



CHEMISTRY

BOOKS - NAGEEN CHEMISTRY (ENGLISH)

SELF ASSESSMENT PAPER 2

Questions

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

(external, spontaneous, Reversible, internal, Carbon, irreversible, pressure-volume, 40, 30, chain, 60, position, 70, non-spontaneous)

_____ reactions never go to completion whereas _____ reactions proceed almost to completion.

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

(external, spontaneous, Reversible, internal, Carbon, irreversible, pressure-volume, 40, 30, chain, 60, position, 70, non-spontaneous)

The sum of _____ energy and _____ energy of a system is called enthalpy of the system.

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

(external, spontaneous, Reversible, internal, Carbon, irreversible, pressure-volume, 40, 30, chain, 60, position, 70, non-spontaneous)

Butan-1-ol and 2-methylpropan-1-ol differ in their _____ skeletons and show _____ isomerism.

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4. The knocking behaviour of a fuel with octane number 60 is the same as the mixture containing% iso-octane and% n-heptane.

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5. Benzene vapour mixed with air when passed over V_2O_5 catalyst at 775 K give

- A. glyoxal
- B. oxalic acid
- C. maleic anhydride
- D. fumaric acid

Answer:

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6. The process of evaporation of a liquid is accompanied by:
increase in enthalpy

decrease in entropy

no change in free energy

increase in entropy.

A. increase in enthalpy

B. decrease in entropy

C. no change in free energy

D. increase in entropy

Answer:



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7. The densities of two gases are in the ratio of 1:16. The ratio of their rates of diffusion is

A. 16:1

B. 4:1

C. 1:4

D. 1:16

Answer:



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8. 18g of water contains

A. 1g atom of hydrogen

B. 2g atom of hydrogen

C. 3g atom of hydrogen

D. None of the above

Answer:

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9. Draw the geometrical isomers of but-2-ene.

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10. What is the relationship between the atomic mass and actual mass of one atom of an element ?

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11. Name a compound whose empirical formula and molecular formula are equal.

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12. Among all the isomers of pentane which has the lowest boiling point ?

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13. What is the state of hybridisation of carbon atoms in benzene?

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14. Arrange BF_3 , BCl_3 , BBr_3 , BI_3 in the decreasing order of Lewis acid character and explain.

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15. For what purpose are the black diamonds used ?

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16. An atomic orbital has $n=3$, what are the possible values of l and m_l ?

(ii) List the quantum numbers (m_l and l) of electrons for 3d orbital .

(iii) which of the following orbitals are possible ?





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17. State the expression for Heisenberg's uncertainty principle.



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18. 0.400 g of chloroplatinate salt of a monoacid base on ignition gave 0.125 g of platinum. Find the molecular mass of the base.



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19. 1.26 g of a dibasic acid were dissolved in water and the solution made up to 200 mL. 20 mL of this solution were

completely neutralised by 10 mL of $\frac{N}{5}$ NaOH solution.

Calculate the equivalent mass and molecular mass of the acid.

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20. Why do boron halides act as Lewis acids ?

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21. Calculate the number of moles and number of molecules in 4.4 g of CO_2 . Also find its volume at N.T.P

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22. Write the IUPAC names of the following compounds:



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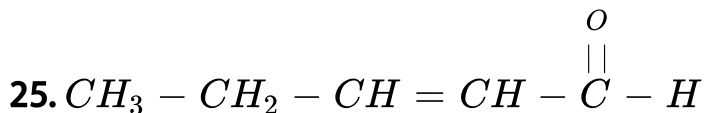
23. Write the IUPAC names of the following compounds:



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24. The hydroxides and carbonates of sodium and potassium are easily soluble in water while the corresponding salts of magnesium and calcium are sparingly soluble in water. Explain.

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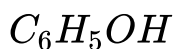
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26. For the following bond cleavages, use curved-arrows to show that electron flow and classify each as homolysis or heterolysis. Identify reactive intermediate produced as free radical, carbocation and carbanion



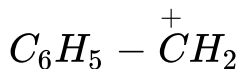
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27. Draw the resonance structures for the following compounds. Show the electron shift using curved-arrow notation.



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28. Draw the resonance structures for the following compounds. Show the electron shift using curved-arrow notation.



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29. If the starting material for the manufacture of silicones is $RSiCl_3$, write the structure of the product formed.

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30. Why is the bond energy of superoxide ion (O_2^-) less than that of O_2 molecule?

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31. On the basis of molecular orbital theory predict which of the following is paramagnetic.

He_2 and He_2^+

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32. 0.9367 g of cadmium combine with chlorine to form 1.5276 g of $CdCl_2$ - Find the equivalent mass of cadmium.

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33. What will be the pressure exerted by a mixture of 3.2 g of methane and 4.4 g of carbon dioxide contained in a 9 dm^3 flask at $27^\circ C$?

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34. What happens when magnesium is burnt in air ?

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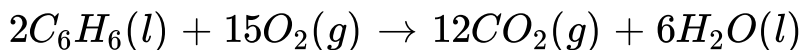
35. What happens when quick lime is heated with silica ?

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36. What happens when chlorine reacts with slaked lime?

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37. The difference between heats of reaction at constant pressure and constant volume for the reaction,



at $25^\circ C$ in kJ is

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38. State and explain Hess's law of constant heat summation. Illustrate it with examples. Discuss its important applications.

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39. Name a pollutant which is carcinogenic in nature

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40. What do you mean by green chemistry? How will it help decrease environmental pollution?

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41. What is the main difference between position isomerism and functional isomerism? Explain with an example.

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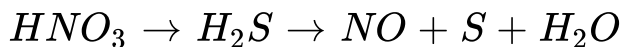
42. Why is meso-tartaric acid regarded achiral in nature ?

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43. Explain the structures of PCl_5 and SF_6 with in the framework of octet rule.

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44. Balance the following equations by oxidation number method.



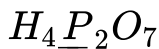
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45. Assign oxidation number to the underlined elements in each of the following species :



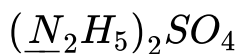
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46. Assign oxidation number to the underlined elements in each of the following species :



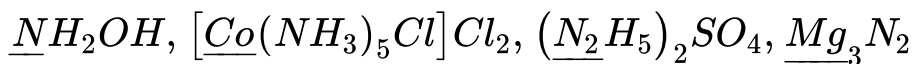
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47. Assign oxidation number to the underlined elements in each case



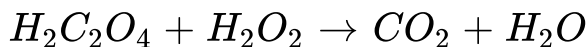
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48. Calculate the oxidation number of the underlined atoms in the following species.



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49. Balance the following equations by ion electron method.



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50. Consider the elements :

Cs ,Ne , I and F

(a) Identify the element that exhibits only negative oxidation state.

(b) Identify the element that exhibits only positive oxidation state.

(c) Identify the element that exhibits both positive and negative oxidation states.

(d) Identify the element which exhibits neither the negative nor does the positive oxidation state.



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51. Consider the elements :

Cs ,Ne , I and F

(a) Identify the element that exhibits only negative oxidation state.

(b) Identify the element that exhibits only positive oxidation state.

(c) Identify the element that exhibits both positive and negative oxidation states.

(d) Identify the element which exhibits neither the negative nor does the positive oxidation state.



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52. Consider the elements :

Cs ,Ne , I and F

- (a) Identify the element that exhibits only negative oxidation state.
- (b) Identify the element that exhibits only positive oxidation state.
- (c) Identify the element that exhibits both positive and negative oxidation states.
- (d) Identify the element which exhibits neither the negative nor does the positive oxidation state.



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53. Consider the elements :

Cs ,Ne , I and F

(a) Identify the element that exhibits only negative oxidation state.

(b) Identify the element that exhibits only positive oxidation state.

(c) Identify the element that exhibits both positive and negative oxidation states.

(d) Identify the element which exhibits neither the negative nor does the positive oxidation state.



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54. Deduce the structural formula of compounds (A) and (B)

on the basis of the following data:

Both (A) and (B) yield n-butane on reduction with Zn-Cu couple

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55. Deduce the structural formula of compounds (A) and (B) on the basis of the following data:

When refluxed with sodium and ether, (A) gives n-octane, whereas (B) yields 3, 4-dimethylhexane.

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56. Two isomeric compounds A and B have carbon 52.17%, hydrogen 13.04% and the rest being oxygen. Their vapour density is 23. Compound A on being treated with HI gives a

compound C, which when reacted with aqueous KOH gives C_2H_5OH . Identify compounds A, B and C and explain the reactions.

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57. Calculate the hydronium ion and hydroxyl ion concentrations in

(1) 0.001 M HCl

(ii) 0.01 M NaOH

at 298 K assuming that both HCl and NaOH are completely ionised

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58. Calculate the hydronium ion and hydroxyl ion concentrations in

(i) 0.001 M HCl

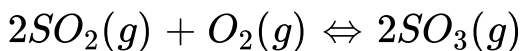
(ii) 0.01 M NaOH

at 298 K assuming that both HCl and NaOH are completely ionised

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59. What is K_c for the following equilibrium when the equilibrium concentration of each substance is :

$[SO_2] = 0.60M$, $[O_2] = 0.82M$ and $[SO_3] = 1.90M$?

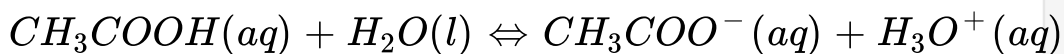


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60. The solubility of sodium chloride in water is 6.150molL^{-1} at 20°C . 80g of sodium chloride is dissolved in 100cm^3 of water at 20°C . How much sodium chloride is left undissolved ? After equilibrium is reached, an additional 50cm^3 of water is added to the system at the same temperature. Find the amount of NaCl present in the solution and in the undissolved state.

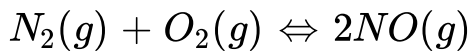
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61. Write the equilibrium constant expressions for the following reactions.



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62. Write the equilibrium constant expressions for the following reactions.



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