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Reg. No. : .....

Name : .....

Second Semester B.Sc. Degree Examination, August 2018

First Degree Programme under CBCSS

CHEMISTRY

Complementary Course II for Physics / Geology

CH 1231.1 / CH 1231.2 : Principles of Chemistry – II

(2013 – 2016 Admissions)

Time : 3 Hours Max. Marks : 80

SECTION – A

(Very Short Answer Type Questions)

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

1. What are isotones ?
2. State Geiger Nuttal rule.
3. Define rad.
4. Arrange the following in the increasing order of energy UV, IR, MW and Radio waves.
5. How is frequency related to wavelength and energy ?
6. What is meant by standard electrode potential ?
7. Define the term corrosion.
8. State Nernst equation for cell potential.
9. What is a primary standard in volumetric analysis ?
10. What do the terms absolute error and relative error mean with regard to analytical chemistry ?

(10×1=10 Marks)

P.T.O.

SECTION – B

(Short Answer Questions)

Answer **any eight** questions. **Each** carries **2** marks.

11. What are redox titrations ?

12. How does N-phenyl anthranilic acid function as indicator in the titration of ferrous iron against dichromate ?

13. Define mean and median with regard to a number of analytical measurements.

14. What is a fuel cell ? Give an example.

15. Give an example for a metal-insoluble metal salt electrode.

16. What is a concentration cell ?

17. Define zero point energy.

18. Under what conditions of atomic number and mass number does the spin of a nucleus become integral and half integral ?

19. Define chemical shift.

20. Explain the term mass deffect.

21. Explain the term packing fraction.

22. What is meant by artificial transmutation ?

(8×2=16 Marks)

SECTION – C

(Short Essay Questions)

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

23. Explain the term tracers with suitable examples.

24. 0.20 mg of a radioactive material decays to 0.12 mg in 12.5 hours. Calculate its decay constant and half life period.

25. Describe the radio carbon dating technique.

26. Calculate and compare the energies of two radiations, one with wavelength 400 nm and other with wave length 800 nm.

27. Given that the fundamental vibrational frequency for HI is 2192.5 cm^{-1}, calculate the force constant of the HI bond.

28. What is Raman shift ? Give the classical theory of Raman effect.

29. Write a note on potentiometric titrations.

30. Calculate the EMF at 298 K of the cell

$Zn(s) \mid Zn^{2+}$ (0.1 M) || Ag^{+} (0.1 M) | Ag(s) E^{0} Zn/Zn^{2+} is – 0.76 V and E^{0} Ag/Ag^{+} is 0.80 V.

31. Explain the term standard deviation in respect to analytical determinations.

(6×4=24 Marks)

SECTION – D

(Long Essay Questions)

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

32. a) Explain the principle regarding the choice of suitable indicators for different acid base titrations.

    b) Derive the expressions for moment of inertia and rotational energy of a rigid diatomic molecule.

33. a) Discuss the applications of radioactivity in various fields. **10**

    b) Write a short note on synthetic elements. **5**

34. a) Explain the term transport number. Discuss the moving boundary method of determining transport numbers.

    b) In a moving boundary method experiment, 0.01 N HCl was taken in the cell having area of cross section equal to 3.3 cm^2 at 300 K. On passing a current of 3 mA for 40 minutes, the boundary moved through 2.1 cm. Calculate the transport number of Chloride ions.

35. a) Discuss the principles and salient features of ceric sulphate dosimeter.

    b) Explain with an example each the role of stable isotope and radio isotopes as tracers.

(2×15=30 Marks)