

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

(CCSS)

Chemistry—Complementary Course

CHIC 01—GENERAL CHEMISTRY

Time : Three Hours

Maximum : 30 Weightage

I. Answer *all* the 12 questions. Each question has a weightage of $\frac{1}{4}$. This part contains multiple choice, fill in the blank and one word answer questions :

- 1 Plants absorb ground water and give off excess water through leaves by the process of :
 - (a) Respiration.
 - (b) Transpiration.
 - (c) Evaporation.
 - (d) Osmosis.
- 2 The altitude range of the stratosphere is nearly :
 - (a) 11 - 50 km.
 - (b) 5 - 20 km.
 - (c) 40 - 80 km.
 - (d) 50 - 100 km.
- 3 The region around the nucleus where there is a probability of locating the electron is called the :
 - (a) Orbit.
 - (b) Orbital.
 - (c) Probability distribution region.
 - (d) None of these.
- 4 The hybridization of chlorine atom in ClF_3 molecule is :
 - (a) sp^2 .
 - (b) sp^3d .
 - (c) sp^3 .
 - (d) sp^3d^2 .
- 5 Carboxy haemoglobin is formed when haemoglobin reacts with :
 - (a) Cyanide.
 - (b) Carbon dioxide.
 - (c) Carbon monoxide.
 - (d) Tricarbon dioxide.
- 6 The energy required for photosynthesis occurring in dark is derived from the hydrolysis of :
 - (a) Glucose.
 - (b) Phosphoric acid.
 - (c) Chloroplast.
 - (d) ATP.
- 7 The concept of conjugate bases and conjugate acids is given in the :
 - (a) Bronsted theory.
 - (b) Lewis theory.
 - (c) Luxflood theory.
 - (d) Usanovich theory.

Turn over

8 A mixture of lead chloride and silver chloride can be separated with :

(a) boiling water.

(b) dil.HCl.

(c) KI solution.

(d) dil HNO₃.

9 Nitrogen from the atmosphere can directly be converted into plant food by _____ bacteria.

10 The type of error which is classified into methodic, operative and instrumental is _____.

11 Column chromatography is based on the retention of solute by _____.

12 Which property of electron is made use of in electron microscope ?

(12 × ¼ = 3 weightage)

II. Answer *all* 9 questions. Each question has a weightage 1. Answers may be in one sentence or two :

13 What are the different segments of the environment ?

14 Briefly outline the sulphur cycle.

15 What are the pollutants present in automobile exhausts ?

16 State and explain the Schrödinger wave equation.

17 Explain the hybridization of Ni in [Ni (CN)₄]²⁻.

18 Give the molecular orbital electronic configuration of B₂ and calculate its bond order.

19 Discuss the biochemistry of Zinc.

20 Distinguish between accuracy and precision.

21 Explain the action of N-phenyl anthranilic acid as a redox indicator.

(9 × 1 = 9 weightage)

III. Answer any *five* questions. Each question has a weightage of 2. Answers may be in a *paragraph* :

22 What is Smog ? Discuss the formation of different types of smogs.

23 Ozone layer depletion is observed mainly over Antartica ? Explain.

24 Derive an expression for the radius of an electron orbit in hydrogen like atoms using the Bohr theory.

25 Calculate the uncertainty in position of an electron having a mass 9.1×10^{-31} kgs and moving with a velocity of 10^6 ms⁻¹ if the uncertainty in momentum is 10%.

26 Explain how the weights in a weight box are calibrated.

27 Discuss the theory of the titration between a strong base and a weak acid.

28 Briefly outline the technique of thin layer chromatography. What are its advantages over paper chromatography ?

(5 × 2 = 10 weightage)

IV. Answer any *two* questions. Each question has a weightage of 4 :

- 29 (a) Name the important heavy metals that pollute water and explain their sources.
(b) What is space quantisation ?
- 30 Explain the structure and mechanism of action of sodium potassium pump.
- 31 Discuss the role of (i) H_2S and HCl and (ii) NH_4OH and NH_4Cl in the qualitative analysis of cations.

(2 x 4 = 8 weightage)

42