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D – 5139

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, February 2018
Career Related First Degree Programme under CBCSS
Group 2(a) : BIO-CHEMISTRY AND INDUSTRIAL MICROBIOLOGY
Complementary Course – I
CH 1131.7 : Basic Theoretical and Analytical Chemistry
(2013 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

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

1. Write down the hydrogen halides in the decreasing order of their dipole moments.
2. State the rule which restricts the maximum number of electrons in an orbital.
3. Give an example of a molecule in which the central atom is sp hybridised.
4. Define half life period of a radioactive element.
5. What are thermonuclear reactions ?
6. Give the relationship between wave length and wave number.
7. Distinguish between molarity and molality.
8. What is meant by a buffer solution ?
9. Name the major air pollutants released from automobile exhausts.
10. Write the photochemical reaction sequence leading to the formation of ozone in the stratosphere. **(10×1=10 Marks)**

P.T.O.



SECTION – B

Answer **any 8** questions, **not** exceeding a paragraph. **Each** question carries **2** marks :

11. Why NH_3 is having more dipole moment than NF_3 ?
 12. Write down the electronic configuration of O_2 molecule and explain its magnetic property.
 13. PCl_5 has the shape of trigonal bipyramidal whereas IF_5 is square pyramidal. Why ?
 14. Define lattice energy of a crystal.
 15. Name the various regions of electromagnetic spectrum and the corresponding spectroscopic methods of analysis.
 16. What are selection rules in spectroscopy ? Give the selection rules for IR spectroscopy.
 17. What is meant by 'induced radioactivity' ? Give an example.
 18. Explain radioactive equilibrium.
 19. State and explain Beer-Lambert's law.
 20. Explain why potassium permanganate cannot be used as primary standard.
 21. What are the causes of ozone layer depletion ?
 22. Mention the consequences caused by air pollution due to nitrogen oxides.
- (8×2=16 Marks)**

SECTION – C

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

23. What are the essentials of VSEPR theory ?
24. State and explain Auf bau principle.
25. Explain the factors affecting the stability of a nucleus.



26. Describe a method for the determination of the age of a carbonaceous fossil.
27. Write a note on transuranic elements.
28. Discuss the application of IR spectroscopy in chemical analysis.
29. Briefly describe the theory and application of complexometric titrations.
30. What is Green House Effect ? Discuss the methods which may be adopted to reduce Green House gas emissions.
31. What is photochemical smog ? How is it formed ? What are its constituents ?
(6×4=24 Marks)

SECTION – D

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

32. Discuss the postulates of Bohr's theory. Explain its merits and limitations.
 33. Derive the expression for rotational energy levels of diatomic molecules and show that the spectral lines are equally spaced.
 34. Discuss the applications of solubility product principle and common ion effect in qualitative analysis.
 35. Describe the principle and procedure involved in the determination of COD and BOD of water samples. Explain how water pollution can be assessed using these parameters.
(2×15=30 Marks)
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