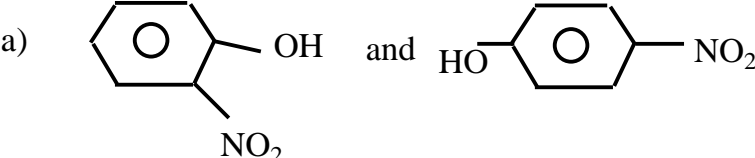
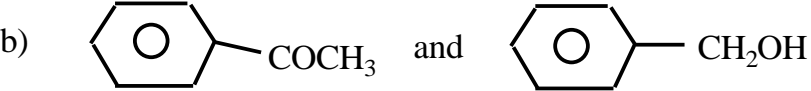




- d) Explain Stark effect in brief. 4
- e) Explain the applications of ESR in 4  
 i) Study of free radicals                      ii) Structure determination
- f) Give the classification of compound on the basis of moment of inertia. 4
4. a) Explain the moment of Inertia of diatomic molecules with stoke's and antistoke's line in Raman Spectroscopy. 8
- b) i) Discuss following compounds on the basis of IR spectra.
- a)  and
- b)  and
- ii) Explain how Raman and IR are complementary to each other.
- OR**
- c) Distinguish between following pair of compounds using IR spectroscopy. 4  
 i)  $\text{CH}_3 - \text{CH}_2 - \text{OH}$  and  $\text{CH}_3 - \text{O} - \text{CH}_3$   
 ii) m-xylene and p-xylene
- d) Discuss the pure rotational Raman spectra of diatomic molecule. 4
- e) Explain the P, Q, R branches. 4
- f) Explain Rayleigh and Raman scattering. 4
5. a) Differentiate between  $\text{C}_{2V}$  and  $\text{C}_{3V}$  point group with suitable example. 2
- b) Write a note on dihedral plane. 2
- c) What is nitrogen rule. 2
- d) What is isomer shift. 2
- e) What are rigid and non-rigid molecule. 2
- f) Predict the no of lines in the esr spectrum of methyl free radical. 2
- g) Define symmetric and asymmetric speaching. 2
- h) What are factors affecting on Raman peak intensities. 2

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