K20U 1814

Reg. No. : .....

Name : .....

III Semester B.Sc. Degree CBCSS (OBE) – Regular Examination, November 2020
(2019 Admission Only)
COMPLEMENTARY ELECTIVE COURSE IN CHEMISTRY/POLYMER CHEMISTRY
3C03 CHE/PCH(PS) : Chemistry (for Physical Science)

Time : 3 Hours Total Marks : 32

***Instruction** : Answer the questions in **English** only.*

SECTION – A

(Very short answer type. **Each** carries **1** mark. Answer **all 5** questions.)

1. How many NMR signals are expected for ethyl chloride ?
2. What is the work done when a system undergoes free expansion ?
3. Give an example for bidentate ligands.
4. The neutron to proton ratio for ^{12}C is _____
5. Which is the stationary phase in paper chromatography ? **(5×1=5)**

SECTION – B

(Short answer type. **Each** carries **2** marks. Answer **4** questions out of **6**.)

6. What is meant by zero point energy ?
7. Distinguish between reversible process and irreversible process in thermodynamics.
8. Write the names of the complexes :
   a) $[CoCl_3(NH_3)_3]$ b) $[Co(NH_3)_6]^{2+}$.
9. A first order reaction is 50% completed in 13.86 hours. Calculate its rate constant.

P.T.O.

10. State and explain group displacement law.

11. What is meant by R_f value ? What is its significance ? **(4×2=8)**

SECTION – C

(Short essay type. **Each** carries **3** marks. Answer **3** questions out of **5**.)

12. Explain the terms Stoke's and anti-Stoke's lines with regard to Raman spectra.

13. Discuss the physical significance of Gibb's free energy.

14. Explain the terms C_p and C_v. How are they related ?

15. How does collision theory explain the effect of temperature on the rate of a reaction ?

16. Write a note on radiocarbon dating. **(3×3=9)**

SECTION – D

(Long essay type. **Each** carries **5** marks. Answer **2** questions out of **4**.)

17. a) A large amount of energy is released during nuclear fission. Explain the reason.

    b) Calculate the binding energy of helium nucleus in MeV [mass of proton = 1.00758 amu; mass of neutron = 1.00897 amu; mass of helium nucleus = 4.00820 amu] **(2+3)**

18. a) Explain Werner's theory of coordinate compounds with suitable examples.

    b) Describe the shape and magnetic behaviour of $[Ni(CN)_4]^{2-}$ with the help of VB theory.

19. a) Give the important characteristics of catalytic reaction.

    b) Explain how a catalyst increases the rate of a reaction. **(2+3)**

20. a) The microwave spectrum of CO consists of a series of equally spaced lines separated by 3.844 cm^{-1}. Calculate the moment of inertia and C-O bond length.

    b) Write a note on thin layer chromatography. **(2+3)**

(2×5=10)