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Reg. No. : .....

Name : .....

# First Semester B.Sc. Degree Examination, February 2018
## First Degree Programme Under CBCSS
## CHEMISTRY
## CH 1131/CH 1131.3/CH 1131.4 – Theoretical Chemistry
## (for Microbiology/Botany/Zoology)
## (2017 Admission)

Time : 3 Hours Max. Marks : 80

### SECTION – A

Answer **all** questions. Answer is **one** word of maximum **two** sentence. **Each** question carries **one** mark.

1. Give the electronic configuration of chromium (Cr) (Atomic Number 24).
2. How many orbital are possible for the main energy level n = 4 ?
3. What is green house effect ?
4. What is the indicator used in strong acid against strong base titration ?
5. Differentiate between iodometry and iodimetry.
6. Define normality.
7. What is COD ?
8. Calculate the bond order of $He_2$ molecule.
9. Write down the equation for Beer Lambert law.
10. What is hybridization ?

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### SECTION – B

Short answer type. Answer **any 8** questions. **Each** question carries **2** marks.

11. List out the different factors affecting the purity of water.
12. What is meant by bond order ? How is it related bond length and bond energy ?

P.T.O.

13. The bond angle in $H_2O$ is 104.5° while that $H_2S$ is 90°. How will you account for this ?

14. What are the consequences of ozone depletion ?

15. How will you prepare 500 ml of 0.5 N Potassium dichromate ?

16. Draw the titration curve for strong acid against strong base.

17. What is reverse osmosis ?

18. Which series of line in the hydrogen atom spectrum is in the visible region ? Which electronic transition will give this ?

19. What is the significance of the 4 quantum numbers of the electron ?

20. Explain Beer's law.

21. Mention the hybridization involved in $XeF_2$, $BF_3$, $SF_6$.

22. Mention the limitations of Bohr's theory.

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## SECTION – C

Short essay. Answer **any six** questions from the following. **Each** question carries **four** marks.

23. Show that the circumference of the Bohr orbit of the Hydrogen atom is an integral multiple of the de Brogle wave length associated with the electrone.

24. Explain the MO theory of $O_2$ molecule.

25. Discuss the theory of redox indicators.

26. Explain the structure of $PCl_5$ using the principle of hybridization.

27. Explain the method of determination of BOD.

28. Discuss the importance of ozone layer. Explain the mechanism of ozone layer depletion.

29. Discuss the method of colorimetric determination of iron.

30. Calculate the energy of radiation emitted associated with transfer of electron from $5^{th}$ energy level to $2^{nd}$ energy level. (Energy of electron in $1^{st}$ level is $-2.18 \times 10^{-18}$ j/atom)

31. Explain the energetic of ionic bond formation.

## SECTION – D

Essay. Answer **any two** questions from the following. **Each** question carries **15** marks.

32. a) Discuss the VSEPR theory. How can you apply this theory to predict the shape of ammonium ion and chlorine trifluoride ?

    b) Explain the theory of acid-base indicators.

    c) What is Green House effect ? Mention the sources of green house gases.

33. a) Give an account of permanganometric titration using oxalic acid and $KMnO_4$ as an example.

    b) Explain the Born-Haber cycle considering the formation of NaCl as an example.

    c) Write a note on classification of air pollutants.

34. a) Discuss the important postulates of Bohr theory. What are its draw backs ?

    b) Explain quantum numbers with its significance.

    c) Write a note on hydrogen bonding with its consequence on boiling point and solubility.

35. a) Briefly explain the atomic spectrum of hydrogen.

    b) Explain the various steps involved in the purification of waste water.

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