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Reg. No. : .....

Name : .....

First Semester B.Sc. Degree Examination, November 2019

First Degree Programme under CBCSS

Complementary Course I for Botany/Zoology/Microbiology

CH 1131.3/CH 1131.4 : THEORETICAL CHEMISTRY

(2014–2016 Admissions)

Time : 3 Hours

Max. Marks : 80

SECTION – A

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

1. Write Schrödinger wave equation. Explain the terms.

2. For the principal quantum number $n = 3$. Write all possible values of l and m.

3. Write electronic configuration of Cu^{+}. Justify your answer.

4. NO^{+} is more stable than NO. Why?

5. O_2 is paramagnetic. Why?

6. Write one example for bonding with (a) d^2sp^3 (b) dsp^2.

7. Write two examples for primary standards.

P.T.O.

8. Write structure of EDTA.

9. Name two organometallic compounds used in medium.

10. Define organometallic compound.

(10 × 1 = 10 Marks)

SECTION – B

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

11. Find the frequency in cm^{-1} for the first line in Balmer series of atomic hydrogen $R = 109700\ cm^{-1}$.

12. State and explain Afbau principle.

13. What is Lanthanide contraction?

14. Bond angle in water 104.5°. Justify the statement.

15. Explain with example 'partial ionic character'.

16. Arrange O_2, O_2^+ and O_2^- in the increasing order of stability. Justify your answer.

17. 3.16 g of $KMnO_4$ is dissolved in 500 ml of water. Find the concentration in molarity and normality.

18. Name two redox indicators.

19. Methyl orange is used as indicator in the titration of sodium carbonate against HCl. Why?

20. Name two organometallic compounds of Fe. Write their structure.

21. Name two antitumour drugs. Write their structure.

22. Name two organometallic compounds used in agriculture. Write their structure.

(8 × 2 = 16 Marks)

SECTION – C

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

23. Discuss atomic spectrum of hydrogen.

24. Compare electronic configuration of actinides and lanthanides.

25. Discuss shapes of s, p and d atomic orbitals.

26. Using suitable example discuss sp^3d^3 hybridization.

27. Briefly discuss H-bonding.

28. Discuss theory of acid base indictors.

29. What is Ćodometry ? Discuss.

30. Discuss environmental aspects of organometallic compounds.

31. Name two organometallic compounds of Hg. How are they synthesised? Discuss.

(6 × 4 = 24 Marks)

SECTION – D

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

32. Discuss Bohr theory of H atom.

33. Discuss briefly LCAO method of bonding.

34. Discuss the applications of dichromate in titrimetry.

35. Discuss synthesis and applications of organometallic compounds of Fe.

(2 × 15 = 30 Marks)