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Previous Year Paper

Chemistry - 2013



Multiple Choice Questions

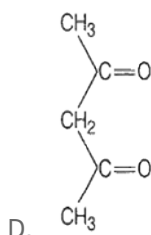
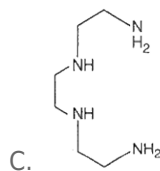
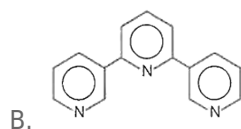
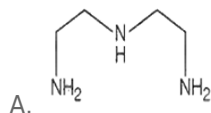
1. NH_4Cl (s) is heated in a test tube. Vapours are brought in contact with red litmus paper, which changes it to blue and then to red. It is because of
- formation of NH_4OH and HCl
 - formation of NH_3 and HCl
 - greater diffusion of NH_3 than HCl
 - greater diffusion of HCl than NH_3

Answer

2. When 1 mole of CO_2 (g) occupying volume 10 L at 27°C is expanded under adiabatic condition, temperature falls to 150 K. Hence, final volume is
- 5 L
 - 20 L
 - 40 L
 - 80 L

Answer

3. Which of the following ligands is tetradentate?



Answer

4. A near UV photon of 300 nm is absorbed by a gas and then re-emitted as two photons. One photon is red with wavelength 760 nm. Hence, wavelength of the second photon is
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B. 496 nm

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C. 300 nm

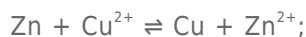
D. 215 nm

Answer

5. A constant current of 30 A is passed through an aqueous solution of NaCl for a time of 1.00 h. What is the volume of Cl_2 gas at STP produced?
- A. 30.00 L
B. 25.08 L
C. 12.54 L
D. 1.12 L

Answer

6. If for the cell reaction,



entropy change ΔS° is $96.5 \text{ J mol}^{-1}\text{K}^{-1}$, then temperature coefficient of the emf of a cell is

- A. $5 \times 10^{-4} \text{ VK}^{-1}$
B. $1 \times 10^{-3} \text{ VK}^{-1}$
C. $2 \times 10^{-3} \text{ VK}^{-1}$
D. $9.65 \times 10^{-4} \text{ VK}^{-1}$

Answer

7. What transition in the hydrogen spectrum would have the same wavelength as the Balmer transition, $n = 4$ to $n = 2$ of He^+ spectrum?
- A. $n = 4$ to $n = 2$
B. $n = 3$ to $n = 2$
C. $n = 2$ to $n = 1$
D. $n = 4$ to $n = 3$

Answer

8. What is the degeneracy of the level of H-atom that has energy $-RH_9$?
- A. 16
B. 9
C. 4
D. 1

Answer

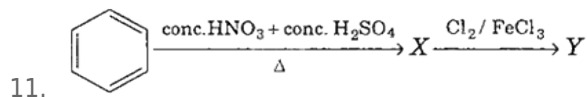
9. What is the EAN of $[\text{Al}(\text{C}_4\text{O}_4)_3]^{3-}$?
- A. 28
B. 22

Answer

10. Calculate pH of a buffer prepared by adding 10 mL of 0.10 M acetic acid to 20 mL of 0.1 M sodium acetate [$pK_a(\text{CH}_3\text{COOH}) = 4.74$]

- A. 3.00
B. 4.44
C. 4.74
D. 5.04

Answer

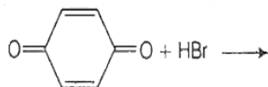


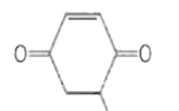
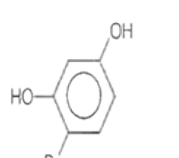
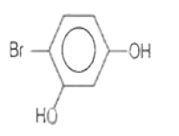
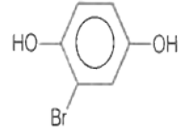
The product Y is

- A. *p*-chloro nitrobenzene
B. *o*-chloro nitrobenzene
C. *m*-chloro nitrobenzene
D. *o, p*-dichloro nitrobenzene

Answer

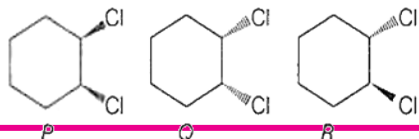
12. End product of the following reaction is



- A. 
B. 
C. 
D. 

Answer

13. Following compounds are respectively geometrical isomers



B. P - cis ; Q - trans ; R - trans

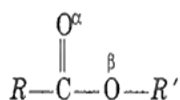
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C. P - trans ; Q - cis ; R - cis

D. P - cis ; Q - trans ; R - cis

Answer

14. Which is more basic oxygen in an ester?



- A. Carbonyl oxygen, α
- B. Carboxyl oxygen, β
- C. Equally basic
- D. Both are acidic oxygen

Answer

15. Match the following and choose the correct option given below:-

Compound / Type	Use
A. Dry ice	I. Anti-knocking compound
B. Semiconductor	II. Electronic diode or triode
C. Solder	III. Joining circuits
D. TEL	IV. Refrigerant for preserving food

- A. A - I; B - II; C - IV; D - III
- B. A - II; B - III; C - I ; D - IV
- C. A - IV; B - III; C - II; D - I
- D. A - IV; B - II; C - III; D - I

Answer

16. B can be obtained from halide by van- Arkel method. This involves. This involves reaction

- A. $2\text{BI}_3 \xrightarrow{\text{filament Red hot W or Ta}} 2\text{B} + 3\text{I}_2$
- B. $2\text{BCl}_3 + 3\text{H}_2 \xrightarrow{\text{filament Red hot W or Ta}} 2\text{B} + 6\text{HCl}$
- C. Both (a) and (b)
- D. None of the above

Answer

17. The density of solid argon is 1.65 g per cc at -233°C . If the argon atom is assumed to be a sphere of radius 1.54×10^{-8} cm, what percent of solid argon is apparently empty space? (Ar = 40)

A. 16.5%

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C. 50%

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Answer

18. Acid hydrolysis of ester is first order reaction and rate constant is given by

$$k = \frac{2.303}{t} \log \frac{V_{\infty} - V_0}{V_{\infty} - V_t}$$

where, V_0 , V_t and V_{∞} are the volume of standard NaOH required to neutralise acid present at a given time, if ester is 50% neutralised then

- A. $V_{\infty} = V_t$
B. $V_{\infty} = (V_t - V_0)$
C. $V_{\infty} = 2V_t - V_0$
D. $V_{\infty} = 2V_t + V_0$

Answer

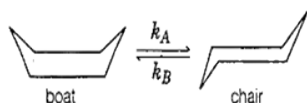
19. Which of these ions is expected to be coloured in aqueous solution?

- I. Fe^{3+}
II. Ni^{2+}
III. Al^{3+}

- A. I and II
B. II and III
C. I and III
D. I, II and III

Answer

20. Consider the following reaction,



The reaction is of first order in each diagram, with an equilibrium constant of 10^4 . For the conversion of chair form to boat form $e^{-E_a/RT} = 4.5 \times 10^{-8}$ at 298 K with pre-exponential factor of 10^{12} s^{-1} . Apparent rate constant ($=k_A/k_B$) at 298 K is

- A. $4.35 \times 10^4 \text{ s}^{-1}$
B. $4.35 \times 10^8 \text{ s}^{-1}$
C. $4.35 \times 10^{-8} \text{ s}^{-1}$
D. $4.35 \times 10^{12} \text{ s}^{-1}$

Answer

21. For the cell reaction,
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$2\text{Ce}^{4+} + \text{Ce} \rightarrow 2\text{Ce}^{3+} + \text{Co}^{3+}$; E_{cell}° is 1.69 V. If $E_{\text{Co}^{2+}/\text{Co}}$ is -0.28V, what is the value

of $E_{\text{Ce}^{4+}/\text{Ce}^{3+}}^\circ$?

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- A. 0.28 V
B. 1.61 V
C. 2.17 V
D. 5.29 V

Answer

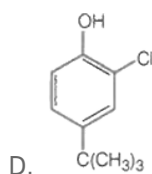
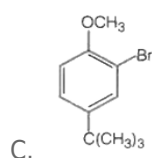
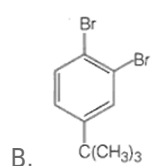
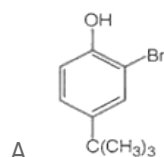
22. The equivalent conductance of silver nitrate solution at 250°C for an infinite dilution was found to be $133.3 \Omega^{-1} \text{ cm}^2 \text{ equiv}^{-1}$. The transport number of Ag^+ ions in very dilute solution of AgNO_3 is 0.464. Equivalent conductances of Ag^+ and NO_3^- (in $\Omega^{-1} \text{ cm}^2 \text{ equiv}^{-1}$) at infinite dilution are respectively.

- A. 195.2; 133.3
B. 61.9; 71.4
C. 71.4; 61.9
D. 133.3; 195.2

Answer

23. Treating anisole with the following reagents, the major product obtained is

- I. $(\text{CH}_3)_3\text{CCl}$, AlCl_3
II. Cl_2 , FeCl_3
III. HBr , Heat



Answer

24. Ketones $[\text{R} - \text{C}(=\text{O}) - \text{R}']$ where, $\text{R} = \text{R}' = \text{alkyl group}$ can be obtained in one step by

- A. hydrolysis of esters

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C. oxidation of secondary alcohols

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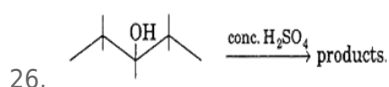
D. reaction of acid halide with alcohols

Answer

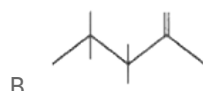
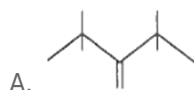
25. An optically active compound 'X' has molecular formula $C_4H_8O_3$. It evolves CO_2 with aqueous $NaHCO_3$. 'X' reacts with $LiAlH_4$ to give an achiral compound. 'X' is

- A. $CH_3CH_2C(OH)HCOOH$
- B. $CH_3C(OMe)HCOOH$
- C. $CH_3CH(CH_2OH)HCOOH$
- D. $CH_3C(OH)HCH_2COOH$

Answer



Product is/ are



- C. Both (a) and (b)
- D. None is correct

Answer

27. Glycerol $\rightarrow KHSO_4$ A $\rightarrow HClO$ B

A and B respectively are

- A. $CH_2=CHC(OH)_2$; $ClCH_2-C(OH)HCOH$
- B. $CH_2=CHCOH$; $C(OH)H_2-C(Cl)HOCH$
- C. CH_3CH_2CHO ; $CH_3CH_2CH(OH)(Cl)$
- D. $CH_2=CHCOH$; $C(Cl)OH_2CH_2CHO$

Answer

28. Phenol is heated with phthalic anhydride in the presence of conc. H_2SO_4 . The product gives pink colour with alkali. The product is

- A. phenolphthalein
- B. bakelite
- C. salicylic acid
- D. fluorescein

Answer

29. $C_6H_5NH_2 \xrightarrow{0^\circ C} NaNO_2/HCl$ X $\xrightarrow{CuCN}$ Y $\xrightarrow{H_2O/H^+}$ Z, Z is identified as

A. $C_6H_5NH_2CH_3$ Like, Share, Bookmark. Download. Make Notes. Print - Your Favourite Questions. Join www.zigya.com

C. $\text{C}_6\text{H}_5\text{-CH}_2\text{-COOH}$

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D. $\text{C}_6\text{H}_5\text{-COOH}$

Answer

30. Out of $\text{H}_2\text{S}_2\text{O}_3$, $\text{H}_2\text{S}_2\text{O}_4$, H_2SO_5 and $\text{H}_2\text{S}_2\text{O}_8$ peroxy acids areA. $\text{H}_2\text{S}_2\text{O}_3$; $\text{H}_2\text{S}_2\text{O}_8$ B. H_2SO_5 ; $\text{H}_2\text{S}_2\text{O}_8$ C. $\text{H}_2\text{S}_2\text{O}_4$; H_2SO_5 D. $\text{H}_2\text{S}_2\text{O}_3$; $\text{H}_2\text{S}_2\text{O}_4$

Answer

31. Select the correct statement(s).

A. LiAlH_4 reduces methyl cyanide to methyl amine.

B. Alkaline nitrile has electrophilic as well as nucleophilic centres

C. Saponification is a reversible reaction.

D. Alkaline hydrolysis of methane nitrile forms methanoic acids.

Answer

32. In a Claisen condensation reaction (when an ester is treated with a strong base)

A. a proton is removed from the α -carbon to form a resonance stabilised carbanion of the ester

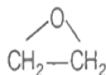
B. carbanion acts as a nucleophile in a nucleophilic acyl substitution reaction with another ester molecule

C. a new C - C bond is formed

D. All of the above statements are correct

Answer

33. An organic compound B is formed by the reaction of ethyl magnesium iodide with a substance A, followed by treatment with dilute aqueous acid. Compound B does not react with PCC or PDC in dichloromethane. Which of the following is a possible compound for A?



A.

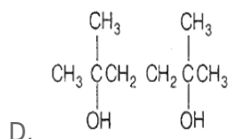
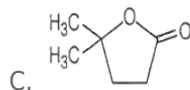
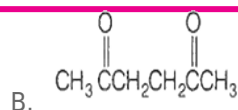
B. $\text{CH}_3\text{CH}_2\text{COCH}_3$ C. CH_3COH D. $\text{H}_2\text{C=O}$

Answer

34. $\text{CH}_3\text{COCH}_2\text{CH}_2\text{COOCH}_2\text{CH}_3 \rightarrow \text{(ii) H}_3\text{O}^+ \text{ (i) CH}_3\text{MgBr}$ (one mole) A

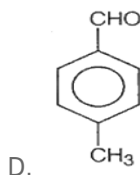
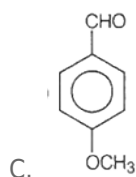
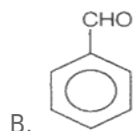
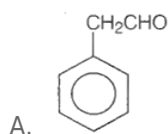
A formed in this reaction is

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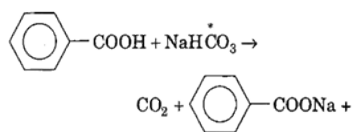


Answer

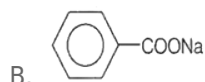
35. Which of the following does not undergo benzoin condensation?



Answer



C* is with the product



C. Both (a) and (b)

D. None of the above

Answer

37. Benzene diazonium chloride on treatment with hypophosphorus acid and water yield benzene.
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A. LiAlH_4

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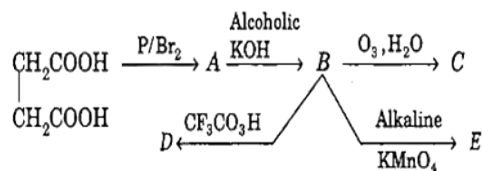
B. Red P

C. Zn

D. Cu^+

Answer

38. Consider the following reaction sequence,



Isomers are

A. C and E

B. C and D

C. D and E

D. C, D and E

Answer

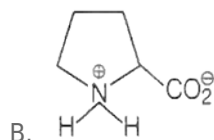
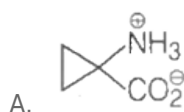
39. When a monosaccharide forms a cyclic hemiacetal, the carbon atom that contained the carbonyl group is identified as the carbon atom, because

A. D, the carbonyl group is drawn to the right

B. L, the carbonyl group is drawn to the left

C. acetal, it forms bond to an $-\text{OR}$ and an $-\text{OR}'$ D. anomeric, its substituents can assume an α or β position

Answer

40. Which of the following is/are α -amino acid?

C. Both (a) and (b)

D. None of these

Answer