

FIRST SEMESTER B.Sc. DEGREE EXAMINATION
JANUARY 2014

(UG-CCSS)

Core Course – Chemistry

CH IB 01 – FOUNDATIONS IN CHEMISTRY

Time : Three Hours

Maximum : 30 Weightage

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

1. Numerology is an example of :
(a) Pure science (b) Pseudo science.
(c) Theoretical science (d) None of these.
2. The first step in a scientific studies is :
(a) Observation. (b) Law.
(c) Hypothesis. (d) Theory.
3. In which of the branches of chemistry would the development of a theory about how a reaction takes place best be carried out ?
(a) Organic. (b) Inorganic.
(c) Physical. (d) Analytical.
4. A mixture of NH_4Cl and sand can be separated by :
(a) Sublimation. (b) Decantation.
(c) Evaporation. (d) Centrifugation.
5. Which of the following has weakest C-C bond strength?
(a) C_6H_6 . (b) C_2H_2 .
(c) C_2H_4 . (d) C_2H_6 .
6. The nuclide Iron-56 has a mass defect of 0.52840 amu. What is the binding energy per nucleon in Mev?
(a) 8.81. (b) 9.79×10^{-17} .
(c) 8.81×10^3 . (d) 494.

Turn over

the nuclide formed when ^{203}Pb undergoes positron emission takes place from _____

- (a) ^{203}Pb (b) ^{203}Bi
(c) ^{206}Bi (d) ^{209}At

8. Name the person who developed a table of elements which revealed regularities in elemental properties in 1869 :

- (a) Theodore Richards. (b) Dmitri Mendeleev.
(c) Antoine Lavoisier. (d) Svante Arrhenius.

9. The low density of ice than water can be explained by _____ bonding in water.

10. The source of energy in sun is the _____ of hydrogen to form helium.

11. When we move from left to right of the periodic table in a period, the electronegativity of the atoms _____

12. The natural rubber is formed from the monomeric units _____

(12 x ¼ = 3 weightage)

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

13. What is hypothesis?

14. Why solar energy is preferred over conventional energy resources?

15. What is paracetamol? What medical effect does it produce in the human body?

16. Water is a liquid while H_2S is a gas at ordinary temperature. Why?

17. What do you mean by artificial transmutation of elements? Write an example.

18. Why the electron affinities of atoms increase from left to right of the periodic table?

19. How will you explain the emission of β -particle from the nucleus of a radioactive element?

20. Account for the C–C bond length of 1.39 Å in benzene when the single C–C bond length in ethane is 1.54 Å and C = C double bond length in ethylene is 1.34 Å unit.

21. The isotopes of hydrogen ^1H and ^2H are stable while ^3H is radioactive. Why?

(9 x 1 = 9 weightage)

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

22. What is a postulate? How it is different from law?

23. Briefly discuss the Slater's rule for screening effect.

24. Nuclear fusion reactions are not employed for power generation. Why?

25. What are metalloids? How will you distinguish them from metals?
26. How will you explain the stability of nucleus by exchange theory?
27. Briefly explain how ^{14}C dating is used for the determination of age of fossils.
28. One nanogram of ^{32}P was injected into a living system for tracer studies. The half life of ^{32}P was 14.3 days. How long will it take for the radioactivity to reduce to 20% of its initial value?

(5 x 2 = 10 weightage)

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

29. Write the important steps involved in the formation of theory from observation.
30. Briefly discuss the different electronegativity scales.
31. Chemistry helps to increase the harvest of agricultural products but its side effects make them not acceptable to general public. Discuss.

(2 x 4 = 8 weightage)