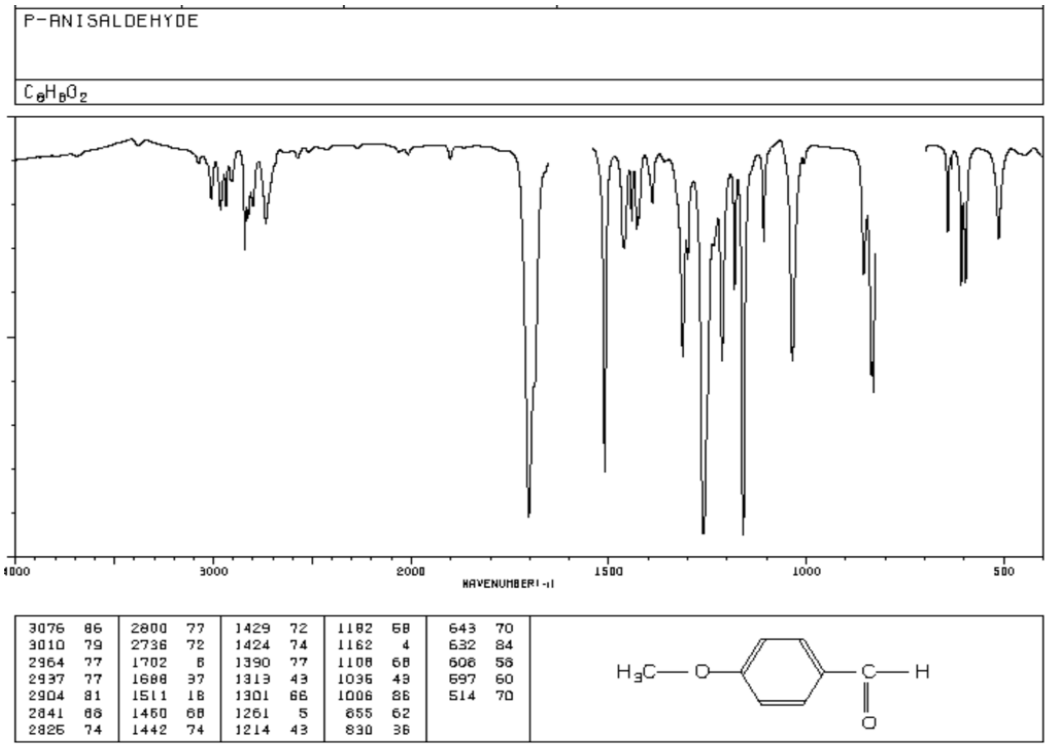
Roll No. 16010421063
Batch No. G3
Name: Arya Nair

Experiment No. 10

Title: **Analysis of IR spectrum**

Aim: To analyze the IR spectrum.



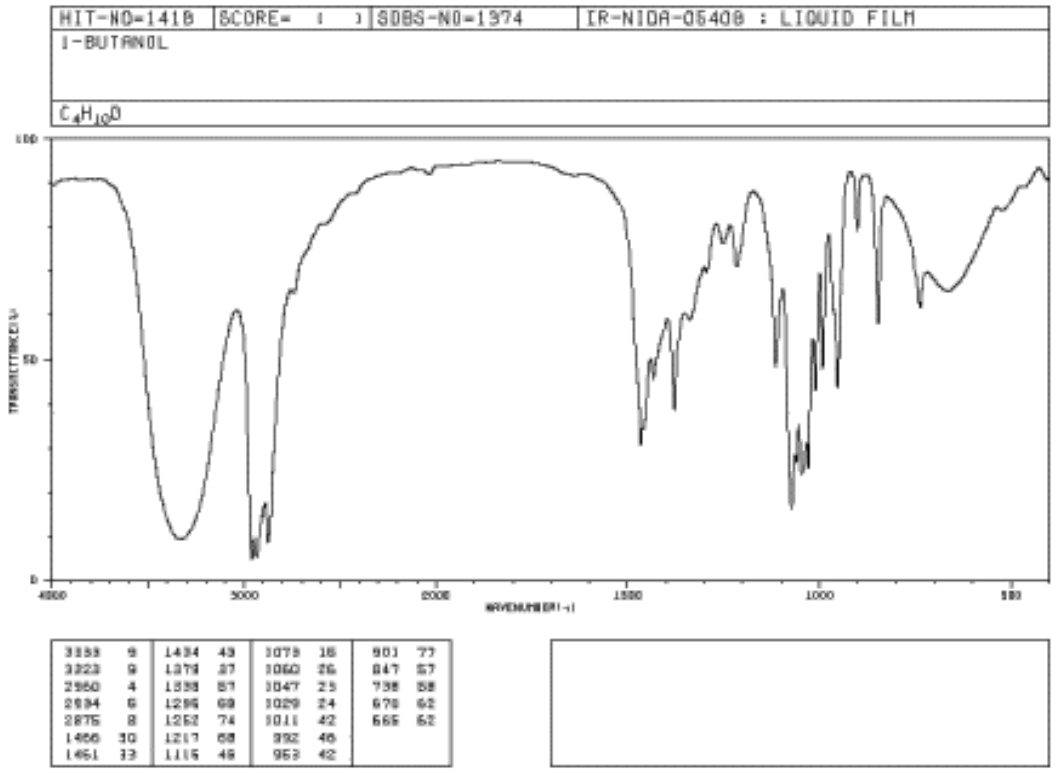
3076	86	2800	77	1429	72	1182	68	643	70
3010	79	2736	72	1424	74	1162	4	632	84
2964	77	1702	8	1390	77	1108	68	606	56
2937	77	1688	37	1313	43	1035	43	597	60
2904	81	1511	18	1301	66	1006	86	514	70
2841	66	1460	68	1261	5	855	62		
2826	74	1442	74	1214	43	830	36		

Result: Important IR frequencies of the above compound are

IR frequency (cm^{-1})	Vibrational Type & Intensity	Frequency Range (cm^{-1})	Functional Group
1424, 1429, 1442, 1450	Medium-weak, Multiple Bands	1400-1600	Aromatic C = C
1688, 1702	Strong, stretch	1670-1820	Carbonyl C = O
2736, 2800, 2826, 2841	medium, two peaks, stretch	2820-2850 & 2720-2750	Aldehyde = C-H
2904, 2937, 2964	Strong, stretch	2850-3000	-C-H sp3

Observations:

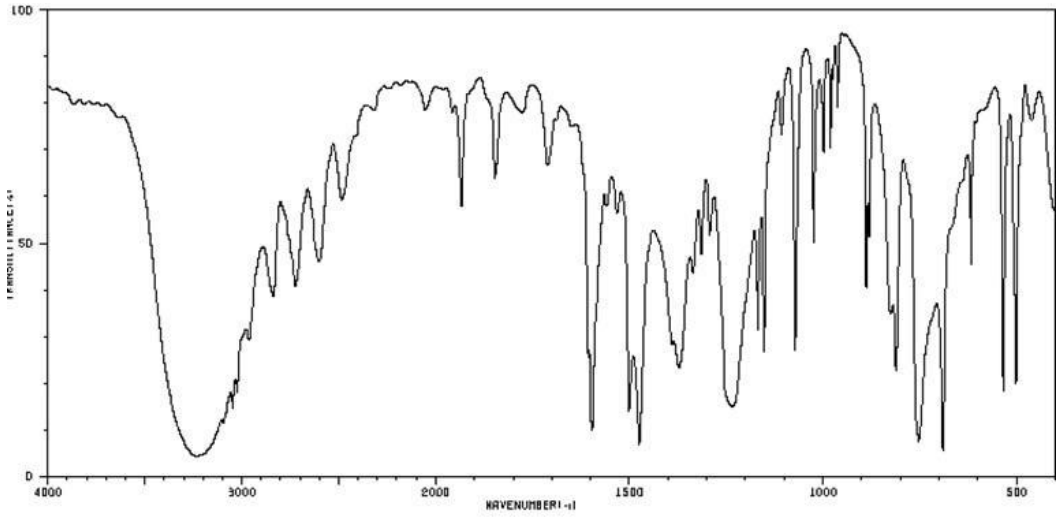
- The number of atoms in $C_8H_8O_2$ =18.
- The molecule is Non-linear.
- Therefore, the total number of Vibrational modes = 3N - 6 = 3(18) - 6 = **48.**



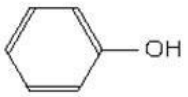
Result: Important IR frequencies of the above compound are

IR Frequency	Vibrational Type & Intensity	Frequency Range	Functional Group
3223, 3253	strong, broad	3200-3600	O-H (stretch, H-bonded)
2950, 2934, 2875	Strong, stretch	3000-2850	C-H Alkane
1378, 1434, 1461, 1466	variable, bending	1350-1480	-C-H Alkane
1378, 1434, 1461, 1466	variable, bending	1350-1480	-C-H Alkane

Observations:
The molecule has formula H3C-CH2-CH2-CH2-OH.



3229	4	2484	58	1632	55	1234	15	825	36
3048	15	1933	57	1501	14	1169	31	812	23
3023	16	1847	62	1474	7	1153	25	754	6
2962	29	1711	64	1372	23	1072	27	691	5
2837	38	1606	26	1336	43	1024	49	617	44
2723	41	1598	10	1315	47	889	41	535	16
2599	46	1569	57	1293	50	881	50	502	20

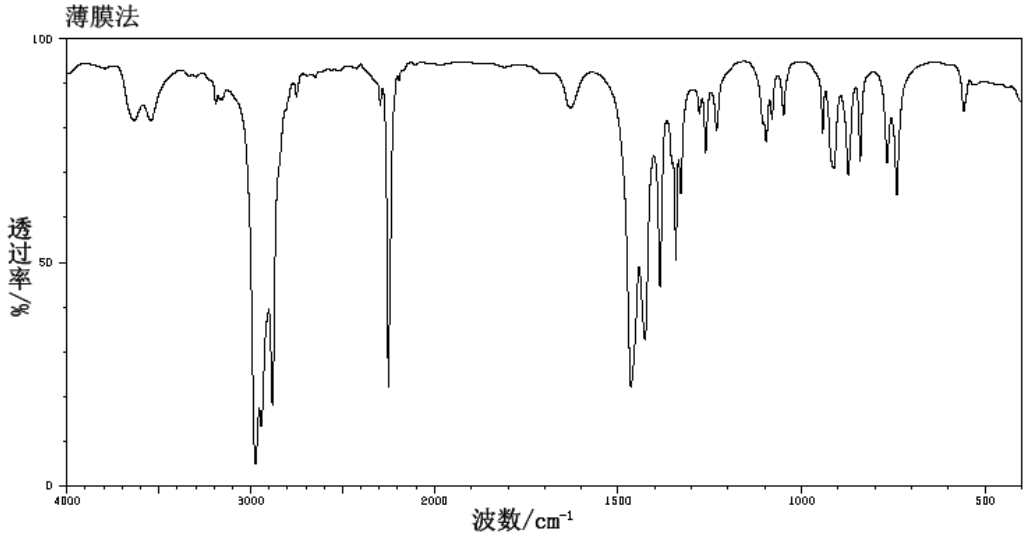


Result: Important IR frequencies of above compound are

IR Frequency	Vibrational Type & Intensity	Frequency Range	Functional Group
3023, 3048	medium, stretch	3000-3100	C-H (aromatic)
1072, 1153, 1169	Variable, bending	1050-1150	C-O (alcohol)
1474, 1501	medium-weak, multiple bands, stretch	1400-1600	C = C aromatic
3229	strong, H-bonded, stretch, free	3200-3600	O-H alcohol

Observations:

- The number of atoms in C6H5OH = 13.
- The molecule is Non-linear.
- Therefore, the total number of Vibrational modes = 3N - 6 = 3(13) - 6 = 33



3634	79	2882	17	1386	42	1095	74	767	70	$CH_3—CH_2—CH_2—C\equiv N$	
3543	79	2751	84	1343	49	1081	79	741	62		
3191	81	2295	81	1330	82	1049	79	559	61		
3176	84	2260	21	1279	79	943	77				
3161	84	1629	81	1262	72	913	68				
2974	4	1465	21	1232	77	873	66				
2943	12	1427	31	1106	77	840	70				

Result: Important IR frequencies of above compound are

IR Frequency	Vibrational Type & Intensity	Frequency Range	Functional Group
2882, 2943, 2974	strong, stretch	2850-3000	C-H alkane
2260	medium, stretch	2210-2260	CN nitrile
1343, 1386, 1427, 1465	variable, bending	1350-1480	-C-H alkane

Observations:

- The number of atoms in C4H7N = 12.
- The molecule is linear.
- Therefore, the total number of Vibrational modes = 3N - 5 = 3(12) - 5 = 31.