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Reg. No. : .....

Name : .....

Second Semester B.Sc. Degree Examination, July 2014
First Degree Programme under CBCSS
Complementary Course – Chemistry
CH 1231.1/ CH 1231.2 – PRINCIPLES OF CHEMISTRY
(For Physics and Geology)
(2013 Admissions)

Time : 3 Hours Max. Marks :80

SECTION – A

Answer **all** questions. Answer in **one word** to maximum of **two** sentences. **Each** question carries **one** mark.

1. Mention any two units used to express dose.
2. How is n/p ratio related to the stability of the nucleus ?
3. What is the essential condition for a molecule to give rotational spectrum ?
4. Arrange the different electromagnetic radiations in the order of increasing wavelength.
5. Which is the finger print region in an IR spectrum of an organic compound ?
6. The EMF of a cell is 1.30 V and the positive electrode has a potential of 0.50V. Calculate the potential of the negative electrode ?
7. What is meant by standard electrode potential ?
8. Which indicator can be used in the titration of a weak base vs strong acid ?
9. Define the term molarity.
10. Differentiate between accuracy and precision. **(10×1=10 Marks)**

SECTION – B

Short answer type (**Not** to exceed one paragraph) Answer **any 8** from the following. **Each** question carries **two** marks.

11. What is the principle of neutron activation analysis ?

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12. Mention the essential conditions to be satisfied by a chemical dosimeter.
13. Explain the term radioactive equilibrium.
14. How is force constant of a bond related to bond length, bond order and bond energy ?
15. The first line in the rotational spectrum of HCl appears at $21.18cm^{-1}$. Calculate the moment of inertia of HCl.
16. Distinguish between stokes and antistokes lines with regard to Raman spectra.
17. Explain electrolyte concentration cell without transference with an example.
18. Sketch and explain the conductometric titration curve for the strong acid vs strong base titration.
19. Discuss the electrochemical theory of corrosion.
20. Differentiate between primary and secondary standard substances with examples.
21. Explain the theory of redox indicators.
22. Discuss the principle of volumetric analysis. **(8×2=16 Marks)**

SECTION – C

Short essay (**Not** to exceed **120** words) Answer **any 6** from the following. **Each** question carries **four** marks.

23. Distinguish between nuclear fission and nuclear fusion.
24. How is radioactivity detected using Wilson's cloud chamber method ?
25. Describe the radiocarbon dating technique.
26. How are bond stretching frequencies calculated in IR spectroscopy.
27. Distinguish between the structures of 1-propanol and 2-propanol using the NMR method.
28. Explain the Hittorf's method for the determination of transport number.
29. Explain the working of H_2-O_2 fuel cells.
30. Discuss the Ostwald's theory of acid-base indicators.
31. Discuss the principles of permanganometric and dichrometric titrations **(6×4=24 Marks)**

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SECTION –D

Long essay Answer **any two** questions from the following. **Each** question carries **fifteen** marks.

32. a) Discuss the applications of radioisotopes with suitable examples.

b) The activity of C-14 in an old sample of wood is found to be one-fourth of that in a fresh piece of wood. Calculate the age of the wood if the half-life of C-14 is 5730 years.

33. a) How can you use the microwave spectra to determine the bond length of a diatomic molecule.

b) Sketch the vibrational modes of CO_2 and specify which are IR active.

34. a) Discuss the principle of Calomel electrode.

b) Explain the principle of potentiometric titration with a suitable example and mention its advantages.

35. a) How are the errors classified in analytical chemistry ?

b) Suggest the methods for the detection and correction of determinate errors.

(2×15 = 30 Marks)

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