AMRITA VIDYALAYAM

ANNUAL EXAMINATION 2017 -'18

Class : XI **Marks : 70**

Time : 3 hrs

CHEMISTRY (043)

General Instructions:

1. All questions are compulsory.

2. Question No. 1 to 5 are very short answer questions of 1 mark each.

3. Question No. 6 to 10 are short answer questions of 2 marks each.

4. Question No. 11 to 22 are also short answer questions of 3 marks each.

5. Question No. 23 is a value based question of 4 marks.

6. Question No. 24 to 26 are long answer questions of 5 marks each.

7. Use log tables if necessary. Use of calculator is not allowed.

1. State Heisenberg's uncertainty principle.
2. . What is photoelectric effect?
3. What is octet rule?
4. What do you mean by Biochemical Oxygen Demand?
5. Write the IUPAC name of $H \equiv C\text{-}CH_2\text{-}CH_2\text{-}CH_2\text{-}CH_2$.
6. What is smog? How is classical smog different from photochemical smogs?
7. Using s, p, d notations, describe the orbital with the following quantum numbers.
   a) n = 1, l = 0 b) n = 3, l = 1 c) n = 4, l = 2 d) n = 4, l = 0
8. The pK_b of acetic acid and pK_b of ammonium hydroxide are 4.76 and 4.75 respectively. Calculate the pH of ammonium acetate solution.
9. Among NH_3, H_2O and HF, which would you expect to have highest magnititude of hydrogen bonding? Why?
10. Discuss the chemistry of Lassaigne's test.
11. a) Would you expect the first ionisation enthalpies for two isotopes of the same element to be the same or different? Explain.
    b) The increasing order of reactivity among group 1 elements is Li < Na < K < Rb < Cs whereas that among group 17 elements is F > Cl > Br > I. Explain.
12. a) What is the basic difference between the terms electron gain enthalpy and electronegativity?
    b) What are isoelectronic species? Give example.
13. Discuss the shape of the following molecules using VSEPR model.
    $BeCl_2$, BCl_3, $SiCl_4$
14. a) What is bond order?
    b) Calculate the number of sigma and pi bonds present in
    (i) $CH_3\text{-}CH{=}CH_2$ (ii) C_2H_4
15. a) Which out of NH_3 and NF_3 has higher dipole moment and why?
    b) Define hydrogen bond.
16. a) Calculate the volume occupied by 8.8 g of CO_2 at 31.1^0 C and 1 bar pressure.
    b) Explain the physical significance of van der waals parameters.
17. Calculate the molar solubility of Ni $(OH)_2$ in 0.10 M NaOH. The ionic product of N i$(OH)_2$ is 2×10^{-15}.
18. Discuss the principle and method of softening of hard water by synthetic ion exchange resins.

    OR

    What do you understand by
    a) syn gas? b) water gas shift reaction? c) fuel cell?

19. a) What is the oxidation state of K in KO_2?
b) Why do alkali metals impart colour to flame?

20. a) Why are lithium salts are easily hydrated and that of other alkali ions are usually anhydrous?
b) Potassium Carbonate can not be prepared by solvay process. Why?
c) What happens when chlorine reacts with slaked lime?

21. In sulphur estimation, 0.157 g 0f an organic compound gave 0.4813 g of barium sulphate. What is the percentage of sulphur in the compound?

22. What are eletrophiles and nucleophiles? Explain with examples.

23. After entering a closed coal mine area, Ravi found difficulty in breathing, also felt nausea.
a) What could be the reason for this?
b) How could Ravi estimate the level of the pollutant?
c) As a citizen of the country what should be his course of action further?

24. a) Which of the following are Lewis acids?
H_2O, BF_3, NH_4^+
b) The pH of a sample of vinegar is 3.76. Calculate the concentration of H^+ ion in it.
c) What is buffer solution?

OR

a) A liquid is in equilibrium with its vapour in a sealed container at a fixed temperature. The volume of the container is suddenly increased.
(i) What is the intial effect of the change on vapour pressure?
(ii) How do evaporation and condensation change initially?
(iii) What happens when equilibrium is restored finally and what wil be the final pressure?
b) Find out K_c for the following equlibria.
$CaCO_3 \rightleftarrows CaO + CO_2$ $K_p = 167$ at 1073 K

25. a) Give reasons.
(i) Conc.HNO_3 can be transported in Aluminium containers.
(ii) Graphite is used as a lubricant.
(iii) Aluminium alloys are used to make air craft body.
c) Draw the resonance structures of CO_3^{2-}.

OR

a) If B-Cl bond has dipole moment, explain why BCl_3 molecule has zero dipole moment.
b) Draw the structure of diborane.
c) Suggest a reason why CO is poisonous.

26. a) Why is a solution of potassium hydroxide used to absorb carbondioxide evolved during the estimation of carbon present in an organic compound?
b) Why is it necessary to use acetic acid and not sulphuric acid for acidification of sodium extract for testing sulphur by lead acetate test?
c) What are the hybridisation states of each carbon atom in the following compounds?
(i) $CH_2 = C = O$ (ii) $CH_3\text{–}CH = CH_2$

OR

a) Explain the principle of paper chromatography.
b) Explain the terms inductive and electromeric effects. Which electron displacement explains the following correct orders of acidity of the carboxalic acids?
$Cl_3CCOOH > Cl_2CHCOOH > ClCH_2COOH$