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FIRST SEMESTER B.Sc. DEGREE EXAMINATION, JANUARY 2013

(CCSS)

Chemistry

CH IB 01—FOUNDATIONS IN CHEMISTRY

Time : Three Hours

Maximum : 30 Weightage

I. Answer *all* twelve questions. Each question has a weightage of ¼. This part contains multiple choice, fill in the blank and one word answer questions :

1 Scientific data can be represented by using :

   (a) Tables.
   (b) Graphs.
   (c) Diagrams.
   (d) All the above.

2 Which of the following forms a criterion of purity of organic compound :

   (a) Molecular mass.
   (b) Empirical mass.
   (c) Melting and boiling points.
   (d) Solubility.

3 Which element of 2nd period forms most acidic oxide :

   (a) Fluorine.
   (b) Nitrogen.
   (c) Boron.
   (d) Carbon.

4 A theory is an explanation for proven ———— and so it is accepted by the scientific fraternity.

   (a) Hypothesis.
   (b) Document.
   (c) Observation.
   (d) Knowledge.

5 Bohr's model of atom is not in agreement with :

   (a) Line spectrum of hydrogen atom.

   (b) Pauli's exclusion principle.

   (c) Plank's theory.

   (d) Heisenberg's uncertainty principle.

6 The subatomic particles responsible for keeping the nucleons together in a nucleus :

   (a) Meson.
   (b) Nutrino.
   (c) Positron.
   (d) Neutron.

7 Which of the following has maximum ionization power :

   (a) α-rays.
   (b) β-rays.
   (c) γ-rays.
   (d) X-rays.

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8 The material used for absorbing nuetrons in a nuclear reactor is :

    (a) Cd.   (b) Ra.

    (c) U.   (d) Zn.

9 $_{94}Pu^{241} \rightarrow \underline{\quad\quad} + \beta$.

10 The generalization of observed facts is called.

11 Chemical substances which are utilized as medicines to lower body temperature are ca[...]

12 Drugs which produce sleep and reduce anxiety are.

$(12 \times \frac{1}{4} = 3$ weig[...]

II. Answer *all* nine questions. Each question has a weightage of 1. Answers may be in one se[...] *or two :*

13 The half-life period of a radioactive element is 5 days. Calculate the decay constant.

14 Which is group displacement law ?

15 What is the principle of hydrogen bomb ?

16 Ca^{2+} ion is smaller than Ca atom. Why ?

17 Why tritium is radioactive but not deuterium ?

18 Electron affinities of noble gases are zero. Why ?

19 The beach sand of Kerala contains the ore of an important element which can be u[...] nuclear power generations. Identify the element and the ore.

20 Beryllium and Nitrogen of the second period of periodic table have slightly higher ioni[...] energy than expected. Why ?

21 How a scientific theory is different from hypothesis ?

$(9 \times 1 = 9$ weig[...]

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

22 Detergents are preferred for the cleansing of clothes to soaps in hard water. Why ?

23 Briefly explain the Aston's mass spectrograph.

24 With the help of suitbale example mention the geometrical isomerism shown by o[...] compounds.

25 Discuss the anomalous behaviuor of Be.

26 Define binding energy. Calculate the binding energy/nucleon of the helium atom. M[...] $_2He^4$ nuclei is 4.0026 amu. Mass of neutron = 1.008665 amu, Mass of proton = 1.00727[...]

27 Discuss the importance of chemical science to the service of men taking fertilizers as an ex[...]

28 Explain why the ionization energy of the transition elements is reasonably constant.

$(5 \times 2 = 10$ weig[...]

IV. Answer any *two* questions. Each question has a weightage of 2 :

29 Explain the application of radioisotopes.

30 Briefly describe the steps involved in the development of theory from observations.

31 Brifely explain how the technological development enhances the living standards of [...] beings.

$(2 \times 4 = 8$ wei[...]