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Previous Year Paper

Chemistry - 2017

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Multiple Choice Questions

1. Uncertainty principle is valid for

- A. Proton
- B. Methane
- C. Both (a) and (b)
- D. $1\text{ }\mu\text{m}$ sized platinum particles

Answer

2. The energy of an electron in the 3S orbital (excited state) of H- atom is

- A. -1.5 eV
- B. -13.6 eV
- C. -3.4 eV
- D. -4.53 eV

Answer

3. Among the following, the molecule that will have the highest dipole moment is

- A. H_2
- B. HF
- C. HBr
- D. HCl

Answer

4. Which of the following pairs have identical bond order?

- A. CN^- and NO^+
- B. CN^- and O_2^-
- C. CN^- and CN^+
- D. NO^+ and O_2^-

Answer

5. A gas will approach ideal behavior at

- A. Low temperature and low pressure
- B. Low temperature and high pressure
- C. High temperature and low pressure
- D. High temperature and high pressure

Answer

6. Pressure of ideal and real gases at 0K are

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C. 0 and 0

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D. 0 and >0

Answer

7. For the process $A(1, 0.05 \text{ atm}, 32^\circ\text{C}) \rightarrow A(g, 0.05 \text{ atm}, 32^\circ\text{C})$

The correct set of thermodynamic parameters is

- A. $\Delta G = 0$ and $\Delta S = -ve$
- B. $\Delta G = 0$ and $\Delta S = +ve$
- C. $\Delta G = +ve$ and $\Delta S = 0$
- D. $\Delta G = -ve$ and $\Delta S = 0$

Answer

8. Mixing of N_2 and H_2 from an ideal gas mixture at room temperature in a container. For this process, which of the following statement is true?

- A. $\Delta H = 0$; $\Delta S_{\text{surrounding}} = 0$; $\Delta S_{\text{system}} = 0$ and $\Delta G = -ve$
- B. $\Delta H = 0$; $\Delta S_{\text{surrounding}} = 0$; $\Delta S_{\text{system}} > 0$ and $\Delta G = -ve$
- C. $\Delta H > 0$; $\Delta S_{\text{surrounding}} = 0$; $\Delta S_{\text{system}} > 0$ and $\Delta G = -ve$
- D. $\Delta H < 0$; $\Delta S_{\text{surrounding}} > 0$; $\Delta S_{\text{system}} < 0$ and $\Delta G = -ve$

Answer

9. In the $\ln K$ vs $1/T$ plot of a chemical process having $\Delta S^\circ > 0$ and $\Delta H^\circ < 0$, the slope is proportional to (where K is equilibrium constant).

- A. $-|\Delta H^\circ|$
- B. $|\Delta H^\circ|$
- C. ΔS°
- D. $-\Delta S^\circ$

Answer

10. For the process,

$32A \rightarrow B$, at 298 K, ΔG° is 163 kJ mol^{-1} . The composition of the reaction mixture is $[B] = 1$ and $[A] = 10000$. Predict the direction of the reaction and the relation between reaction quotient (Q) and the equilibrium constant (K).

- A. Forwards direction because $Q > K$
- B. Reverse direction because $Q > K$
- C. Forward direction because $Q < K$
- D. Reverse direction because $Q < K$

Answer

11. The molality of the 3M solution of methanol if the density of the solution is 0.9 g cm^{-3} is

- A. 3.73
- B. 3.0

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Answer

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12. Consider a fuel cell supplied with 1 mol of H_2 gas and 10 moles of O_2 gas. If fuel cell is operated at 9.63 mA current, how long will it deliver power? (Assume $1 F = 96500 \text{ C/mole of electrons}$).
- A. $1 \times 10^6 \text{ s}$
B. $0.5 \times 10^6 \text{ s}$
C. $2 \times 10^6 \text{ s}$
D. $4 \times 10^6 \text{ s}$

Answer

13. 10 g of $MgCO_3$ decomposes on heating to 0.1 mole CO_2 and 4 g MgO . The percent purity of $MgCO_3$ is
- A. 24%
B. 44%
C. 84%
D. 74%

Answer

14. The compound $Na_2CO_3 \cdot x H_2O$ has 50% H_2O by mass. The value of "x" is
- A. 4
B. 5
C. 6
D. 8

Answer

15. Hybridisation of carbon in CH_3-
- A. sp^2
B. sp^3
C. sp^3d
D. sp^3d^2

Answer

16. The common features among CO , CN^- and NO_2^+ are
- A. Bond order three and isoelectronic.
B. Bond order three and weak field ligands.
C. Bond order two and π -acceptors.
D. Bond order three and π -donors.

Answer

17. Which of the following is covalent?

A. NaCl

B. KCl

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D. MgCl_2

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Answer

18. The inert gas found most abundant in the atmosphere is

- A. He
- B. Ne
- C. Ar
- D. Kr

Answer

19. Water gas is produced by

- A. Passing steam over red hot coke
- B. Passing steam and air over red hot.
- C. Burning coke in excess air.
- D. Burning coke in limited supply of air.

Answer

20. The volume of oxygen liberated at STP from 15 mL of 20 volume H_2O_2 is

- A. 100 mL
- B. 200 mL
- C. 300 mL
- D. 400 mL

Answer

21. The strongest base among the following is

- A. Amide ion
- B. Hydroxide ion
- C. Trimethylamine
- D. Ammonia

Answer

22. When potassium is reacted with water which compound(s) is/are formed preferentially?

- A. K_2O
- B. KO_2
- C. Both K_2O and KO_2
- D. K_2O_2

Answer

23. Select the most appropriate statement in BF_3 .

- A. All the bonds are completely ionic.
- B. All the bonds are covalent.
- C. The B-F bond is partially ionic.
- D. B-F bond has partial double bond character.

Answer

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compound with the appropriate colour.

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A. K_2MnO_4 , green

B. KMnO_4 , purple

C. Mn_2O_3 , brown

D. Mn_3O_4 , black

Answer

25. Identify the case(s) where there is change in oxidation number

A. Acidified solution of CrO_4^{2-}

B. SO_2 gas bubbled through an acidic solution of $\text{Cr}_2\text{O}_7^{2-}$

C. Alkaline solution of $\text{Cr}_2\text{O}_7^{2-}$

D. Ammoniacal solution of CrO_4^{2-}

Answer

26. The solution which does not produce precipitate when treated with aqueous K_2CO_3 is

A. BaCl_2

B. CaBr_2

C. MgCl_2

D. Na_2SO_4

Answer

27. Lassaigne's test (with silver nitrate) is commonly used to detect halogens such as chlorine, bromine and iodine but not useful to detect fluorine because the product AgF formed is

A. Volatile

B. Reactive

C. Explosive

D. Soluble in water

Answer

28. The reaction of propene with HBr in the presence of peroxide proceeds through the intermediate

A. $\text{H}_3\text{C} - \dot{\text{C}}\text{H} - \text{CH}_3$

B. $\text{H}_3\text{C} - \text{C}\dot{\text{H}} - \text{CH}_2\text{Br}$

C. $\text{H}_3\text{C} - \text{CH}|\text{Br} - \text{C}\dot{\text{H}}_2$

D. $\text{H}_3\text{C} - \text{CH}_2 - \text{C}\dot{\text{H}}_2$

Answer

29. Cycloheptatrienyl cation is

A. Non-benzenoid and non-aromatic

B. Non-benzenoid and aromatic

C. Benzenoid and non-aromatic

D. Benzenoid and aromatic

Answer

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- A. Mechanism of the reaction in presence and absence of catalyst could be different.
B. Use of catalyst cannot change the order of the reaction.

- C. Catalyst enhances both forward and backwards reaction at equal rate.
D. Catalyst participates in the reaction, but not consumed in the process.

Answer

31. Solubility product (K_{sp}) of saturated $PbCl_2$ in water is $1.8 \times 10^{-4} \text{ mol}^3 \text{ dm}^{-9}$. What is the concentration of Pb^{2+} in the solution?

- A. $(0.45 \times 10^{-4})^{1/3} \text{ mol dm}^{-3}$
B. $(1.8 \times 10^{-4})^{1/3} \text{ mol dm}^{-3}$
C. $(0.9 \times 10^{-4})^{1/3} \text{ mol dm}^{-3}$
D. $(2.0 \times 10^{-4})^{1/3} \text{ mol dm}^{-3}$

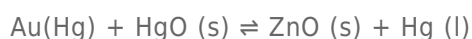
Answer

32. The freezing point of equimolal solution will be highest for

- A. $C_6H_5NH_3Cl$
B. D- fructose
C. $AgNO_3$
D. $Ca(NO_3)_2$

Answer

33. Consider the equilibrium obtained by electrically connecting zinc-amalgam $Zn(Hg)$ and HgO electrodes in mercury cell,



Under this equilibrium, what is the relation between the potential of the $Zn(Hg)$ and HgO electrodes measured against the standard hydrogen electrode?

- A. $Zn(Hg)$ electrode potential is equal to HgO electrode potential.
B. $Zn(Hg)$ electrode potential is more than HgO electrode potential.
C. HgO electrode potential is more than $Zn(Hg)$ electrode.
D. Cell voltage at above said equilibrium is 1.35 V

Answer

34. One mole of an unknown compound was treated with excess water and resulted in the evolution of two moles of a readily combustible gas. The resulting solution was treated with CO_2 and resulted in the formation of white turbidity. The unknown compound is

- A. Ca
B. CaH_2
C. $Ca(OH)_2$
D. $Ca(NO_3)_2$

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- A. Hall's process
B. Froth flotation process

- C. Bayer's process
D. Hoop's process

Answer

36. Corundum is mineral of aluminium.

- A. Silicate
B. Oxide
C. Double salt
D. Sulphate

Answer

37. If the boiling point difference between that two liquids is not much, the method is used to separate them

- A. Simple distillation
B. Distillation under reduced pressure
C. Steam distillation
D. Differential extraction

Answer

38. Protein is a polymer made of

- A. Carbohydrates
B. Amino acids
C. Nucleic acids
D. Carboxylic acids

Answer

39. The letter 'D' in D-carbohydrates represents

- A. Dextrorotation
B. Direct synthesis
C. Configuration
D. Mutarotation

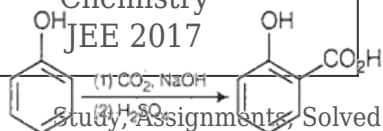
Answer

40. Phenol is a highly corrosive substance, but it 0.2 percent solution is used as

- A. Antibiotic
B. Antiseptic
C. Disinfectant
D. Antihistamine

Answer

41. Name of the following reaction is



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- A. Reimer-Tiemann
- B. Kolbe-Schmitt
- C. Cannizzaro
- D. Gattermann

Answer

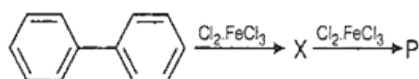
42. X and Y in the below reaction are and respectively



- A. SOCl_2 and $\text{C}_6\text{H}_5\text{CHO}$
- B. $(\text{COCl})_2$ and $\text{C}_6\text{H}_5\text{CH}_3$
- C. SOCl_2 and $\text{C}_6\text{H}_5\text{CH}_3$
- D. $(\text{COCl})_2$ and $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$

Answer

43. The major product P formed in the following reaction is



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

Answer

44. The correct increasing order of the acidic strength of acids, butyric acid (I), 2-chlorobutyric acid (II), 3-chlorobutyric acid (III) and 2, 2-dichlorobutyric acid (IV) is

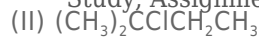
- A. $\text{I} < \text{II} < \text{III} < \text{IV}$
- B. $\text{III} < \text{II} < \text{IV} < \text{I}$
- C. $\text{I} < \text{III} < \text{II} < \text{IV}$
- D. $\text{III} < \text{I} < \text{II} < \text{IV}$

Answer

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(IV) Towards $\text{S}_{\text{N}}2$ displacement is

Answer

46. The condensation reaction between one equivalent of acetone and two equivalents of benzaldehyde in presence of dilute alkali leads to the formation of

A. Benzalacetophenone

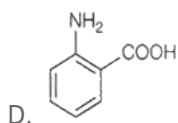
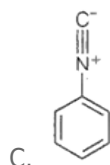
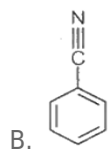
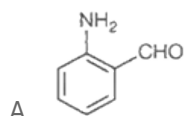
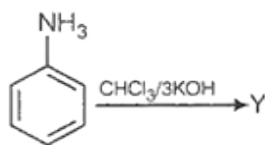
B. Benzylideneacetone

C. Dibenzylideneacetone

D. Benzoic acid and acetic acid

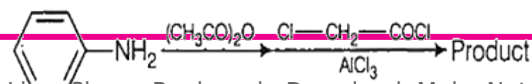
Answer

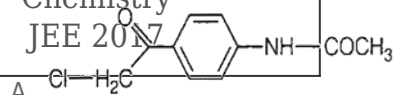
47. The product Y for the below reaction is



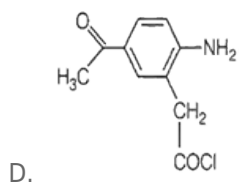
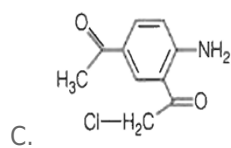
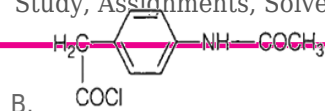
Answer

48. The product formed in the following reaction is

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Answer