CHEMISTRY

BOOKS - NAGEEN CHEMISTRY (ENGLISH)

SELF ASSESSMENT PAPER 03

Questions

1. The pressure of a gas is due to ..... exerted by its molecules per ..... of the walls of the container.

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2. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

[ΔS_{system}, energy, unit area, 0, similar, force, ΔS_{work}, 1, unit volume,

different, identical, hydrogenation, cyclisation, dehydrogenation]

For a spontaneous change, $\Delta S_{\text{total}} =$ _____ $+ \Delta S_{\text{surroundings}} >$ _____

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3. The enthalpy of combustion of C, H , and sucrose are -393.5 , -286.2, and -5644.2 kJ/mol calculate the enthalpy of formation of sucrose .

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4. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

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The conversion of n-hexane to benzene involves _____ and _____

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5. Which of the following when treated with a Grignard reagent yield (s) an alkane?

A. H_2O

B. C_2H_5OH

C. Both H_2O and CH_3CH_2OH

D. None of the two

Answer:

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6. The aqueous solution of $FeCl_3$ is

A. acidic

B. alkaline

C. neutral

D. either acidic or basic depending upon concentration.

Answer:

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7. The solubility in water of a sparingly soluble salt AB_2 is 1.0×10^{-5} mol L^{-1}. Its solubility product number will be

A. 4×10^{-15}

B. 4×10^{-10}

C. 1×10^{-15}

D. 1.0×10^{-10}

Answer:

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8. The total number of electrons that take part in forming bonds in O_2 is

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9. Match the following

(i)	MnO_4^-	(a)	Purification of water
(ii)	Geometrical Isomerism	(b)	good oxidizing agent
(iii)	Alum	(c)	CO_3^{2-}
(iv)	HCO_3^-	(d)	alkenes

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10. Name the term used when a quantity neither varies nor can have arbitrary values?

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11. State the expression for Heisenberg.s uncertainty principle.

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12. Give reasons why?

The size of cation is smaller than the size of parent atom.

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13. what is the general electronic configuration of the elements off-block?

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14. Name the type of reaction that occurs at anode in an electrochemical cell. Give an example.

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15. Write the Nernst equation at 298 K for the electrode reaction

$2H^+(0.1M) + 2e^- \rightarrow H_2(g)$

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16. Sort out electrophiles and nucleophiles among the following

$\overset{+}{N}O_2, CH_3\overset{+}{C}H_2, AlCl_3, C_2H_5OH, CN^-, \overset{-}{C}H_3$

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17. What type of electrons get displaced in

(i) inductive effect

(ii) electromeric effect?

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18. At 35^o ° C and 700 mm of hg pressure, a gas occupies a 500 ml volume. What will be its pressure when the temperature is 15^{oo} C and the volume of the gas is 450 ml?

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19. 0.303 g of an organic compound was analysed for nitrogen by Kjeldahl's method. The ammonia evolved was absorbed in 50 ml of 0.1 N H_2SO_4. The excess acid required 25 ml of 0.1 N NaOH for neutralisation. Calculate the percentage of nitrogen in the compound.

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20. 0.255 of an organic nitrogenous compound was Kjeldahlised and the ammonia evolved was absorbed in $50cm^3$ of $\frac{N}{10}H_2SO_4$. The excess acid required $10cm^3$ of $\frac{N}{5}$ NaOH. Calculate the percentage of nitrogen in the given compound

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21. Complete and balance the following equations:

$MnO_4^-(aq) + H_2O_2(aq) \rightarrow$ _____+_____

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22. Complete and balance the following equations:

$AlCl_3(g) + H_2O(l) \rightarrow$ _____+_____

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23. The volume of a gas X and chlorine diffusing during the same time and through same holes are 25mL and 29mL, respectively. If molecular mass of chlorine is 71, calculate the molecular mass of gas X.

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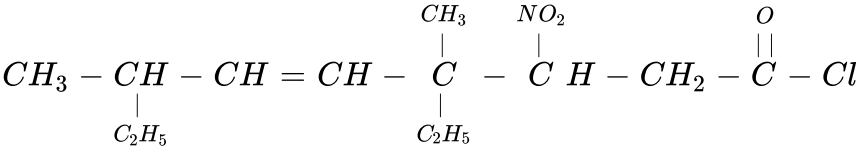
24. Write the systematic IUPAC name of the following compound.



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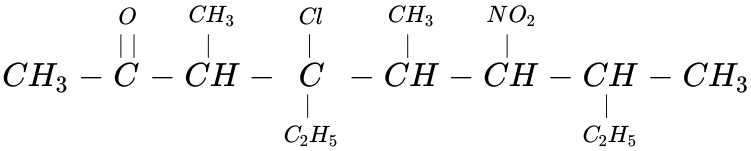
25. Write the IUPAC name of the following compound:



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26. Explain why :

Conc. nitric acid can be stored in aluminium containers.

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27. Give reasons

A mixture of dilute NaOH and aluminium pieces is used to open drain.

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28. How does benzene react with,

C_2H_5Cl in the presence of $AlCl_3$

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29. What happens when benzene is treated with acetyl chloride in the presence of anhydrous $AlCl_3$

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30. Calculate the bond orders of CO_3^{2-}

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31. How will you convert,

Ethane to butane

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32. What happens when aluminium reacts with water?

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33. Draw the Lewis structure of the following compounds:

$CH_3CH_2CH_3$

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34. Draw the Lewis structures of the following species :

BCl_3

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35. Draw the Lewis structures of the following species :

H_2S

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36. A sugar syrup of weight 214.2 g contains 34.2 g of sugar $(C_{12}H_{22}O_{11})$. Calculate (i) molal concentration (ii) mole fraction of sugar in the syrup.

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38. 4 g of O_2 and 2g of H_2 are confined in a vessel of capacity 1 litre at $0^\circ C$. Calculate

the number of moles of each gas

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39. 4 g of O_2 and 2g of H_2 are confined in a vessel of capacity 1 litre at $0^\circ C$. Calculate

the partial pressure of each gas, and

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40. 4g of O_2 and $2g$ of H_2 are confined in a vessel of capacity 1 litre at $0^\circ C$. Calculate

the total pressure of the gaseous mixture.

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41. Why are the second ionisation energies of alkaline earth metals much smaller than those of alkali metals ?

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42. Calculate the standard enthalpy change for the reaction

$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l),$

given that the standard heatds of formation of $CH_4(g, CO_2(g)$ and $H_2O(l)$ are $-74.91 mol^{-1}$, $-394.12 kJ mol^{-1}$ and $-286.31 kJ mol^{-1}$ respectivley.

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43. Define internal energy of a system.

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44. Which of the following processes are spontaneous and which are non-spontaneous ?

(i) Flow of air from high pressure to low pressure.

(ii) Formation of ice in a refrigerator.

(iii) Spreading of a drop of ink in water kept in a beaker.

(iv) Reverse osmosis.

(v) Burning of coal in air.

(vi) Dissolution of Cu in $ZnSO_4$ solution.

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47. Which of the following processes are spontaneous and which are non-spontaneous?

Reverse osmosis.

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48. What is the size of particulates?

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49. What is soil pollution and name the common soil pollutants?

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50. Differentiate between inductive and electromeric effect

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51. Discuss how the valence bond theory explains the pyramidal shape of NH_3 molecule.

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52. Balance the following equations by oxidation number method.

$MnO_2 + HCl \rightarrow MnCl_2 + Cl_2 + H_2O$

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53. Calculate the oxidation number of the underlined atom in the following molecules.

$H_2\underline{C}_2O_4$, $\underline{C}_6H_{12}O_6$, $\underline{Pb}_3O_4$, $\underline{lF}_7$, $H\underline{Cl}O$, $\underline{O}F_2$, $\underline{Ni}(CO)_4$, $H\underline{Au}Cl_4$, BaO_2,

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57. Balance the following equations by ion electron method.

$AsO_3^{3-} + I_2 + H_2O \rightarrow AsO_4^{3-} + H^+ + I^-$

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58. Calculate the oxidation number of the underlined atom in the following ions.

$\underline{S}O_4^{2-}$, $\left[\underline{Cr}(H_2O)_6\right]^{3+}$, $\left[\underline{Fe}(CN)_6\right]^{3-}$, CrO_4^{2-}, BrO_3^-

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62. An acid of molecular mass 104 contains 34.6% carbon and 3.85% hydrogen. 3.812 mg of the acid required 7.33 cm of 0.01 N NaOH for neutralisation. Suggest a structure for the acid.

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63. A hydrocarbon (A) containing 90% carbon and having V.D. 20 reacts with dil. H_2SO_4 in the presence of H_2SO_4 to give (B). Compound (B) is reduced by $LiAIH_4$ to (C) which on heating with H_2SO_4 gives (D). Compound (A) can be converted into (D) directly by hydrogenation in the presence of deactivated palladium-calcium carbonate catalyst. Identity the compounds (A) to (D) and explain the reactions involved.

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64. At 20° C the solubility of N_2 gas in water is 0.0150 g L^{-1} when the partial pressure of the gas is 580 torr . Find the solubility of nitrogen in water at $20^\circ C$ when the partial pressure is 800 torr.

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65. Calculate the degree of ionisation and $\left(H_3O^+\right)$ of a 0.15 M CH_3COOH solution. The dissociation constant of acetic acid is 1.8×10^{-5}

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66. The hydronium lon concentration of a fruit juice is 4.6×10^{-4} mol L^{-1}. What is the pH of the juice?

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67. A liquid is in equilibrium with its vapour in a seated container at a fixed temperature. The volume of the container is suddenly increased.

(a) What is the initial effect of the change on vapour pressure?

(b) How do rates of evaporation and condensation change initially?

(c) What happens when equilibrium is restored finally and what will be the final vapour pressure?

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