D 9489 (Pages : 3) Name.....

Reg. No.....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

(CCSS)

Chemistry—Core Course I

CHI B01—FOUNDATIONS IN CHEMISTRY

Time : Three Hours Maximum : 30 Weightage

I. Answer all *twelve* questions. Each question has a weightage 1/4. Choose the correct answer :

1 When $^{238}_{92}U$ emits an alpha-particle, the N/P ratio of the daughter element :

(a) increases. (b) decreases.

(c) is unaffected. (d) is unpredictable.

2 The energy source of the stars is :

(a) atomic fusion. (b) atomic fission.

(c) radioactive decay. (d) bombardment reaction.

3 Which of the following can be used as control rod in nuclear reactors ?

(a) Graphite. (b) Boronsteel.

(c) Sodium. (d) Lead.

4 Whether the C-0 bond or the 0—H bond is broken in —C(=O)—0—H of the ester during ester hydrolysis can be studied using :

(a) deuterium as tracer. (b) oxygen-18 as tracer.

(c) carbon-14 as tracer. (d) tritium as tracer.

5 If the 7th period is also complete, the p-block of the periodic table will contain :

(a) 30 elements. (b) 32 elements.

(c) 34 elements. (d) 36 elements.

6 In a given atom screening effect is maximum for the :

(a) s-electrons. (b) p-electrons.

(c) d-electrons. (d) f-electrons.

7 Which of the following elements has the lowest ionization enthalpy among them ?

(a) Carbon. (b) Nitrogen.

(c) Oxygen. (d) Fluorine.

8 The ionic radii of S^{2-}, K^+ and Ca^{2+} are in the order :

(a) $S^{2-} > K^+ > Ca^{2+}$. (b) $Ca^{2+} >$ > S2-

(c) $Ca^{2+} > S^{2-} > Cl^-$. (d) $K^+ > Ca^{2+} > Cl > S^{2-}$.

9 The branch of chemistry which deals with chemical reactions in living systems is known as :

(a) Organic Chemistry. (b) Medicinal Chemistry.

(c) Biochemistry. (d) Phytochemistry.

10 Chemicals which are used as medicines to lower body temperature are called :

(a) Analgesics. (b) Antipyretics.

(c) Antibiotics. (d) Antiseptics.

11 The temperature at which water has maximum density is :

(a) 0° C. (b) 4° C.

(c) 15° C. (d) 100° C.

12 Theories consist of postulates put forward in order to explain :

(a) Observations. (b) Practical information.

(c) Laws. (d) Scientific knowledge.

(12 x = 3 weightage)

II. Answer *all* nine questions. Each question has a weightage 1. Answer these questions in one sentence *or* two:

13 Differentiate between Science and what is not science.

14 What is the importance of dying in textiles ?

15 Outline the Wohler's experiment which was a blow to the vital force theory.

16 State and explain the modern periodic law.

17 What is covalent radius ? How does it vary in a period ?

18 How does beryllium differ from the rest of the elements of its group ?

19 Name the isotopes with which the (4n + 1) radioactive series begins and terminates. Give the name of the series.

20 What is artificial transmutation ? Give two examples.

21 What is mass defect ? How is it related to binding energy ?

x 1 = 9 weightage)

III. Answer any *five* questions. Each question has a weightage 2, these are short essay questions :

22 The carbon-14 activity of a fresh piece of wood is 16.3 beta particles per minute per gram carbon whereas that of a fossil is 4.5 beta particles per minute per gram carbon. Calculate the age of the fossil if the half-life of carbon-14 is 5760 years.

23 The half-life of Ra-226 is 1590 years. Calculate the number of Rutherfords present in 2.26 g. of radius.

24 What is diagonal relationship ? List examples. Mention some of the similarities in properties of elements so related.

25 Discuss the Pauling scale of electronegativity.

26 How do the properties of ionic and covalent compounds differ ?

27 Discuss the application of Chemistry to agriculture.

28 Explain with examples :

(a) Supramolecules (b) Nanomaterials.

(5 x 2 = 10 weightage)

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

29 Outline any four important revolutionary discoveries in science.

30 Explain with examples the isomerism exhibited by organic compounds.

31 (a) Calculate the screening constant and the effective nuclear charge for the 3p electrons in argon.

(b) How is N/P ratio related to the stability of an isotope ? How does NIP ratio decide the type of particles emitted by a radioisotope ?

(2 x 4 = 8 weightage)