Cumilla Board 2016

## Chemistry

Subject Code | 1 | 3 | 7 |

(Creative Essay Type Questions)

Time — 2 hours 10 minutes

› Full marks — 40

[N.B.—The figures in the right margin indicate full marks. Read the stems carefully and answer the associated questions. Answer any **four** questions.]
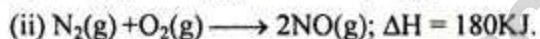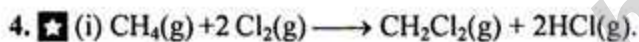
1. ★ (i) $FeCl_3 + H_2O \longrightarrow Fe(OH)_3 + HCl$.

   (ii) $CaCl_2 + 6H_2O \longrightarrow CaCl_2.6H_2O$.

a. Write the modern periodic law. 1

b. Though graphite is non-metal but it is good conductor— explain it. 2

c. How will you identify the metallic ion of (i) no. reaction? Write it with reaction. 3

d. Though both reactions of the stem occur in presence of water but their types are different— analyze it. 4

2. ▶ Saif and Shawon prepared 250 ml solution of 4.2gm of baking powder in a beaker and 300 ml 0.1M solution of HCl was in another beaker.

a. What is diffusion? 1

b. Explain the structure of SiO_2. 2

c. Determine the concentration of 1st solution of the stem. 3

d. Which one will be limiting reagent when solution of both beakers are mixed to each other? Analyze it mathematically. 4

3. ▶

$$\overset{\cdot\cdot}{X} \qquad \overset{\cdot\cdot}{:Y:} \qquad \cdot\overset{\cdot}{Z}\cdot$$
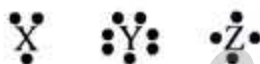
Though 'X' and 'Y' have tow energy shell but 'Z' element has three energy shell.

a. What is metallic bond? 1

b. Why is potasium alkali metal? 2

c. How will the compound which is formed by 'Y' and 'Z' element react with water? Analyze it with reaction. 3

d. Is it applicable octet law in the formation of the compound of 'X' and 'Y' element? Analyze it with bond formation. 4

4. ★ (i) $CH_4(g) + 2Cl_2(g) \longrightarrow CH_2Cl_2(g) + 2HCl(g)$.

   (ii) $N_2(g) + O_2(g) \longrightarrow 2NO(g); \Delta H = 180KJ$.

Here, bond energy of C—H, C—Cl, Cl—Cl and H—Cl are 414, 326, 244 and 431 KJ/mole.

a. Which one is the main component of toilet cleaner? 1

b. Why is electronegativity of chlorine more than that of bromine? Explain it. 2

c. Determine the value of ΔH of (i) no. reaction. 3

d. Effect of temperature on equilibrium state of above both reactions are completely opposite. Analyze it. 4

5. ▶ Calcium reacts with water and produces 'A' gas and 'B' compound. Again 'B' compound is heated with chlorine, 'C' compound is produced.

a. What is ore? 1

b. How does baking powder blow up cake? 2

c. Determine the amount of mass of 'A' gas of 50L at standard temperature and pressure. 3

d. Analyze the spot removing technique from cloth by 'C' compound. 4

6. ▶ 'A' is an alcohol of which molecular mass is 60. If 'A' is heated with concentrated sulphuric acid, water is removed and 'B' compound is produced.

a. What is electrolytic cell? 1

b. Explain the role of P^H to protect the beauty of health. 2

c. Determine the composition of 'A' compound. 3

d. Unsaturation of 'B' is identified by redox reaction. Analyze it with reaction. 4

[NB. Answer all the questions. Each question carries one mark. Block fully, with a ball point pen, the circle of the letter that stands for the correct/best answer in the "Answer Sheet" for the Multiple Choice Questions Examination.]

1. ★ How much energy in produced in nuclear fission reaction of one mole of U-235?
   (a) 2.0×10^{10} J   (b) 2.0×10^{11} J
   (c) 2.0×10^{12} J   (d) 2.0×10^{13} J

2. Which one accelerates the enzymatic activities in digestion?
   (a) H_2O (b) H_2CO_3
   (c) $NaCl$ (d) $NaOH$

3. Which one is used in condensation polymerization?
   (a) Organic acids   (b) Alkane
   (c) Alkene   (d) Alkyne

4. Ag^+ of Tollen's reagent—
   i. reacts with CH_3CHO and is reduced
   ii. fall as precipitance of Ag
   iii. reduce aldehyde to organic acid
   Which one is correct?
   (a) i and ii   (b) i and iii
   (c) ii and iii   (d) i, ii and iii

5. How many lone pair electrons are present in H_2O molecule?
   (a) 1   (b) 2
   (c) 3   (d) 4

6. Which one is used to spot bitten by bee?
   (a) Vinegar   (b) Salt
   (c) Sugar   (d) Lime

7. Which one is coinage metal?
   (a) Nickel   (b) Magnesium
   (c) Copper   (d) Chromium

8. The solute necessary to prepare 2 liter 0.1 molar $CuSO_4$. $5H_2O$ is—
   (a) 49.9 gm   (b) 99.89 gm
   (c) 249.5 gm   (d) 499 gm

9. ★ Which one is the ideal P^H of the body skin?
   (a) 5.3   (b) 5.4
   (c) 5.5   (d) 6.0

10. Which one is the second step in investigation and research?
    (a) Planning of project
    (b) Analysis of information and data
    (c) Acquire relevant knowledge about the subject
    (d) Experiment and information data collection

11. Which of the following is base?
    (a) Caustic soda   (b) Copper oxide
    (c) Iron hydroxide   (d) Vinegar

12. In nuclear reaction—
    i. heavy nucleus dissociates into smaller nucleus
    ii. heavy nucleus is formed by joining of smaller nucleus
    iii. electricity is produced by using produced heat energy
    Which one is correct?
    (a) i and ii   (b) ii and iii
    (c) i and iii   (d) i, ii and iii

13. Which is the oxidation of chromium in potassium dichromate?
    (a) $+3$ (b) $+5$
    (c) $+6$ (d) $+7$

Read the following information and answer questions no. 14—16 :—
Oxidation of an alcohol having three carbons produces 'X'. Further oxidation of 'X' produces 'Y' known as organic acid.

14. Which one is the alcohol in the stem?
    (a) Ethanol   (b) Methanol
    (c) Propanal   (d) Butanol

15. ★ What is the percentage of carbon in 'X'?
    (a) 48.65%   (b) 54.55%
    (c) 60%   (d) 62.07%

16. In the case of Y—
    i. It's molecular mass is 74
    ii. It gives Hydrogen ion in aqueous solution
    iii. It reacts with inorganic acids
    Which one is correct?
    (a) i and ii   (b) i and iii
    (c) ii and iii   (d) i, ii and iii

17. In which element of the following the electronic configuration is $1s^2\,2s^2\,2p^6\,3s^2\,3p^6\,3d^5\,4s^1$?
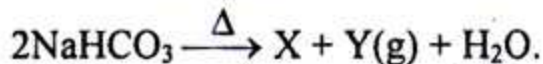   (a) Mn   (b) Cr
    (c) Sc   (d) Fe

18. The formula of 'Sinnabar' is—
    (a) ZnS (b) HgS
    (c) PbS (d) Cu_2S

19. In respect of percentage abundance, the two isotopes of ^{37}Cl and ^{35}Cl are—
    ⓐ 25% and 75%   ⓑ 35% and 65%
    ⓒ 65% and 35%   ⓓ 75% and 25%

Answer questions no. 20 & 21 on the basis of the following reaction :—

$2NaHCO_3 \xrightarrow{\Delta} X + Y(g) + H_2O$.

20. How much amount of 'X' compound will be needed to produce 250 ml semi-molar solution?
    ⓐ 2.65 gm   ⓑ 5.3 gm
    ⓒ 6.5 gm   ⓓ 13.25 gm

21. What is the mass of 5.5 liter of 'Y' compound at standard temperature and pressure?
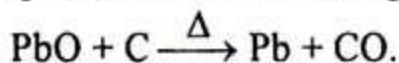   ⓐ 10.80 gm   ⓑ 5.40 gm
    ⓒ 2.80 gm   ⓓ 1.96 gm

22. ★ $CO_2(g) + H_2O(1) \longrightarrow A$
    What is the mass 0.5 mole of A?
    ⓐ 62.03 g   ⓑ 56.02 g
    ⓒ 31.00 g   ⓓ 28.01 g

Read the following reaction and answer questions no. 23 & 24 given below :—

$PbO + C \xrightarrow{\Delta} Pb + CO$.

23. Which one is the oxidant of the reaction?
    ⓐ C   ⓑ CO
    ⓒ PbO   ⓓ Pb

24. In this reaction takes place—
    i.   the reduction of PbO
    ii. the oxidation of C
    iii. oxidation-reduction simultaneously
    Which one is correct?
    ⓐ i and ii   ⓑ i and iii
    ⓒ ii and iii   ⓓ i, ii and iii

25. ★ How much gm of MgO is produced from 56 gm of Mg?
    ⓐ 11.67 gm   ⓑ 23.33 gm
    ⓒ 46.67 gm   ⓓ 93.33 gm

26. Which relieves the indigestion problem?
    ⓐ HCL   ⓑ $NaHCO_3$
    ⓒ NH_4HCO_3 ⓓ Na_2CO_3

27. What is the colour of the precipitation of $Al(OH)_3$?
    ⓐ White   ⓑ Light blue
    ⓒ Reddish brown   ⓓ Green

28. What is the volume of 1gm Nitrogen gas in standard condition?
    ⓐ 0.7 L   ⓑ 0.8 L
    ⓒ 1.6 L   ⓓ 3.2 L

29. On formation of which molecule, every atom attains the electronic configuration of neon?
    ⓐ KF   ⓑ MgO
    ⓒ CaS   ⓓ NaCl

30. ★ In the case of liquid substances—
    i.   volume is compressible with pressure
    ii. the intermolecular attraction of molecules is higher than that of solids
    iii. the motion of molecules is higher than that of solids
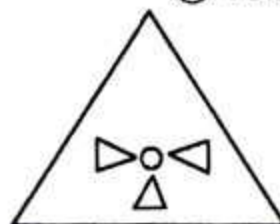   Which one is correct?
    ⓐ i and ii   ⓑ ii and iii
    ⓒ i and iii   ⓓ i, ii and iii

31. What is the bond energy of H—Cl?
    ⓐ 414 KJ   ⓑ 431 KJ
    ⓒ 435 KJ   ⓓ 464 KJ

32. What is the amount of copper and other metal in 22 carat gold?
    ⓐ 8.33%   ⓑ 12.5%
    ⓒ 18%   ⓓ 18.5%

From the above figure answer questions no. 33 & 34 :—

33. In which year the international ray sign was first used?
    ⓐ 1896   ⓑ 1936
    ⓒ 1946   ⓓ 1956

34. The symbolic ray of the stem signifies—
    i.   it may cripple the human body
    ii. causes cancer in body
    iii. store in special container
    Which one is correct?
    ⓐ i and ii   ⓑ ii and iii
    ⓒ i and iii   ⓓ i, ii and iii

35. Whose rate of effusion is lowest?
    ⓐ H_2 ⓑ CO
    ⓒ He   ⓓ CH_4

| Ans. | 1 | ⓐ | 2 | ⓑ | 3 | ⓐ | 4 | ⓐ | 5 | ⓑ | 6 | ⓓ | 7 | ⓒ | 8 | ⓐ | 9 | ⓒ | 10 | ⓒ | 11 | ⓐ | 12 | ⓓ | 13 | ⓒ | 14 | ⓒ | 15 | ⓓ | 16 | ⓐ | 17 | ⓑ | 18 | ⓑ | 19 | ⓐ | 20 | ⓓ |
| | 21 | ⓐ | 22 | ⓒ | 23 | ⓒ | 24 | ⓓ | 25 | ⓓ | 26 | ⓑ | 27 | ⓐ | 28 | ⓑ | 29 | ⓑ | 30 | ⓒ | 31 | ⓑ | 32 | ⓐ | 33 | ⓒ | 34 | ⓓ | 35 | ⓑ | | | | | | | | | | |