K18U 0087

Reg. No. : .....

Name : .....

VI Semester B.Sc. Degree (CBCSS – Reg./Supple./Imp.) Examination, May 2018
(2014 Admn. Onwards)
CORE COURSE IN CHEMISTRY
6B16 CHE : Physical Methods in Chemistry

Time : 3 Hours Max. Marks : 40

SECTION – A

Answer **all** the **4** questions – **each** carries **1** mark.

1. Give two examples for molecules belonging to C_{2v} point group.
2. How many hexagons and pentagons are present in C_{60} ?
3. The lowest energy region of electromagnetic spectrum is _____ region.
4. A non-liner N atomic molecule can have _____ number of fundamental vibrations. **(1×4=4)**

SECTION – B

Short answer type – **each** carries **2** marks – answer **any 7** questions.

5. State and explain Beer-Lambert's law.
6. What are auxochromes ? Give two examples.
7. Explain improper axis of rotation with an example.
8. Among, HCl, CH_4, CH_3Cl, H_2, H_2O and SF_6, which of the molecules will show microwave rotational spectra ? Why ?
9. Write two advantages of polarographic analysis.
10. Differentiate between fundamental bands and overtones in IR spectroscopy.

P.T.O.

11. Explain McLafferty rearrangement with an example.

12. What is meant by Amperometric titrations ?

13. Explain the fragmentation pattern of acetaldehyde.

14. What is meant by chemical vapour deposition ? **(2×7=14)**

SECTION – C

Short essay/problem type – **each** carries **3** marks – answer **any 4** questions.

15. What is Raman scattering ? Explain the selection rule for Raman spectroscopy.

16. Explain the construction and working of dropping mercury electrode.

17. Explain the chemical shift and spin-spin coupling.

18. Discuss the microemulsion method for the synthesis of nanoparticles.

19. Explain the principle behind AAS.

20. How NMR spectroscopy is useful in differentiating the structure of
    i) Ethanol and dimethyl ether
    ii) Propanal and acetone. **(3×4=12)**

SECTION – D

Long essay type – **each** carries **5** marks – answer **any 2** questions.

21. a) Explain the factors affecting the intensity of rotational spectral lines. 4
    b) The moment of inertia and reduced mass of CO molecule are 14.5695×10^{-47} kg m^2 and 11.3837×10^{-27} kg, respectively. Calculate the bond length of CO. 1

22. Explain the principle and working of TEM and SEM.

23. Write an essay on the factors effecting vibration frequency.

24. Explain the instrumentation of spectrophotometry. **(5×2=10)**
