Diagnostic test-1

Directions:

- This test has 20 multiple-choice questions. For each question, one option is correct.
- You may use periodic table and calculator
- Periodic table is given on the last page of test.

Time – 30 minutes

Question 1

Which of the following is electron configuration of Fe^{2+}?

- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$
- $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6$
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$

Question 2

$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(g)$

Calculate the grams of CO_2 produced when 12g of CH_4 is combusted with excess of oxygen according to given equation?

a) 12g
b) 20g
c) 33g
d) 66g

Question 3

1.6mol of N_2 gas was taken in 500ml rigid container at 300K. What is the pressure of the container in atm? ($R = 0.0821 L.atm.K^{-1}.mol^{-1}$)

a) 78.8g
b) 39.9g
c) 23.5g
d) 44.6g

Question 4

Arrange Na^+, Mg^{2+}, S^{2-}, Cl^- in increasing order of ionic radius.

a) $Na^+ < Mg^{2+} < S^{2-} < Cl^-$
b) $Mg^{2+} < Na^+ < S^{2-} < Cl^-$
c) $Mg^{2+} < Na^+ < Cl^- < S^{2-}$
d) $Na^+ < Mg^{2+} < Cl^- < S^{2-}$

Question 5

Which of the element has highest first ionisation energy?

a) Na
b) Mg

c) Cl
d) S

Question 6

Which of the compounds has the highest mass percentage of oxygen?

a) Na_2SO_4
b) $Mg(NO_3)_2$
c) $KMnO_4$
d) Na_3PO_4

Question 7

A sample of Strontium contains three isotopes Sr-86, Sr-87 and Sr- 88. Their relative abundance is given below

Isotopes	Isotopic Mass	Relative abundance (%)
Sr-86	86	9.9
Sr-87	87	7.1
Sr-88	88	83

Calculate relative atomic mass of Strontium

a) 87.00
b) 88.21
c) 87.73
d) 86.45

Question 8

An ion has mass number 80 with proton number 34, and electron number 36. What is the identity of ion?

a) Se
b) Se^{+2}
c) Se^{-2}
d) Kr

Question 9

A student needs 5 moles of $Ca(NO_3)_2$ for an experiment. How much mass of $Ca(NO_3)_2$ should he weighed for this experiment?

a) 187.6g
b) 937.8g
c) 375.1g
d) 37.5g

Question 10

$CaCO_3(s) \longrightarrow CaO(s) + CO_2(g)$

2g $CaCO_3$ was decomposed according to equation above. What volume of CO_2 is produced at STP when CaCO3 is decomposed completely?

a) 0.61L
b) 0.78L
c) 0.45L
d) 0.22L

Question 11

Which of following lewis dot structure is correct for $SOCl_2$?

a) 1
b) 2
c) 3
d) 4

Question 12

Which of the following is correct shape of NO_3^-?

a) Tetrahedral
b) Trigonal Pyramidal
c) Trigonal Planar
d) Square Planar

Question 13

What type of substance is Graphite

a) Ionic Compound
b) Simple covalent molecule
c) Metal
d) Covalent network solid

Question 14

Metal can conduct the electricity in solid phase whereas ionic compound can not conduct electricity in solid phase. Which of the following is suitable option to justify these properties of substance?

a) Metal has delocalised electron in solid phase whereas ions are fixed in solid ionic compound.
b) Metal has delocalised cations in solid phase whereas ions are fixed in solid ionic compound.
c) Ionic compound has delocalised ions in solid phase whereas metal does not have delocalised cations.
d) Ionic compound has delocalised electrons in solid phase whereas metal does not have delocalised electrons.

Question 15

$2Mg(s) + O_2(g) \longrightarrow 2MgO(g)$

In an experiment, Magnesium (Mg) and oxygen(O_2) reacts to produce white solid product. Which of the following type of the product is formed in the reaction?

a) Covalent
b) Ionic
c) Metallic
d) Network solid

Question 16
Ethanol (CH_3CH_2OH) is miscible in water but hexane(C_6H_{14}) is immiscible. Which of the following can explain miscibility of these substances in water?

a) Ethanol is non-polar and miscible in polar water whereas hexane is polar and immiscible in polar water.
b) Ethanol is non-polar and miscible in non-polar water whereas hexane is polar and immiscible in non-polar water.
c) Ethanol is polar and miscible in non-polar water whereas hexane is non-polar and immiscible in non-polar water.
d) Ethanol is polar and miscible in polar water whereas hexane is non-polar and immiscible in polar water.

Question 17
Which of the following is conjugate base of HNO_2?

a) HNO_3^+
b) NO_2^-
c) NO_2^+
d) HNO_3^-

Question 18
Which of the following is conjugate acid of SO_4^{2-}?

a) H_2SO_4
b) HSO_4^{2-}
c) HSO_4^-
d) SO_3^{2-}

Question 19
In an experiment 100ml of 1M Na_2SO_4 was added into 100ml of 1M $Ba(NO_3)_2$ according to balanced equation given below.
$Na_2SO_4(aq) + Ba(NO_3)_2(aq) \longrightarrow BaSO_4(s) + 2NaNO_3(aq)$
Calculate the grams of $BaSO_4$ are produced in the experiment.

a) 23.34g
b) 46.68g
c) 11.67g
d) 34.87g

Question20
20g of NaOH is added in to water to make 300ml aqueous of NaOH solution. What is concentration(molarity) of the solution?

a) 0.5M

b) 1.5M
c) 1.67M
d) 0.017M