

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, November 2019

First Degree Programme under CBCSS

Complementary Course for Biochemistry/Home Science

CH 1131.5/CH 1131.6 – INORGANIC AND ANALYTICAL CHEMISTRY

(2017 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A (Very short answer questions)

Answer **all** questions. Each question carries 1 mark.

1. What are isotopes?
2. What is the Bohr radius of hydrogen atom?
3. How many haeme units are present in a molecule of myoglobin?
4. What is meant by half-life period of a radioactive compound?
5. What are the n and l values of $3d$ orbital?
6. What are the units of radioactivity?
7. What is the equivalent mass of oxalic acid?

P.T.O.

8. Define normality.
9. Give an example for an indicator that can be used for the titration of Na_2CO_3 vs H_2SO_4 ?
10. What is the general formula of Grignard reagent?

(10 × 1 = 10 Marks)

SECTION – B (Short answer questions)

Answer **any eight** questions. Each question carries **2** marks.

11. Write the Schrodinger wave equation and explain the terms.
12. Explain the chemistry involved in the titration of $\text{K}_2\text{Cr}_2\text{O}_7$ vs FeSO_4 .
13. Arrange the electronic configurations d^0 , d^1 , d^5 and d^{10} in the increasing order of energy.
14. Explain the term mass defect.
15. Calculate the amount of KMnO_4 required for preparing 1 L of N/10 solution.
16. What is the significance of n/p ratio?
17. State Hund's rule
18. What is Stark effect?
19. What is meant by packing fraction?
20. Write the ground state sub-shell electronic configurations of Na and S.
21. Give a method for the preparation of organosilicon compound.
22. Define average life of a radioactive compound.

(8 × 2 = 16 Marks)

SECTION – C (Short Essay questions)

Answer **any six** questions. Each question carries **4** marks.

23. Explain the origin of hydrogen spectrum on the basis of Bohr's atomic theory.
24. Discuss the structural features and functions of myoglobin.
25. Discuss the applications of organometallics in medicine.
26. What is Wilson's cloud chamber? How does it work?
27. Calculate the binding energy of helium atom. Mass of hydrogen atom = 1.007825 amu, neutron = 1.008665 amu, helium atom = 4.00260 amu.
28. Explain the term induced radioactivity.
29. Explain the Ostwald theory of acid-base indicators.
30. What are the requirements for a primary standard used in a volumetric analysis?
31. Calculate the frequency of spectral line of hydrogen atom when the electron jumps from the third orbit to the ground state. [Mass of an electron = 9.109×10^{-31} kg, $h = 6.626 \times 10^{-34}$ JS, charge of an electron = 1.602×10^{-19} C, and permittivity factor ($4\pi\epsilon_0$) = 1.1264×10^{-10} C²N⁻¹m⁻²].

(6 × 4 = 24 Marks)

SECTION – D (Long Essay questions)

Answer **any two** questions. Each question carries **15** marks.

32. Write a brief note on (a) classification of organometallic compounds (b) the role of hemoglobin in the transport of oxygen and carbon dioxide.

33. Derive Bohr equation. How it can be used to calculate the spectral frequency of atomic spectrum?
34. What are redox indicators? Explain the theory of redox indicators with suitable examples.
35. Write a short note on
- (a) stability of nucleus
 - (b) radioactive decay series
 - (c) application of radioactivity in agriculture.

(2 × 15 = 30 Marks)
