⁻ will be

- (A) 20,000 cm⁻¹ (B) 18,000 cm⁻¹
(C) 16,000 cm⁻¹ (D) 8,000 cm⁻¹

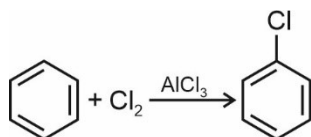
Answer (D)

Sol. $\Delta_o = 18000 \text{ cm}^{-1}$

$$\Delta_t = \frac{4}{9} \Delta_o$$

$$\Delta_t = \frac{4}{9} \times 18000 = 8000 \text{ cm}^{-1}$$

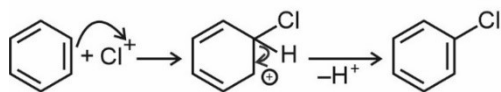
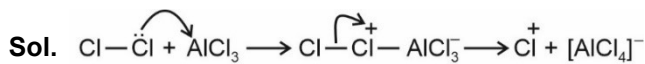
Question ID: 6927324



Which one of the following species attacks the benzene ring in the above reaction?

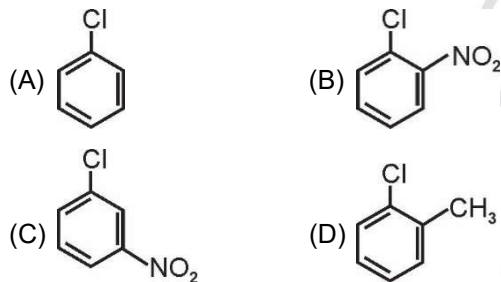
- (A) Cl^- (B) Cl^+
(C) AlCl_3 (D) $[\text{AlCl}_4]^-$

Answer (B)



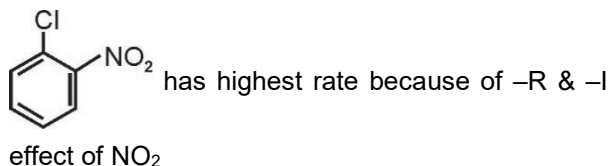
Question ID: 6927325

_____ has the highest rate of reaction towards nucleophilic substitution



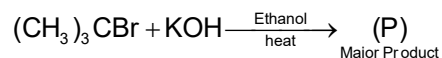
Answer (B)

Sol. Electron withdrawing group ($-\text{NO}_2$) increases the reactivity towards nucleophilic substitution reaction



Question ID: 6927326

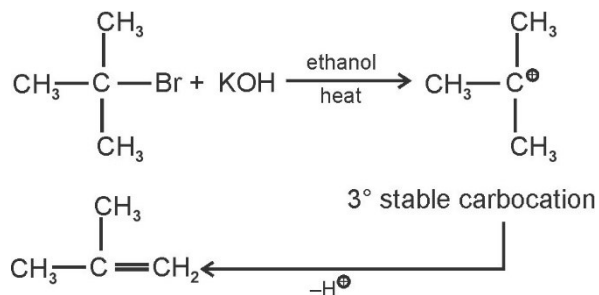
Identify the major product (P) formed on reaction of



- (A) $(\text{CH}_3)_3\text{COH}$
(B) $(\text{CH}_3)_2\text{C}=\text{O}$
(C) $(\text{CH}_3)_2\text{C}=\text{CH}_2$
(D) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$

Answer (C)

Sol. Reaction follows E_1 type mechanism



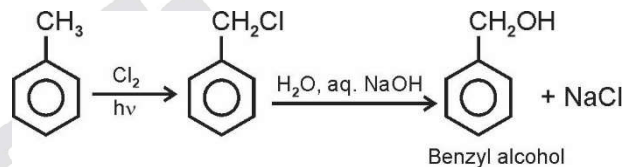
Question ID: 6927327

Monochlorination of toluene in sunlight followed by hydrolysis with aq NaOH gives

- (A) Benzylalcohol
(B) 2, 4-Dihydroxytoluene
(C) m-cresol
(D) o-cresol

Answer (A)

Sol.

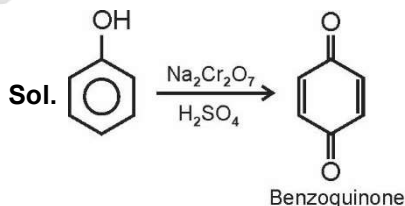


Question ID: 6927328

Phenol on oxidation with chromic acid gives

- (A) Benzene (B) Benzaldehyde
(C) Quinol (D) Benzoquinone

Answer (D)



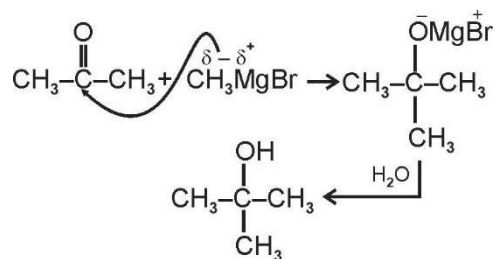
Question ID: 6927329

The compound formed on reaction of propanone with methylmagnesium bromide followed by hydrolysis is

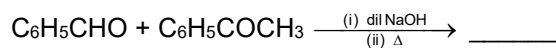
- (A) $\text{H}_3\text{C}-\text{CH}(\text{OH})-\text{CH}_3$ (B) $\text{CH}_3-\text{C}(\text{CH}_3)_2-\text{OH}$
(C) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (D) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

Answer (B)

Sol.



Question ID: 6927330

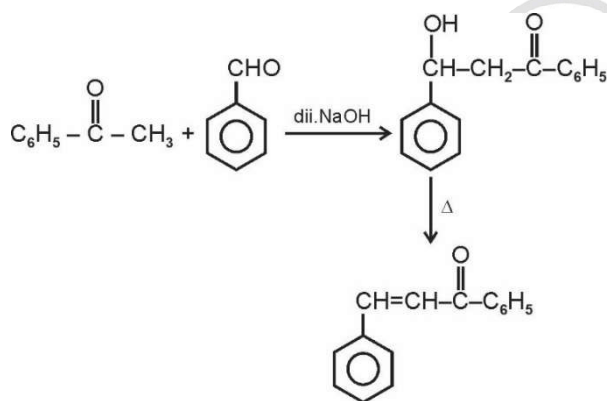


The major product in the above reaction is

- (A) $\text{C}_6\text{H}_5\text{CH}=\text{CHC}_6\text{H}_5$
 (B) $\text{C}_6\text{H}_5\text{CH}=\text{CHCOC}_6\text{H}_5$
 (C) $\text{C}_6\text{H}_5\text{CH}_2\text{OH} + \text{C}_6\text{H}_5\text{CH}(\text{OH})\text{C}_6\text{H}_5$
 (D) $\text{C}_6\text{H}_5\text{CH}_2\text{OH} + \text{C}_6\text{H}_5\text{COONa}$

Answer (B)

Sol. It is an aldol condensation reaction

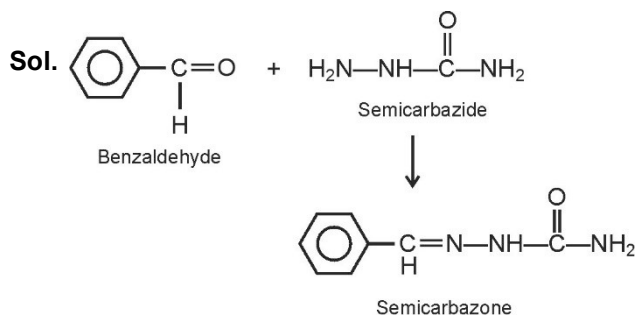


Question ID: 6927331

Benzaldehyde reacts with semicarbazide to give

- (A)
- (B)
- (C)
- (D)

Answer (B)

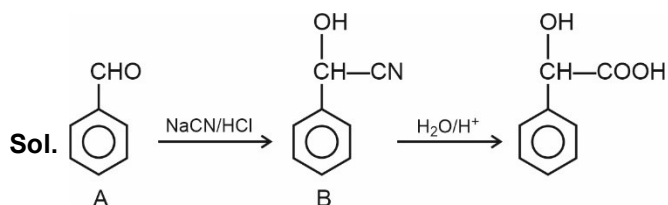


Question ID: 6927332

A compound 'A' on reaction with NaCN/HCl gives compound B which on hydrolysis in acidic medium gives α - Hydroxyphenyl acetic acid. Identify compound A

- (A)
- (B)
- (C)
- (D)

Answer (B)



Question ID: 6927333

Aniline does not undergo

- (A) Sulphonation
 (B) Friedel - Crafts alkylation
 (C) Bromination
 (D) Nitration

Answer (B)

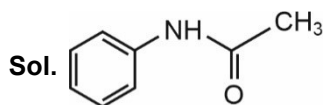
Sol. Aniline does not undergo Friedel-Crafts alkylation due to the salt formation with AlCl_3 which is used as a Lewis acid catalyst.

Question ID:6927334

IUPAC name of Acetanilide is

- (A) N-Ethylethanamide
- (B) N-Phenylethanamide
- (C) N,N-Diethylethanamide
- (D) N-Methyl benzamide

Answer (B)



N-Phenylethanamide

Question ID:6927335

Which of the following organic compounds show Carbylamine test?

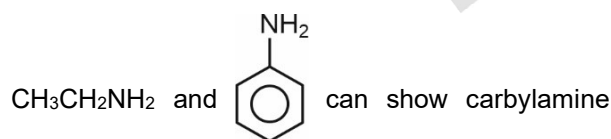
- A. Ethanamine
- B. N-Ethylethanamine
- C. N,N-Dimethylethanamine
- D. Aniline
- E. N-Methyl aniline

Choose the correct answer from the options given below:

- (A) A, B only
- (B) C only
- (C) A, D only
- (D) D, E only

Answer (C)

Sol. Aliphatic and aromatic primary amines shows carbylamine test.



reaction.

Question ID: 6927336

Nucleotides are joined together by

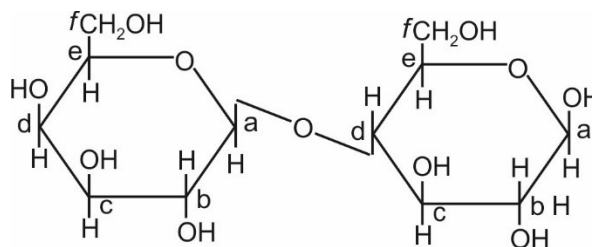
- (A) Phosphodiester linkage
- (B) Glycosidic linkage
- (C) Peptide linkage
- (D) Hydrogen bond

Answer (A)

Sol. Nucleotides are joined together by phosphodiester linkage between 5' and 3' carbon atoms of pentose sugar.

Question ID: 6927337

Lactose is a disaccharide formed from β -D-galactose and β -D-glucose. Identify anomeric carbon atoms in monosaccharide units



- (A) 'a' carbon of galactose and 'd' carbon of glucose
- (B) 'd' carbon of galactose and 'a' carbon of glucose
- (C) 'a' carbon of galactose and 'a' carbon of glucose
- (D) 'e' carbon of galactose and 'e' carbon of glucose

Answer (C)

Sol. Lactose is formed of C1 of galactose and C4 of glucose. So, 'a' carbon of galactose and 'a' carbon of glucose are anomeric carbon atoms.

Question ID: 6927338

Identify the incorrect statements from the following.

- (A) Pentose sugar in DNA is β -D-2-deoxyribose
- (B) DNA has four bases Adenine, Cytosine, Guanine, Uracil
- (C) Two strands of DNA are complementary to each other
- (D) DNA finger printing is used to identify racial groups to rewrite biological evolution

Answer (B)

Sol. DNA contain four bases viz. adenine, guanine, cytosine and thymine. Uracil is present in RNA.

Question ID: 6927339

Identify the monomers which forms biodegradable polymers

- (A) Ethylene glycol + phthalic acid
- (B) Caprolactam
- (C) Phenol + Formaldehyde
- (D) Amino caproic acid + glycine

Answer (D)

Sol. Nylon 2 – nylon 6 is a polymer of glycine and amino caproic acid and is biodegradable. Other given polymers are non-biodegradable.

Question ID: 6927340

In view of general awareness and concerns for accumulation of polymeric solid waste materials, certain biodegradable synthetic polymers have been developed. Which amongst the following are biodegradable synthetic polymers?

- (A) Novolac (B) Neoprene
(C) PHBV (D) BUNA-S

Answer (C)

Sol. PHBV undergoes bacterial degradation in environment.

Question ID: 6927341

Which of these following is not a non-narcotic analgesic?

- (A) Aspirin (B) Ibuprofen
(C) Codeine (D) Dichlorofenac sodium

Answer (A)

Sol. Aspirin is non-narcotic analgesics. It reduces or abolish pain.

Question ID: 6927342

Which of the following is likely to cause ulcer in the stomach?

- (A) Luminal (B) Aspirin
(C) Phenelzine (D) Iproniazid

Answer (B)

Sol. Aspirin like pain reliever causes ulcer in stomach.

Question ID: 6927343

Which of the following is responsible for the mood changes/depression in humans?

- (A) Thyroid (B) Norethindrone
(C) Noradrenaline (D) Terfenadine

Answer (C)

Sol. Noradrenaline is one of the neurotransmitters that plays a role in mood change.

Question ID: 6927344

Which category of drug can act, both as antipyretic as well as analgesic?

- (A) Narcotic analgesics
(B) Non narcotic analgesics
(C) Tranquilizers
(D) Antibiotic

Answer (B)

Sol. Non-narcotic analgesic drugs have other effects such as reducing fever (antipyretic)

Question ID: 6927345

Tranquilizers are the substances used for the treatments of

- (A) Cancer (B) AIDS
(C) Mental diseases (D) Physical disorder

Answer (C)

Sol. Tranquilizers are used for the treatments of mental diseases.

Passage:

Solubility of gases in liquids is greatly affected by pressure and temperature. Henry gave the quantitative relationship between pressure and solubility of gas in a solvent. According to Henry's law, partial pressure of a gas above a liquid is directly proportional to its mole fraction in solution and is expressed as $P = K_H \cdot x$, where K_H is Henry's constant and x is mole fraction of gas. K_H is a function of nature of gas.

F M Raoult gave a quantitative relationship between partial pressures and mole fractions in the binary solution of volatile liquids. Raoult's law states that for a binary solution of volatile liquids, the partial pressure of each component in the solution is directly proportional to its mole fraction. Thus for a solution of component 1 and 2, partial pressure of each component $P_1 = p_1^\circ x_1$, where p_1° is the vapour pressure of pure component 1 at the same temperature. Similarly $P_2 = p_2^\circ x_2$

Questions ID : 6927346

Solubility of Carbon dioxide in soda water increases with

- (A) Increase in pressure and temperature both
(B) Increase in pressure and decrease in temperature
(C) Decrease in pressure and increase in temperature
(D) Decrease in pressure and decrease in temperature

Answer (B)

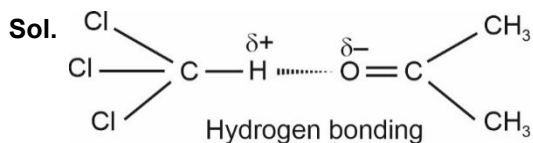
Sol. Solubility of $\text{CO}_{2(g)}$ in water increases with increase in pressure and decrease in temperature.

Questions ID : 6927347

Which of the following show negative deviation from Raoult's law?

- (A) Water and Ethanol
- (B) Ethanol and Acetone
- (C) Acetone and Chloroform
- (D) Carbondisulphide and Acetone

Answer (C)



A mixture of chloroform and acetone shows negative deviation from Raoult's law, it is due to H-bonding.

Questions ID : 6927348

K_H value for Ar(g), CO(g), HCHO(g) and CH₄(g) are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. Identify the correct order of their increasing solubility in water

- (A) HCHO < CH₄ < CO₂ < Ar
- (B) HCHO < CO₂ < CH₄ < Ar
- (C) Ar < CO₂ < CH₄ < HCHO
- (D) Ar < CH₄ < CO₂ < HCHO

Answer (C)

Sol. Solubility of a gas in water varies inversely to its K_H value, so correct order of solubility is
Ar < CO₂ < CH₄ < HCHO

Questions ID : 6927349

If a solution exhibits positive deviation from Raoult's Law then sign of $\Delta_{\text{mix}}H$ and $\Delta_{\text{mix}}V$ will be

- (A) $\Delta_{\text{mix}}H$ = positive; $\Delta_{\text{mix}}V$ = positive
- (B) $\Delta_{\text{mix}}H$ = positive; $\Delta_{\text{mix}}V$ = negative
- (C) $\Delta_{\text{mix}}H$ = negative; $\Delta_{\text{mix}}V$ = positive
- (D) $\Delta_{\text{mix}}H$ = negative; $\Delta_{\text{mix}}V$ = negative

Answer (A)

Sol. For a solution exhibiting positive deviation from Raoult's law

$$\Delta_{\text{mix}}H > 0, \Delta_{\text{mix}}V > 0$$

Questions ID : 6927350

Henry's law constant for O₂ in water at 293 K is 46.82 bar. The mole fraction of oxygen in air is 0.21. What mole fraction of oxygen is dissolved in 1 litre of water at 2.026 bar pressure and 293 K?

- (A) 0.4254
- (B) 0.850
- (C) 0.018
- (D) 0.009

Answer (D)

Sol. Partial pressure of O₂ = 2.026×0.21
= 0.425

Now, applying Henry's law $p_{\text{O}_2} = K_H \times X_{\text{O}_2}$

$$\therefore X_{\text{O}_2} = \frac{p_{\text{O}_2}}{K_H} = \frac{0.425}{46.82} = 0.009$$

