H – 2218

Reg. No. : ....

Name : ....

First Semester B.Sc. Degree Examination, November 2019

Career Related First Degree Programme under CBCSS

Group 2(a) : Biochemistry and Industrial Microbiology

Complementary Course I-CH 1131.7 : BASIC THEORETICAL AND ANALYTICAL CHEMISTRY

(2014 Admission onwards)

Time : 3 Hours　　　　　　　　　　　　　　　　　　　Max. Marks : 80

SECTION – A

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

1. The Bohr radius gives the size of the ————————

2. Doubly ionized helium atoms are known as ————————

3. The electrical conductivity of metals ———————— with increasing temperature

4. A negative value of the packing fraction indicates that the isotope is ————————

5. The microwave rays are observed at frequency range of ———————— in the electromagnetic spectrum.

6. The hydroxyl band in IR is observed at ———————— cm".

7. ———————— and ———————— are used for the IV group cation precipitation.

P.T.O.

8. —————————— is used as the indicator in iodometry

9. As per WHO the COD of drinking water should be ——————

10. Use of fertilizers is the main cause of —————— pollution.

SECTION – B

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

11. What are the assumptions of Bohr Theory?

12. What is Aufbau principle?

13. What is hybridization?

14. How hydrogen bonding influences the properties of *ortho* and para isomers?

15. What is decay constant?

16. What is 'Q' value of nuclear reaction?

17. Discuss the selection rule for Infrared spectra.

18. What are the factors that affect the carbonyl frequency in IR?

19. What is common ion effect?

20. What is the principle of calorimetry?

21. What is smog? How is it affecting the pollution?

22. What is BOD? How is it determined?

SECTION – C

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

23. State and explain the Hund's rule.

24. What is the wavelength of an electron moving at 5.31×10^6 m/sec? Given: mass of electron $= 9.11 \times 10^{-31}$ kg; $h = 6.626 \times 10^{-34}$ J.s.

25. What is Born Haber Cycle? What is its significance?

26. What is dipole moment? What are the factors affecting dipole moment of a molecule?

27. Describe the effect of inter-molecular hydrogen bonding on the IR frequencies?

28. Distinguish between primary and secondary standard in analytical chemistry.

29. What is the principle of volumetric analysis? Describe the various types of volumetric analysis.

30. What are the methods used for the analysis of oxides of sulfur?

31. Briefly describe the formation and significance of ozone layer.

(6 × 4 = 24 Marks)

SECTION – D

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

32. (a) What is an orbital? Draw the shapes of $2p_y$ and $3d_{z^2}$ orbitals.

    (b) Discuss the postulates of Bohr Theory

    (c) Explain the induced ratio activity   (5 + 5 + 5)

33. (a) Briefly describe the hydrogen bonding in biological system.

    (b) What are nuclear fission reactions? Discuss.

    (c) Briefly describe the applications of radioactivity.   (5 + 5 + 5)

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34. (a) What are the differences between atomic and molecular spectroscopy?

    (b) Distinguish between rotational vibrational spectroscopy.

    (c) Distinguish between iodometry and iodimetry.   (5 + 5 + 5)

35. (a) Explain the applications of solubility product and ionic product in qualitative analysis.

    (b) Briefly explain the structure of atmosphere

    (c) Describe the causes of air pollution   (5 + 5 + 5)

(2 × 15 = 30 Marks)

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