CHEMISTRY

BOOKS - UNITED BOOK HOUSE

MODEL QUESTION PAPER 8

Exercise

1. Which of the following is the correct set of quantum numbers for the outer shell electrons of $_{21}Sc$?

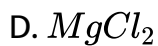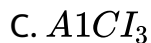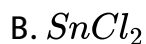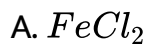   A. $3, 2, 0, +\dfrac{1}{2}$

    B. $4, 0, 0 + \dfrac{1}{2}$

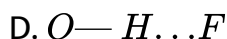   C. $3, 0, 0 - \dfrac{1}{2}$

    D. $4, 0, 7 - 1 + \dfrac{1}{2}$

Answer:

2. Among the following, the maximum covalent character is shown by.

A. $FeCl_2$

B. $SnCl_2$

C. $A1CI_3$

D. $MgCl_2$

Answer:

3. Which of the following hydrogen bonds is strongest?

A. O— $H...H$

B. F— $H..F$

C. O— $H...O$

D. O— $H...F$
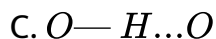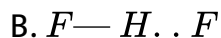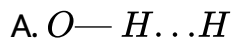
Answer:

4. The compressibility factor for a real gas at high pressure—

A. 1

B. $1 + P\dfrac{b}{R}T$

C. $1 - P\dfrac{b}{R}T$

D. $1 + R\dfrac{T}{P}b$

Answer:

5. For which reaction, change of entropy will be positive—

A. $H_2(g) + I_2(g) \rightleftharpoons 2_HI(g)$

B. $HCI(g) + NH_3(g) \rightleftharpoons NH_4CI(s)$

C. $NH_4NO_3(s) \rightleftharpoons N_2O(g) + 2H_2O(g)$

D. $MgO(s) + H_2(g) \rightleftharpoons Mg(s) + H_2O(g)$
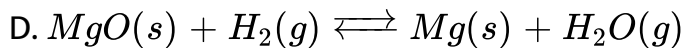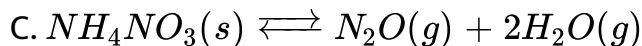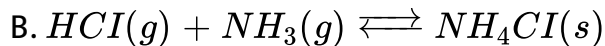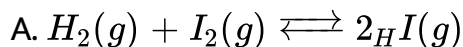
Answer:

6. Which one of the following is correct?

A. $-\Delta G = \Delta H - T\Delta S$

B. $\Delta H = \Delta G - T\Delta S$

C. $\Delta S = \dfrac{1}{T}[\Delta G - \Delta H]$

D. $\Delta S = \dfrac{1}{T}[\Delta H - \Delta G]$

Answer:

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7. For the reactions : $A \rightleftharpoons B, K_C = 1 B \rightleftharpoons C,$ $K_C = 2C \rightleftharpoons D, K_C$ for the reaction $A \rightleftharpoons D$ is—

A. 5

B. 6

C. 15

D. 1

Answer:

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8. Which of the following compounds is a peroxide—

A. KO_2

B. BaO_2

C. MnO_2

D. NO_2

Answer:

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9. NO_2 is not obtained on heating?

A. $AgNO_3$

B. KNO_3

C. $Cu(NO_3)_2$

D. $Pb(NO_3)_2$
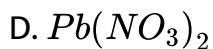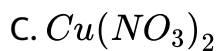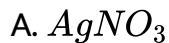
Answer:

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10. The major product 'P' of the following reaction is

$$CH_3CH{=}CH_2 \xrightarrow[\text{(peroxide)}]{HI} P$$

A. $CH_3CH_2CH_2I$

B. $CH_3CH(I)\!-\!CH_3$

C. $ICH_2\!-\!CH = CH_2$

D. $ICH_2\!-\!CH_2\!-\!CH_2I$
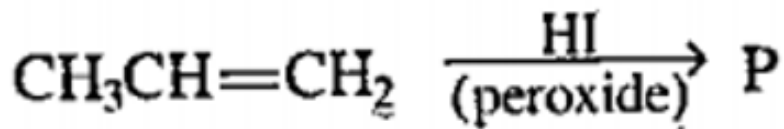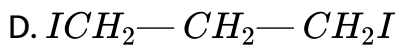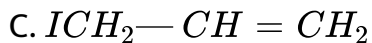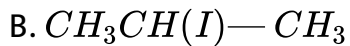
Answer:

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11. Which of the following compounds is most reactive towards electrophilic nitration reaction—

A. Toluene

B. Benzene

C. Benzoic acid

D. Nitrobenzene

Answer:

12. Chlorosis is caused by —

A. CO_2

B. SO_X

C. NO_X

D. $CHCI_3$

Answer:

13. The emperical formula of glucose is_____.

14. Write Duiong and Petit's law. How do you determine the atomic weight of element using this law?

15. Which one of the following ionic species has theleast ionic radius? F^-, Na^+, Mg^{2+}, N^3- .

16. Two elements have outer most electronic configuration as $2s^2$ and $2s^2\,2p^1$. Which one has higher ionisation energy?

17. Define an adiabatic process.

18. Derive the relation between vapour density of a gas and it's molecular mass.

19. What its the number of revolution per second of revolving electron in first Bohr orbit?

20. If ionising energy of 'H' atom is 13.6 eV, then what is the second ionising energy of He?2

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21. Explain why PbI_4 does not exist.

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22. What happens when SiO_2 is treated with HF.

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23. How would you establish the presence of chlorine in an organic compound. (Write only the process name and give

chemical reaction).

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24. Why aniline is less basic than methylamine?

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25. What is stone cancer?

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26. Determine the wavelength and frequency of the radiation having the longest wavelength in Lyman series of hydrogen atom.

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27. Elements A, B and C have atomic numbers (Z - 2). Z and (Z + 1) respectively. of these, B is an inert gas element:- which of these has the highest electronegativity?

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28. Elements A, B and C have atomic numbers (Z - 2). Z and (Z + 1) respectively. of these, B is an inert gas element:- Which one of them has the highest value of ionisation potential?

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29. Elements A, B ,C and atomic number (Z-2), Z and (Z+1) respectively. Of these, B is an inert gas. (a) which one of these has the highest electronegativity? (b) which one of these has the

highest value of ionisation potential (c) what is the compound formed by the combination of A and C?

30. Why the second electron gain enthalpy of oxygen is +vc value?

31. Write the name of the element which is diagonally related to the element beryllium.

32. Is there any change in hybridisation of B and N atoms as a result of the following reaction? $BF_3 + NH_3 \rightarrow F_3 . NH_3$

33. The percentage of ionic character of LiH is 76.81% and the bond length is $1.59g\overset{\circ}{A}$. What is the value of dipole moment of LiH molecule?

34. HF_2^- ion exists but HBr_2^- ion does not explain.

35. (i) Any real gas behaves ideally at very low pressure and high temperature explain.

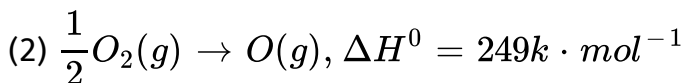(ii) The value of van der waals constant 'a' for N_2 and NH_3 are 1.37

and 4.30 $L^2 \cdot atm \cdot mol^{-2}$ respectively explain the difference in values.

36. State Daltons partial pressure laws and derive partial pressure and total pressure realtion.

37. Calculate the bond energy of O-H bond in $H_2O(g)$ at the standard state from the following data:
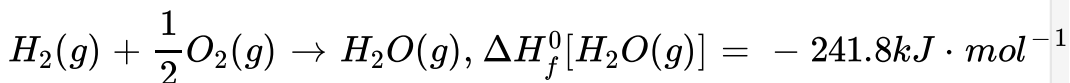
(1) $H_2(g) \rightarrow 2H(g)$, $\Delta H^0 = 436kJ \cdot mol^{-1}$

(2) $\dfrac{1}{2}O_2(g) \rightarrow O(g)$, $\Delta H^0 = 249k \cdot mol^{-1}$

(3)

$H_2(g) + \dfrac{1}{2}O_2(g) \rightarrow H_2O(g)$, $\Delta H_f^0[H_2O(g)] = -241.8kJ \cdot mol^{-1}$

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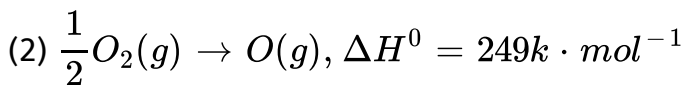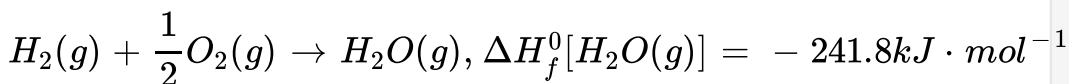
39. The latent heat of fusion of ice at $0°C$ is $6025.24J.\ mol^{-1}$. Calculate the molar entropy of the process at $0°C$.

40. What will be the change in entropy in an irreversible cyclic process ?
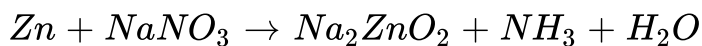
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41. What is the oxidation number of Fe atom in $K_4\left[Fe(CN)_6\right]$ molecule?

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42. Balance the following Chemical equation by oxidation number method :-$CuO + NH_3 \rightarrow Cu + N_2 + H_2O$

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43. Balance by ion electron method :

$$Zn + NaNO_3 \rightarrow Na_2ZnO_2 + NH_3 + H_2O$$

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44. Mention the oxidation number of Cr atom in CrO_5 molecule.

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45. What do you mean by ortho and para hydrogen ? explain why the chemical properties of ortho and parahydrogen are the same but their physical properties are different.

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46. Lithium forms monoxide while sodium forms peroxide in the presence of excess oxygen----Why?

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47. Which alkali metal is used for making photoelectric cells?

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48. Both alkaline earth metals and their salts are diamagnetic in nature explain.

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49. What happens when sodium peroxide dissolves in water.

50. Dipole moment of vinyl chloride $(CH_2 = CHCI)$ is less than ethyl chloride (CH_3CH_2CI) -- explain.

51. Arrange the following ions in order of increasing basicit :-

$CH_3CH_2, CH \equiv C, CH_2 = CH$

52. Which of two : $O_2N < H_2CH_2O$ or $CH_3CH_2O^-$ is more stable and why?

53. Give example of an ambident nucleophile.

54. A 0.l (M) solution of acetic acid is 1.34% ionised at $25°C$. Calculate the ionisation constant of the acid:-

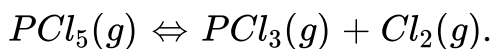**55.** consider the reaction $aX_2(g) + bY_2(g) \rightleftharpoons XY(g)$ theat and answer the following:- find the relation among a,b,c and K_c for the reaction at $25°C$ is 50. What is the value of K_p at same temperature?

56. What will be the effect of addition of an inert gas in the following equilibrium at constant temperature and volume? $PCl_5(g) \Leftrightarrow PCl_3(g) + Cl_2(g).$

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57. Give example of an acidic and an alkaline buffer solution. Explain the buffer action of any one of the solutions.

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58. What concept can justify that $NH_3 + BF_3 \rightarrow NH_3BF_3$ is an acid base reaction?

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59. How will you convert :- Carbon dioxide into carbon monoxide and carbon monoxide into carbon dioxide.

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60. Explain why $N(CH)_3)_3$ is more basic than $N(SiH_3)_3$.
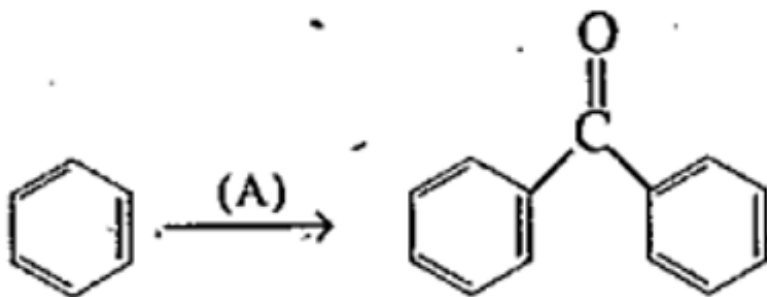
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61. What is thermit mixture? Mentain one use of it.

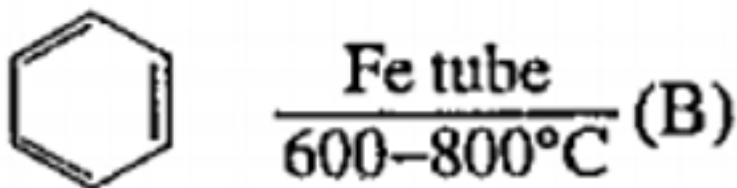▶ **Watch Video Solution**

62. Convert acetylene into but-2-ene.

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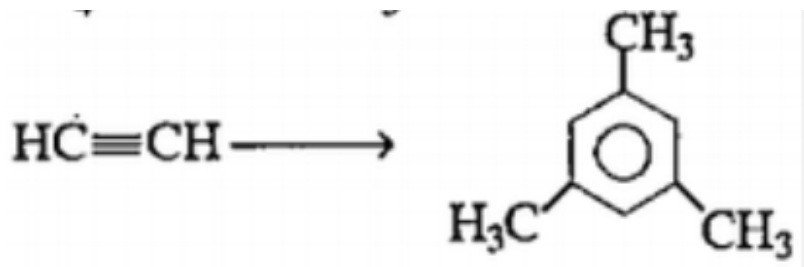
63. Identify 'A' in the figure:-

64. Identify 'B' in the figure:-

$$\frac{\text{Fe tube}}{600-800°C} \text{(B)}$$

65. Do the following conversions :-

$HC\equiv CH \longrightarrow$

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66. Do the following conversions :-

$$CH_3CH = CH_2 \rightarrow CH_3CH_2CH_2OH$$

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