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Previous Year Paper

Chemistry - 2012



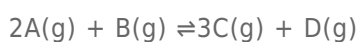
Multiple Choice Questions

1. Among the elements Ca, Mg, P and Cl, the order of increasing atomic radii is

- A. $Mg < Ca < Cl < P$
- B. $Cl < P < Mg < Ca$
- C. $P < Cl < Ca < Mg$
- D. $Ca < Mg < P < Cl$

Answer

2. The reaction



is begun with the concentrations of A and B both at an initial value of 1.00 M. When equilibrium is reached, the concentration of D is measured and found to be 0.25 M. The value for the equilibrium constant for this reaction is given by the expression

- A. $[(0.75)^3 (0.25)] \div [(1.00)^2 (1.00)]$
- B. $[(0.75)^3 (0.25)] \div [(0.50)^2 (0.75)]$
- C. $[(0.75)^3 (0.25)] \div [(0.50)^2 (0.25)]$
- D. $[(0.75)^3 (0.25)] \div [(0.75)^2 (0.25)]$

Answer

3. The pressure exerted by 6.0g of methane gas in a 0.03 m^3 vessel at 129°C is (Atomic masses: C = 12.01, H = 1.01 and $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)

- A. 215216 Pa
- B. 13409 Pa
- C. 41648 Pa
- D. 31684 Pa

Answer

4. Match List I (Equations) with List II (Types of process) and select the correct option.

	List I (Equation)		List II (Types of process)
A.	$K_p > Q$	1.	Non-spontaneous
B.	$\Delta G^\circ < RT \ln Q$	2.	Equilibrium
C.	$K_p = Q$	3.	Spontaneous and endothermic

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A	B	C	D
1	2	3	4

A	B	C	D
3	4	2	1

A	B	C	D
4	1	2	3

A	B	C	D
2	1	1	3

Answer

5. Among the following which one has the highest cation of anion size ratio?

- A. CsI
- B. CsF
- C. LiF
- D. NaF

Answer

6. Some of the properties of the two species, NO₃⁻ and H₃O⁺ are described below. Which one of them is correct?

- A. Dissimilar in hybridisation for the central atom with different structures
- B. Isostructural with same hybridisation for the central atom
- C. Isostructural with different hybridisation for the central atom
- D. Similar in hybridisation for the central atom with different structures

Answer

7. Which has the maximum number of molecules among the following?

- A. 44 g CO₂
- B. 48 g O₃
- C. 8g H₂
- D. 64g SO₂

Answer

8. Consider the following processes and (K₁)₁ Print - Your Favourite Questions. Join www.zigya.com

A. 525 kJ/mol

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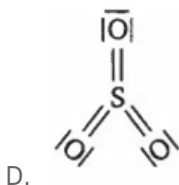
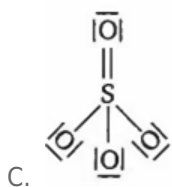
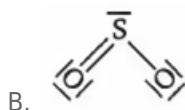
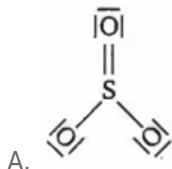
B. -175 kJ/mol

C. -325 kJ/mol

D. 325 kJ/mol

Answer

9. Which of the following structures is the most preferred and hence of lowest energy for SO_3 ?



Answer

10. What is the value of electron gain enthalpy of Na if IE_1 of Na = 5.1 eV?

A. -5.1 eV

B. -10.2 eV

C. +2.55 eV

D. +10.2 eV

Answer

11. A bubble of air is underwater at temperature 15°C and the pressure 1.5 bar. If the bubble rises to the surface where the temperature is 25°C and the pressure is 1.0 bar, what will happen to the volume of the bubble?

A. Volume will become greater by a factor of 1.6

B. Volume will become greater by a factor of 1.1

C. Volume will become smaller by a factor of 0.70

D. Volume will become greater by a factor of 2.9

Answer

12. The pairs of species of oxygen and their magnetic behaviours are noted below. Which of the following presents the correct description?

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C. O_2^+ , O_2^- - Both diamagnetic

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D. O , O_2^{2-} - Both diamagnetic

Answer

13. Which of the following species is not electrophilic in nature?

- A. $C\oplus$
 B. BH_3
 C. $H_3O\oplus$
 D. $N\oplus O_2$

Answer

14. Some statements about heavy water are given below.

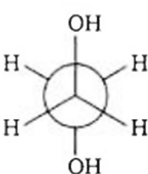
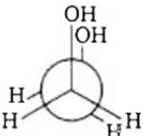
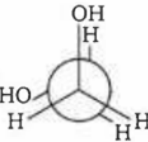
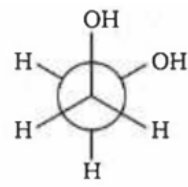
- (i) Heavy water is used as moderator in nuclear reactors.
 (ii) Heavy water is more associated than ordinary water.
 (iii) Heavy water is more effective solvent than ordinary water.

Which of the above statements are correct?

- A. (i) and (ii)
 B. (i), (ii) and (iii)
 C. (ii) and (iii)
 D. (i) and (iii)

Answer

15. Which of the following conformers for ethylene glycol is most stable?

- A. 
- B. 
- C. 
- D. 

Answer

16. The IUPAC name of the compound $CH_3CH=CHC\equiv CH$ is

- A. pent-4-yn-2-ene

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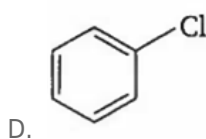
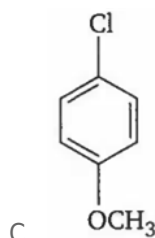
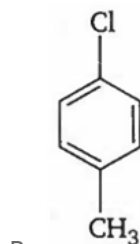
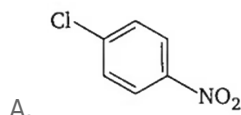
C. pent-2-en-4-yne

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D. pent-1-yn-3-ene

Answer

17. Which of the following compounds undergoes nucleophilic substitution reaction most easily?



Answer

18. Match List I with List II for the compositions of substances and select the correct answer using the codes given below the lists.

	List I (Substance)		ListII (Composition)
A.	Plaster of Paris	1.	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
B.	Epsomite	2.	$\text{CaSO}_4 \cdot 12\text{H}_2\text{O}$
C.	Kieserite	3.	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
D.	Gypsum	4.	$\text{MgSO}_4 \cdot \text{H}_2\text{O}$
		5.	CaSO_4

A. A B C D

3 4 1 2

B. A B C D

Answer

19. Consider the reactions,



The mechanisms of reactions (i) and (ii) are respectively

- A. $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$
- B. $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}1$
- C. $\text{S}_{\text{N}}2$ and $\text{S}_{\text{N}}2$
- D. $\text{S}_{\text{N}}2$ and $\text{S}_{\text{N}}1$

Answer

20. Which of the following oxide is amphoteric?

- A. SnO_2
- B. CaO
- C. SiO_2
- D. CO_2

Answer

21. Which of the following expressions correctly represents the equivalent conductance at infinite dilution of $\text{Al}_2(\text{SO}_4)_3$? Given that $\Lambda_{\text{Al}^{3+}}$ and $\Lambda_{\text{SO}_4^{2-}}$ are the equivalent conductances at infinite dilution of the respective ions?

- A. $2\Lambda_{\text{Al}^{3+}} + 3\Lambda_{\text{SO}_4^{2-}}$
- B. $\Lambda_{\text{Al}^{3+}} + \Lambda_{\text{SO}_4^{2-}}$
- C. $(\Lambda_{\text{Al}^{3+}} + 3\Lambda_{\text{SO}_4^{2-}}) \times 6$
- D. $13\Lambda_{\text{Al}^{3+}} + 12\Lambda_{\text{SO}_4^{2-}}$

Answer

22. Match List I (Substances) with List II (Processes employed in the manufacture of the substances) and select the correct option.

	List I (Substance)		List II (Process)
A.	Sulphuric acid	1.	Haber's process
B.	Steel	2.	Bessemer's process
C.	Sodium hydroxide	3.	Leblanc process

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Chemistry				Exam Year
JEE 2012	Ammonia	4.	Contact process	2012

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A	B	C	D
1	4	2	3

A	B	C	D
1	2	3	4

A	B	C	D
4	3	2	1

A	B	C	D
4	2	3	1

Answer

23. Which one of the following complexes is not expected to exhibit isomerism?

- A. $[\text{Ni}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{2+}$
- B. $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
- C. $[\text{Ni}(\text{NH}_3)_2\text{Cl}_2]$
- D. $[\text{Ni}(\text{en})_3]^{2+}$

Answer

24. Which of the following oxidation states is the most common among the lanthanoids?

- A. 4
- B. 2
- C. 3
- D. 5

Answer

25. A 0.1 molal aqueous solution of a weak acid is 30% ionised. If K_f for water is 1.86°C/m , the freezing point of the solution will be

- A. -0.18°C
- B. -0.54°C
- C. -0.36°C
- D. -0.24°C

Answer

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A. $\text{Mn}(\text{CO})_6^+$ B. $\text{Cr}(\text{CO})_6$ C. $\text{V}(\text{CO})_6^-$ D. $\text{Fe}(\text{CO})_5$

Answer

27. A solid compound XY has NaCl structure. If the radius of the cation is 100 pm, the radius of the anion (Y^-) will be

A. 275.1 pm

B. 322.5 pm

C. 241.5 pm

D. 165.7 pm

Answer

28. The unit of rate constant for a zero order reaction is

A. $\text{mol L}^{-1} \text{s}^{-1}$ B. $\text{L mol}^{-1} \text{s}^{-1}$ C. $\text{L}^2 \text{mol}^{-2} \text{s}^{-1}$ D. s^{-1}

Answer

29. Which of the following complex compounds will exhibit highest paramagnetic behaviour? (At. no. Ti = 22, Cr = 24, Co = 27, Zn = 30)

A. $[\text{Ti}(\text{NH}_3)_6]^{3+}$ B. $[\text{Cr}(\text{NH}_3)_6]^{3+}$ C. $[\text{Co}(\text{NH}_3)_6]^{3+}$ D. $[\text{Zn}(\text{NH}_3)_6]^{2+}$

Answer

30. The following reactions take place in the blast furnace in the preparation of impure iron. Identify the reaction pertaining to the formation of the slag.

A. $\text{Fe}_2\text{O}_3(\text{s}) + 3\text{CO}(\text{g}) \rightarrow 2\text{Fe}(\text{l}) + 3\text{CO}_2(\text{g})$ B. $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$ C. $\text{CaO}(\text{s}) + \text{SiO}_2(\text{s}) \rightarrow \text{CaSiO}_3(\text{s})$ D. $2\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow 2\text{CO}(\text{g})$

Answer

31. When glycerol is treated with excess of HI, it produces

A. 2-iodopropane

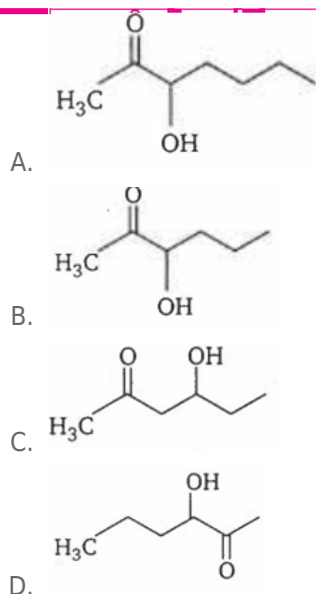
B. allyl iodide

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Answer

32. Which one of the following compounds will be most readily dehydrated?



Answer

33. Following compounds are given

- (i) $\text{CH}_3\text{CH}_2\text{OH}$
- (ii) CH_3COCH_3
- (iii) $\text{CH}_3(\text{CH})\text{CHOH}$
- (iv) CH_3OH

Which of the above compound(s) on being warmed with iodine solution and NaOH, will give iodoform?

- A. (i), (iii) and (iv)
- B. Only (ii)
- C. (i), (ii) and (iii)
- D. (i) and (ii)

Answer

34. Fructose reduces Tollen's reagent due to

- A. asymmetric carbons
- B. primary alcoholic group
- C. secondary alcoholic group
- D. enolisation of fructose followed by conversion to aldehyde by base

Answer

35. Which of the following is not a fat soluble vitamin?

- A. Vitamin-B complex
- B. Vitamin-D
- C. Vitamin-E
- D. Vitamin-A

36. Which of the statements about 'Denaturation' given below are correct?

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- Statements
- (i) Denaturation of proteins causes loss of secondary and tertiary structures of the protein.
 - (ii) Denaturation leads to the conversion of double strand of DNA into single strand.
 - (iii) Denaturation affects primary structure which gets destroyed.

- A. (ii) and (iii)
- B. (i) and (iii)
- C. (i) and (ii)
- D. (i), (ii) and (iii)

Answer

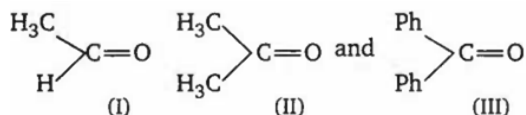
37. In the following reaction,



- A. $\text{C}_6\text{H}_5\text{CH}_2\text{OCH}_2\text{C}_6\text{H}_5$
- B. $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$
- C. $\text{C}_6\text{H}_5\text{CH}_3$
- D. $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{C}_6\text{H}_5$

Answer

38. The order of reactivity of phenyl magnesium bromide (PhMgBr) with the following compounds



- A. $\text{III} > \text{II} > \text{I}$
- B. $\text{II} > \text{I} > \text{III}$
- C. $\text{I} > \text{III} > \text{II}$
- D. $\text{I} > \text{II} > \text{III}$

Answer

39. Match the compounds given in List I with List II and select the suitable option using the codes given below.

	List I		List II
A.	Benzaldehyde	1.	Phenolphthalein
B.	Phthalic anhydride	2.	Benzoin condensation
C.	Phenyl benzoate	3.	Oil of wintergreen
D.	Methyl salicylate	4.	Fries rearrangement

4 1 3 2

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4 2 3 1

C. A B C D

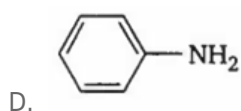
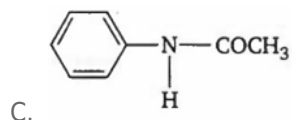
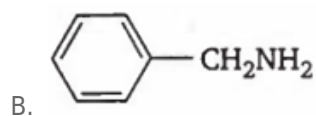
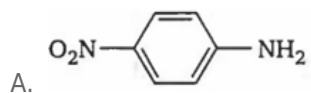
2 3 4 1

D. A B C D

2 1 4 3

Answer

40. Which of the following compound is the most basic?



Answer