

**B.Sc. DEGREE END SEMESTER EXAMINATION OCTOBER 2017****SEMESTER –5: CHEMISTRY (CORE COURSE)****COURSE: 15U5RCHE08: PHYSICAL CHEMISTRY - II***(For Regular 2015 admission)*

Time: Three Hours

Max. Marks: 60

**SECTION A**Answer **all** the questions. Each question carries 1 mark

1. Technique used to distinguish Methyl benzoate from Phenyl acetate is .....
2. If the frequency of scattered radiation is less than that of incident radiation, such lines are called .....
3. For a molecule to be Raman active there should be .....
4. What is an Einstein?
5. When a sample of compound is bombarded with electrons of energy 9-15eV, the peak obtained is called .....
6. The rotational energy of a rigid rotator is .....
7. Number of normal modes vibrations possible for NH<sub>3</sub> is .....
8. Which electronic transition is most prominent in Aromatic compound? (1 x 8 = 8)

**SECTION B**Answer **any Six** questions. Each question carries 2 marks

9. What are the different scales used for chemical shift? Explain.
10. Why the intensity of hot band increases with temperature?
11. How can you identify hydrogen bonding using IR spectroscopy?
12. Explain Born Oppenheimer approximation
13. What is the significant condition for a nuclei to give NMR spectra? Mention three such nuclei used in NMR.
14. Explain Frank-Condon principle and various types of possible electronic transitions.
15. Explain primary and secondary process in photochemical reactions.
16. What is Rayleigh scattering? Explain. (2 x 6 = 12)

**SECTION C**Answer **any four** questions.

Each question carries 5 marks

17. Differentiate between fluorescence and phosphorescence.
18. The frequency difference between successive adsorption lines in microwave spectrum of HCl is found to be 20.7 cm<sup>-1</sup>. Calculate (a) moment of inertia (b) bond length.
19. State and explain laws of photochemistry.

20. Explain the Stern- Volmer equation.
21. What is Beer- Lamberts law? Derive the expression. Explain its limitations.
22. Explain briefly dissociation of hydrogen molecule and isomerization of 2-butene (5 x 4 = 20)

#### SECTION D

Answer **any Two** questions. Each question carries 10 marks

23. Explain (a) Fermi Resonance (b) Quantum yield (c) Karplus relation (d) Larmor Precession (d) Bathochromic shift.
24. Explain (a) chemiluminescence (b) First order NMR spectra (d) Photosynthesis.
25. Explain the basic principle of mass spectrometry.
26. Describe Jablonski diagram. (10 x 2 = 20)

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