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Previous Year Paper

Chemistry - 2019

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Multiple Choice Questions

1. What would be the molality of 20% (mass / mass) aqueous solution of KI? (molar mass of KI = 166 g mol^{-1})

A. 1.08
B. 1.35
C. 1.51
D. 1.48

Answer

2. HF has highest boiling point among hydrogen halides, because it has:

A. Strongest van der Waal's interactions
B. Lowest ionic character
C. Strongest hydrogen bonding
D. Lowest dissociation enthalpy

Answer

3. At a given temperature T , gases Ne, Ar, Xe and Kr are found to deviate from ideal gas behaviour. Their equation of state is given as $p = RT/V - b$ at T . Here, b is the van der Waals constant. Which gas will exhibit steepest increase in the plot of Z (compression factor) vs p ?

A. Ne
B. Xe
C. Ar
D. Kr

Answer

4. During compression of a spring the work done is 10 kJ and 2 kJ escaped to the surroundings as heat. The change in internal energy, ΔU (in kJ) is:

A. -12
B. 8
C. 12
D. -8

Answer

5. Which one of the following about an electron occupying the 1s orbital in a hydrogen atom is incorrect? (The Bohr radius is represented by a_0).

A. The electron can be found at a distance $2a_0$ from the nucleus.

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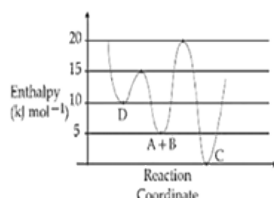
B. The probability density of finding the electron is maximum at the nucleus.

C. The total energy of the electron is maximum when it is at a distance a_0 from the nucleus.

D. The magnitude of the potential energy is double that of its kinetic energy on an average.

Answer

6. Consider the given plot of enthalpy of the following reaction between A and B. $A + B \rightarrow C + D$. Identify the incorrect statement.



- A. C is the thermodynamically stable product.
- B. Formation of A and B from C has highest enthalpy of activation.
- C. Activation enthalpy to form C is 5 kJ mol^{-1} less than that to form D.
- D. D is kinetically stable product.

Answer

7. The correct statement among I to III are:
- (I) Valence bond theory cannot explain the color exhibited by transition metal complexes.
- (II) Valence bond theory can predict quantitatively the magnetic properties of transition metal complexes.
- (III) Valence bond theory cannot distinguish ligands as weak and strong field ones.
- A. (I) and (III) only
- B. (II) and (III) only
- C. (I), (II) and (III)
- D. (I) and (II) only

Answer

8. Among the following species, the diamagnetic molecule is:
- A. B_2
- B. O_2
- C. CO
- D. NO

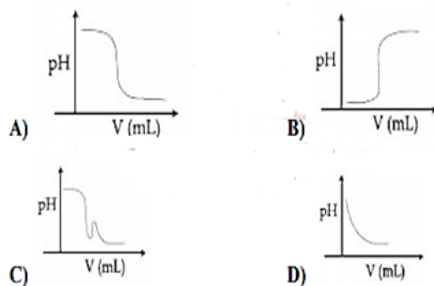
Answer

9. Hinsberg's reagent is:
- A. $C_6H_5SO_2Cl$
- B. $SOCl_2$
- C. $(COCl)_2$

Answer

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10. In an acid-base titration, 0.1 M HCl solution was added to the NaOH solution of unknown strength. Which of the following correctly shows the change of pH of the titration mixture in this experiment ?



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

Answer

11. The amorphous form of silica is:

- A. Tridymite
B. Quartz
C. Kieselguhr
D. Cristobalite

Answer

12. The correct statements among I to III regarding group 13 element oxides are,

- (I) Boron trioxide is acidic.
(II) Oxides of aluminium and gallium are amphoteric.
(III) Oxides of indium and thallium are basic.

- A. (I) and (II) only
B. (I), (II) and (III)
C. (I) and (III) only
D. (II) and (III) only

Answer

13. The layer of atmosphere between 10 km to 50 km above the sea level is called as :

- A. Thermosphere
B. Troposphere
C. Mesosphere
D. Stratosphere

Answer

14. Assertion: For the extraction of iron, haematite ore is used.
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A. Both the assertion and reason are correct and the reason is the correct explanation for the assertion.

B. Only the assertion is correct.

C. Both the assertion and reason are correct, but the reason is not the correct explanation for the assertion

D. Only the reason is correct

Answer

15. A solution of $\text{Ni}(\text{NO}_3)_2$ is electrolysed between platinum electrodes using 0.1 Faraday electricity. How many mole of Ni will be deposited at the cathode?

A. 0.10

B. 0.15

C. 0.20

D. 0.05

Answer

16. The structures of beryllium chloride in the solid state and vapour phase, respectively, are :

A. Chain and chain

B. Chain and Dimeric

C. Dimeric and dimeric

D. Dimeric and chain

Answer

17. 10 mL of 1 mM surfactant solution forms a monolayer covering 0.24 cm^2 on a polar substrate. If the polar head is approximated as a cube, what is its edge length?

A. 2.0 pm

B. 0.1 nm

C. 2.0 nm

D. 1.0 pm

Answer

18. The one that is not a carbonate ore is:

A. Calamine

B. Siderite

C. Malachite

D. Bauxite

Answer

19. The maximum number of possible oxidation states of actinoides are shown by-

A. Neptunium (Np) and plutonium (Pu)

B. Nobelium (No) and lawrencium (Lr)

C. Berkelium (Bk) and californium (Cf)

D. Actinium (Ac) and thorium (Th)

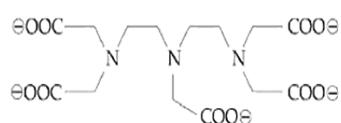
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20. Molal depression constant for a solvent is $4.0 \text{ K kg mol}^{-1}$. The depression in the freezing point of the solvent for 0.03 mol kg^{-1} solution of K_2SO_4 is : (Assume complete dissociation of the electrolyte)

- A. 0.24 K
B. 0.12 K
C. 0.18 K
D. 0.36 K

Answer

21. The maximum possible denticities of a ligand given below towards a common transition and inner-transition metal ion, respectively, are :



- A. 8 and 8
B. 6 and 8
C. 8 and 6
D. 6 and 6

Answer

22. Noradrenaline is a/an :

- A. Antacid
B. Antihistamine
C. Antidepressant
D. Neurotransmitter

Answer

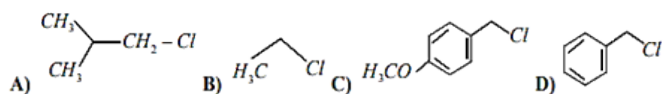
23. Which of the following compounds is a constituent of the polymer?



- A. Ammonia
B. Methylamine
C. Formaldehyde
D. N-methyl urea

Answer

24. Increasing order of reactivity of the following compounds for $\text{S}_\text{N}1$ substitution is:

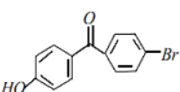
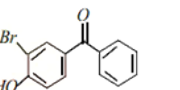
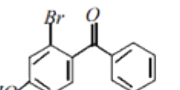
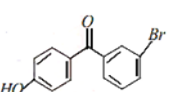


- A. $(\text{B}) < (\text{C}) < (\text{D}) < (\text{A})$
B. $(\text{A}) < (\text{B}) < (\text{D}) < (\text{C})$

D. (B) < (A) < (D) < (C)

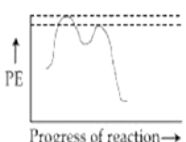
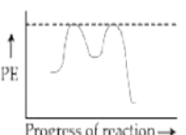
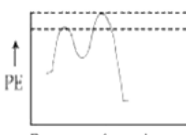
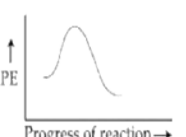
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25. *p*-Hydroxybenzophenone upon reaction with bromine in carbon tetrachloride gives:

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

Answer

26. Which of the following potential energy (PE) diagrams represents the S_N1 reaction?

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

Answer

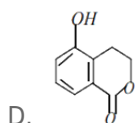
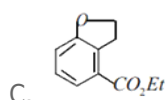
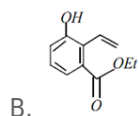
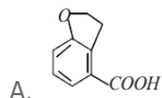
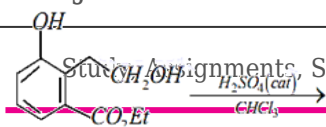
27. In the following reaction carbonyl compound + MeOH $\rightleftharpoons$ HCl acetal.

Rate of the reaction is highest for:

- A. Acetone as substrate and methanol in excess
- B. Propanal as substrate and methanol in stoichiometric amount.
- C. Propanal as substrate and methanol in excess.
- D. Acetone as substrate and methanol in stoichiometric amount.

Answer

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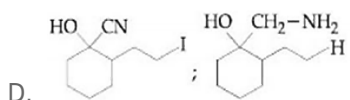
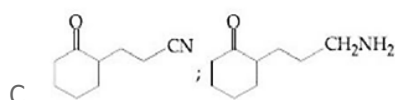
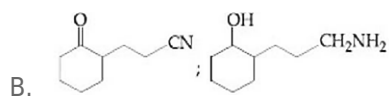
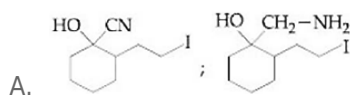
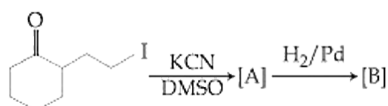
Answer

29. The peptide that gives positive ceric ammonium nitrate and carbylamines tests is:

- A. Asp-Gln
- B. Ser-Lys
- C. Gln-Asp
- D. Lys-Asp

Answer

30. The major products A and B for the following reactions are, respectively:



Answer