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)