

Supporting Information

Hypervalent Iodine Catalyzed Transamidation of Carboxamides with Amines

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I. General Experimental Section:

All the reagents were purchased from commercial suppliers and were used as such. The solvents used in the reactions were distilled and dried prior to use. All the reactions conducted under conventional heating were performed under air atmosphere in a Schlenk flask. Microwave reactions were performed using an Anton Paar Monowave 300 mono-mode microwave reactor with a sealed 10-mL vial containing teflon-coated magnetic stir bar. The microwave system contains a single magnetron that delivers up to 850 W installed microwave power in unpulsed mode over the full power range. The sophisticated software prevents thermal overshoots and the design of the microwave applicator provides utmost field density, which allows efficient heating, even of low-absorbing solvents at any scale. A precisely adjusted IR sensor reflects the internal reaction temperature up to 300 °C. Pressure control up to 30 bar is provided by a non-invasive hydraulic piston embedded in the swiveling cover. For cooling, the cavity is flushed with compressed air automatically after the programmed experiment has been processed. Column chromatography was performed using Merck silica gel (100-200 mesh). Thin layer chromatography (TLC) was performed using silica gel 60/KieselguhrF₂₅₄ pre-coated on aluminum sheets (thickness 0.2 mm), commercially available from Merck. Visualization of spots on TLC plate was accomplished with UV light and by staining in I₂ chamber.

All the melting points were determined in open capillary tubes and are uncorrected. ¹H and ¹³C NMR spectra were recorded on 300 MHz and 75 MHz JEOL AL300 FTNMR spectrometer respectively at a temperature of 300 K. NMR chemical shifts are expressed in δ values with reference to tetramethylsilane (TMS) as internal standard. Product yields refer to isolated yields after column chromatography.

II. Experimental procedures:

a) General conventional experimental procedure: Diacetoxyiodobenzene (DIB) (0.15 mmol, 48.3 mg) was added to a Schlenk flask, equipped with a rubber septum and teflon-coated stir bar, containing carboxamide (3 mmol) and amine (3 mmol). The resulting mixture was vigorously stirred at the appropriate temperature for a specified time. The progress of the reaction was monitored through TLC. After completion of the reaction, mixture was cooled to room temperature; distilled water (10 mL) was added and then extracted with ethyl acetate (3 × 10 mL). The combined organic phase was dried over Na₂SO₄, and then concentrated using rotary vacuum evaporator. The crude product was purified by column chromatography using a mixture of ethyl acetate/n-hexane as an eluent.

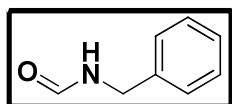
b) General MW experimental procedure: An oven-dried 10-mL microwave reaction vial containing a teflon-coated magnetic stir bar was charged with carboxamide (3 mmol), amine (3 mmol), and diacetoxyiodobenzene (DIB) (0.15 mmol, 48.3 mg). The vessel was sealed with a plastic microwave septum, stirred at room temperature for 5 min and then placed into the MW cavity for a specified temperature and time. After completion of reaction (TLC), the mixture was cooled to room temperature and worked-up as given in conventional method.

III. Complete Optimization Table:

Entry	Accelerator	mol (%)	Solvent	Conventional heating			MW heating		
				T (°C)	t (h)	Yield (%)	T (°C)	t (min.)	Yield (%)
1.	–	–	–	120	24	n.r	120	20	n.r
2.	<i>p</i> -TSA	10	–	120	24	60	120	20	62
3.	TFA	10	–	120	24	40	120	20	41
4.	BF ₃ ·Et ₂ O	10	–	120	24	57	120	20	57
5.	I ₂	10	–	120	24	51	120	20	52
6.	Zn(OAc) ₂ ·2H ₂ O	10	–	120	24	20	120	20	23
7.	CdI ₂	10	–	120	24	33	120	20	39
8.	FeCl ₃	10	–	120	24	41	120	20	42
9.	NiCl ₂ ·6H ₂ O	10	–	120	24	30	120	20	30
10.	ZrOCl ₂	10	–	120	24	40	120	20	41
11.	KOH	10	–	120	24	n.r	120	20	n.r
12.	DBU	10	–	120	24	n.r	120	20	n.r
13.	TBAB	10	–	120	24	trace	120	20	trace
14.	[BmIm]BF ₄	10	–	120	24	50	120	20	55
15.	DIB	10	–	120	24	81	120	20	83
16.	DIB	5	–	120	24	81	120	20	83
17.	DIB	5	–	120	17	72	120	10	77
18.	DIB	3	–	120	24	67	120	20	69
19.	DIB	5	Toluene	120	24	18	120	20	27
20.	DIB	5	Xylene	120	24	29	120	20	30
21.	DIB	5	Chlorobenzene	120	24	20	120	20	25
22.	DIB	5	DMSO	120	24	19	120	20	21
23.	DIB	5	DMF	120	24	24	120	20	27
24.	DIB	5	H ₂ O	100	24	17	120	20	23
25.	DIB	5	<i>n</i> -C ₅ H ₁₁ OH	120	24	n.r	120	20	n.r

IV. Characterization of Products:

1. N-Benzylformamide (3a)¹:

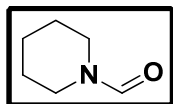


Colorless solid; m.p.: 59–60 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 8.28 (s, 0.8H), 8.23 (d, *J* = 12.0 Hz, 0.2H), 7.37–7.29 (m, 5H), 5.75 (br s, 1H, NH), 4.51 (d, *J* = 6 Hz, 1.8H), 4.44 (d, *J* = 6.3 Hz, 0.2H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 164.7, 161.3, 137.5, 128.6, 128.4, 127.7, 127.6, 127.4, 127.2, 45.4, 41.8.

2. Piperidine-1-carbaldehyde (3b)²:

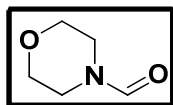


Colorless oil.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 7.99 (s, 1H), 3.47 (t, *J* = 5.4 Hz, 2H), 3.32 (t, *J* = 5.4 Hz, 2H), 1.69–1.54 (m, 6H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 160.4, 46.4, 40.2, 26.2, 24.7, 24.3.

3. N-Formylmorpholine (3c)³:

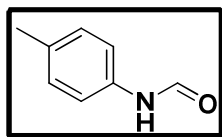


Colorless oil.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 8.06 (s, 1H), 3.72–3.56 (m, 6H), 3.42–3.39 (m, 2H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 160.8, 67.1, 66.3, 45.7, 40.5.

4. **N-4-Tolylformamide(3d)**⁴:

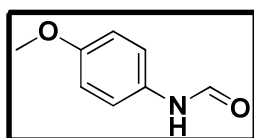


Colorless solid; m.p.: 53–54 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 9.05 (br s, 1H), 8.63 (d, *J* = 11.1 Hz, 1H), 8.39 (s, 1H), 8.27 (s, 1H), 7.43 (d, *J* = 7.5 Hz, 2H), 7.12–6.96 (m, 6H), 2.30/2.28 (each s, 6H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 163.1, 159.5, 134.8, 134.4, 134.2, 134.1, 130.0, 129.3, 120.1, 118.9, 20.7, 20.6.

5. **N-(4-Methoxyphenyl)formamide (3e)**⁵:



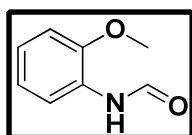
Light brownish solid; m.p.: 80–83 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 9.01 (br s, 1H, NH), 8.53 (d, *J* = 11.1 Hz, 1H), 8.46 (br s, 1H, NH), 8.24 (s, 1H), 7.45 (d, 2H), 7.03 (d, 2H), 6.87–6.79 (m, 4H), 3.77/3.75 (s, 6H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 163.3, 159.4, 157.3, 156.4, 130.0, 129.6, 121.8, 121.2, 114.7, 114.0, 55.3, 55.2.

IR (KBr Disc, $\bar{\nu}/\text{Cm}^{-1}$): 3246, 3192, 3129, 3050, 3001, 2969, 2937, 2895, 1678, 1656, 1604, 1551, 1510, 1462, 1396, 1308, 1235, 1182, 1109, 1029, 835, 808, 783, 696.

6. **N-(2-Methoxyphenyl)formamide (3f)**⁶:



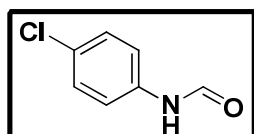
Brown solid; m.p.: 84–85 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 8.74 (d, *J* = 11.4 Hz, 1H), 8.44 (s, 1H), 8.37 (d, *J* = 6.9 Hz, 1H), 7.87 (s, 1H), 7.20–6.87 (m, 8H), 3.87 (s, 6H).

^{13}C NMR (75 MHz, CDCl_3 , TMS) δ /ppm: 161.4, 158.7, 148.7, 147.7, 126.7, 126.1, 125.1, 124.2, 121.0, 120.4, 116.6, 111.2, 110.0, 55.6.

IR (KBr Disc, $\bar{\nu}/\text{Cm}^{-1}$): 3254, 3008, 2922, 2937, 2835, 1694, 1659, 1597, 1535, 1460, 1396, 1287, 1227, 1182, 1109, 1029, 865, 813, 745.

7. *N*-(4-Chlorophenyl)formamide (**3g**)⁷:

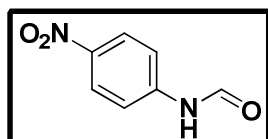


Grey solid; m.p.: 99–100 °C.

^1H NMR (300 MHz, CDCl_3 , TMS) δ /ppm: 8.88 (br s, 1H), 8.67 (d, $J = 11.4$ Hz, 1H), 8.34 (s, 1H), 7.99 (br s, 1H), 7.51 (d, $J = 8.7$ Hz, 2H), 7.33 (m, 4H), 7.05 (d, $J = 8.4$ Hz, 2H).

^{13}C NMR (75 MHz, CDCl_3 , TMS) δ /ppm: 162.7, 159.3, 135.4, 135.3, 130.6, 129.7, 129.0, 121.2, 119.9.

8. *N*-(4-Nitrophenyl)formamide (**3h**)⁵:



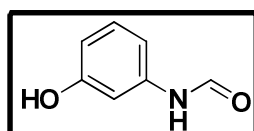
Yellow solid; m.p.: 197–199 °C.

^1H NMR (300 MHz, $\text{DMSO}-d_6$, TMS) δ /ppm: 10.77 (s, 1H), 9.03 (br s, 1H), 8.38 (s, 1H), 8.20 (d, $J = 6.2$ Hz, 2H), 7.80 (d, $J = 7.8$ Hz, 2H), 7.40 (br s, 1H).

^{13}C NMR (75 MHz, $\text{DMSO}-d_6$, TMS) δ /ppm: 162.7, 160.5, 144.2, 142.5, 125.4, 125.0, 119.0, 116.5.

IR (KBr Disc, $\bar{\nu}/\text{Cm}^{-1}$): 3259, 3214, 3152, 3090, 3060, 3050, 2925, 2885, 2629, 1689, 1620, 1596, 1563, 1493, 1411, 1382, 1331, 1302, 1270, 1177, 1155, 1111, 853, 829, 752, 688.

9. *N*-(3-Hydroxyphenyl)formamide (**3i**)⁸:

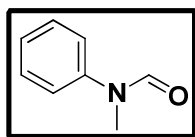


Brown solid; m.p.: 117–118 °C.

^1H NMR (300 MHz, DMSO- d_6 , TMS) δ /ppm: 10.02 (br s, 1H), 9.53 (s, 1H, OH), 9.42 (s, 1H), 8.72 (d, J = 11.1 Hz, 1H), 8.21 (s, 1H), 7.17–6.45 (m, 4H).

^{13}C NMR (75 MHz, DMSO- d_6 , TMS) δ /ppm: 162.5, 159.6, 158.3, 157.7, 139.5, 139.3, 130.3, 129.6, 110.9, 110.0, 108.1, 106.5, 104.8.

10. *N*-Methyl-*N*-phenylformamide (**3j**)⁹:

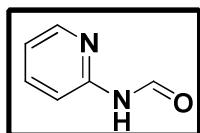


Colorless oil.

^1H NMR (300 MHz, CDCl₃, TMS) δ /ppm: 8.46 (s, 1H), 7.43–7.15 (m, 5H), 3.31 (s, 3H).

^{13}C NMR (75 MHz, CDCl₃, TMS) δ /ppm: 161.4, 161.3, 141.4, 128.8, 128.1, 125.4, 125.1, 122.5, 121.3, 30.9.

11. *N*-(Pyridin-2-yl)formamide (**3k**)¹⁰:

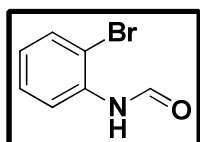


Yellow solid; m.p.: 70–71 °C

^1H NMR (300 MHz, CDCl₃, TMS) δ /ppm: 10.68 (br s, 1H), 10.54 (br s, 1H), 9.36 (d, J = 9.9 Hz, 1H), 8.56 (s, 1H), 8.35–8.26 (m, 3H), 7.76–7.64 (m, 2H), 7.11–6.95 (m, 3H).

^{13}C NMR (75 MHz, CDCl₃, TMS) δ /ppm: 163.2, 159.7, 151.0, 148.2, 147.1, 138.7, 138.5, 119.9, 119.6, 115.0, 110.4.

12. *N*-(2-Bromophenyl)formamide (**3l**)⁸:

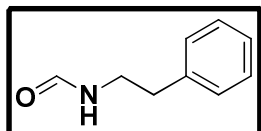


Colorless solid; m.p.: 91 °C.

^1H NMR (300 MHz, CDCl_3 , TMS) δ /ppm: 8.72 (d, 1H), 8.49 (s, 1H), 8.40 (d, $J = 8.1$ Hz, 1H), 7.67 (br s, 1H), 7.61–7.01 (m, 8H).

^{13}C NMR (75 MHz, CDCl_3 , TMS) δ /ppm: 161.6, 158.9, 134.7, 133.4, 132.3, 128.6, 128.4, 126.3, 125.6, 122.1, 118.9, 113.0.

13. **N-Phenethylformamide (3m)**¹¹:

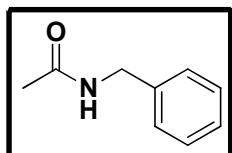


Colorless oil.

^1H NMR (300 MHz, CDCl_3 , TMS) δ /ppm: 8.08 (s, 1H), 7.89 (d, $J = 11.7$ Hz, 1H), 7.33–7.15 (m, 5H), 5.85 (br s, 1H, NH), 3.59–3.49 (m, 2H), 3.44 (t, $J = 6.6$ Hz, 2H), 2.85–2.78 (m, 2H).

^{13}C NMR (75 MHz, CDCl_3 , TMS) δ /ppm: 164.4, 161.2, 138.4, 128.7, 128.7, 128.6, 126.8, 126.5, 43.1, 39.1, 37.6, 35.4.

14. **N-Benzylacetamide (3o)**¹²:



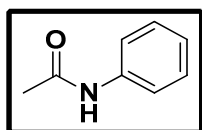
Brown solid; m.p.: 60–61 °C.

^1H NMR (300 MHz, CDCl_3 , TMS) δ /ppm: 7.29–7.21 (m, 5H), 6.61 (br s, 1H), 4.34 (d, $J = 3.9$ Hz, 2H), 1.93 (s, 3H).

^{13}C NMR (75 MHz, CDCl_3 , TMS) δ /ppm: 170.1, 138.2, 128.4, 127.6, 127.2, 43.4, 22.9.

IR (KBr Disc, $\bar{\nu}/\text{Cm}^{-1}$): 3295, 3063, 3033, 2928, 1647, 1548, 1499, 1454, 1374, 1357, 1221, 1162, 1097, 1033, 907, 741, 696.

15. **N-Phenylacetamide (3p)**¹³:

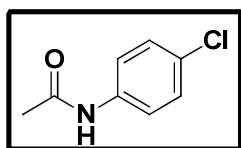


Colorless solid; m.p.: 113–114 °C.

^1H NMR (300 MHz, CDCl_3 , TMS) δ /ppm: 8.50 (br s, 1H), 7.52 (d, J = 7.8 Hz, 2H), 7.28–7.23 (m, 2H), 7.08–7.06 (m, 1H), 2.11 (s, 3H).

^{13}C NMR (75 MHz, CDCl_3 , TMS) δ /ppm: 169.2, 138.0, 128.7, 124.1, 120.2, 24.1.

16. N-(4-Chlorophenyl)acetamide (3q)¹⁴:

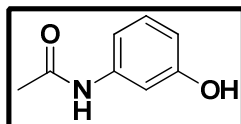


Yellow solid; m.p.: 177–178 °C.

^1H NMR (300 MHz, $\text{DMSO-}d_6$, TMS) δ /ppm: 10.03 (s, 1H), 7.60 (d, J = 6.3 Hz, 2H), 7.31 (d, J = 6.3 Hz, 2H), 2.03 (s, 3H).

^{13}C NMR (75 MHz, $\text{DMSO-}d_6$, TMS) δ /ppm: 168.5, 138.3, 128.5, 126.6, 120.5, 24.0.

17. N-(3-Hydroxyphenyl)acetamide (3r)¹⁵:

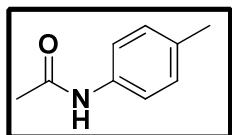


Colorless solid; m.p.: 148–149 °C.

^1H NMR (300 MHz, $\text{DMSO-}d_6$, TMS) δ /ppm: 9.77 (br s, 1H), 9.34 (s, 1H), 7.17 (s, 1H), 7.03 (t, 1H), 6.91 (d, J = 7.8 Hz, 1H), 6.42 (d, J = 6.9 Hz, 1H), 1.99 (s, 3H).

^{13}C NMR (75 MHz, CDCl_3 , TMS) δ /ppm: 168.3, 157.6, 140.4, 129.3, 110.2, 109.9, 106.3, 24.1.

18. N-(4-Tolyl)acetamide (3s)¹⁶:

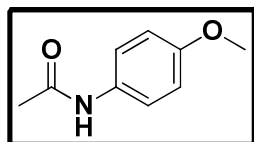


Colorless solid; m.p.: 149–150 °C.

$^1\text{H NMR}$ (300 MHz, CDCl_3 , TMS) δ /ppm: 7.83 (br s, 1H), 7.38 (d, $J = 8.4$ Hz, 2H), 7.10 (d, $J = 8.1$ Hz, 2H), 2.29 (s, 3H), 2.12 (s, 3H).

$^{13}\text{C NMR}$ (75 MHz, CDCl_3 , TMS) δ /ppm: 168.6, 135.4, 133.8, 129.3, 120.1, 24.3, 20.8.

19. N-(4-Methoxyphenyl)acetamide (**3t**)¹⁷:

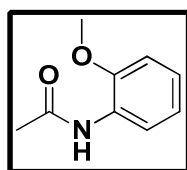


Colorless solid; m.p.: 126–128 °C.

$^1\text{H NMR}$ (300 MHz, CDCl_3 , TMS) δ /ppm: 8.04 (s, 1H), 7.39 (d, $J = 8.7$ Hz, 2H), 6.81 (d, $J = 8.7$ Hz, 2H), 3.76 (s, 3H), 2.10 (s, 3H).

$^{13}\text{C NMR}$ (75 MHz, CDCl_3 , TMS) δ /ppm: 168.7, 156.3, 131.1, 122.0, 113.9, 55.3, 24.1.

20. N-(2-Methoxyphenyl)acetamide (**3u**)¹⁸:

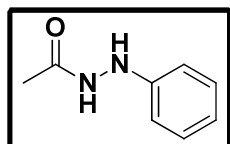


Colorless solid; m.p.: 87–88 °C.

$^1\text{H NMR}$ (300 MHz, CDCl_3 , TMS) δ /ppm: 8.35 (d, $J = 7.8$ Hz, 1H), 7.77 (br s, NH), 7.04–6.84 (m, 4H), 3.86 (s, 3H), 2.19 (s, 3H).

$^{13}\text{C NMR}$ (75 MHz, CDCl_3 , TMS) δ /ppm: 168.1, 147.6, 127.6, 123.5, 120.9, 119.7, 109.8, 55.5, 24.8.

21. N'-Phenylacetohydrazide (**3v**)¹⁹:



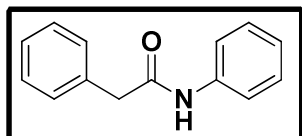
Pale brown solid; m.p.: 129–130 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 7.72 (br s, 1H, NH), 7.26–7.18 (m, 5H), 6.93–6.71 (m, 6H), 6.20 (br s, 1H, NH), 5.85 (br s, 1H, NH), 2.08/2.01 (s, 6H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 177.0, 170.3, 147.8, 147.0, 129.4, 129.1, 121.2, 121.1, 113.4, 112.4, 20.8, 19.1.

IR (KBr Disc, $\bar{\nu}$ /Cm⁻¹): 3287, 3234, 3031, 2928, 1665, 1643, 1597.

22. **N,2-Diphenylacetamide (3x)**²⁰:



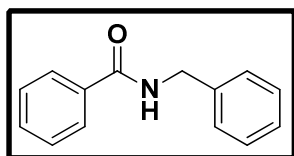
Colorless solid; m.p.: 115–116 °C.

¹H NMR (CDCl₃, 300 MHz, TMS) δ/ppm: 7.75 (br s, 1H), 7.43 (d, *J* = 7.8 Hz, 2H), 7.32–7.02 (m, 8H), 3.64 (s, 2H).

¹³C NMR (CDCl₃, 75 MHz, TMS) δ/ppm: 169.4, 137.7, 134.5, 129.3, 128.9, 128.8, 127.4, 124.3, 119.9, 44.5.

IR (KBr Disc, $\bar{\nu}$ /Cm⁻¹): 3285, 3256, 3060, 1657, 1601, 1556, 1496, 1442, 1167, 755, 724, 691.

23. **N-Benzylbenzamide (3y)**²¹:



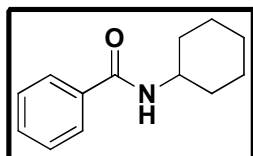
Colorless solid; m.p.: 101–102 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 7.80 (d, *J* = 6.9 Hz, 2H), 7.50–7.25 (m, 8H), 6.37 (br s, 1H), 4.67 (d, *J* = 5.4 Hz, 2H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 167.3, 138.2, 134.3, 131.4, 128.7, 128.5, 127.8, 127.5, 126.9, 44.0.

IR (KBr Disc, $\bar{\nu}$ /Cm⁻¹): 3291, 3061, 3030, 2926, 2853, 1638, 1602, 1550, 1452, 1417, 1362, 1260, 1151, 1056, 1027, 928, 726, 695.

24. N-Cyclohexylbenzamide (**3z**)²²:



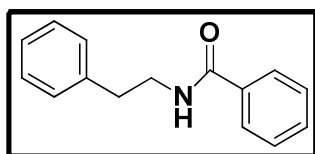
Colorless solid; m.p.: 156–157 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 7.76–7.74 (m, 2H), 7.47–7.38 (m, 3H), 6.09 (br s, 1H, NH), 4.03–3.91 (m, 1H, NHCH), 2.04–1.17 (m, 10H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 166.6, 135.0, 131.1, 128.4, 126.8, 48.6, 33.1, 25.5, 24.9.

IR (KBr Disc, $\bar{\nu}$ /Cm⁻¹): 3239, 3078, 2928, 2851, 1639, 1626, 1564, 1488, 1453, 1330, 1295, 1262, 1241, 1152, 1083, 1025, 1001, 970, 891, 849, 804, 700, 670.

25. N-Phenethylbenzamide (**3aa**)²²:

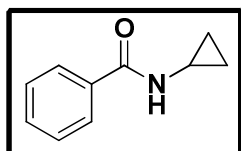


Colorless solid; m.p.: 117–118 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 7.66 (d, *J* = 7.2 Hz, 2H), 7.47–7.19 (m, 8H), 6.11 (br s, 1H, NH), 3.72–3.66 (m, 2H), 2.90 (t, 2H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 167.5, 138.8, 134.5, 131.3, 128.7, 128.5, 128.4, 126.7, 41.1, 35.6.

26. N-Cyclopropylbenzamide (**3ab**)²³:



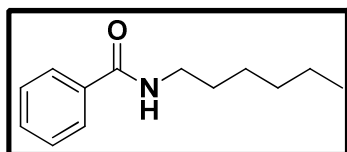
Colorless solid; m.p.: 94–95 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 7.74 (d, *J* = 6.9 Hz, 2H), 7.50–7.38 (m, 3H), 6.34 (br s, 1H, NH), 2.91–2.88 (m, 1H), 0.87 (br s, 2H), 0.62 (br s, 2H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 168.9, 134.4, 131.4, 128.6, 128.5, 127.2, 126.8, 125.8, 31.9, 23.1, 6.7.

IR (KBr Disc, $\bar{\nu}$ /Cm⁻¹): 3303, 2924, 2852, 1641, 1531, 1488, 1310, 1050, 1027, 862, 799, 693, 667.

27. **N-Hexylbenzamide (3ac)**²⁴:



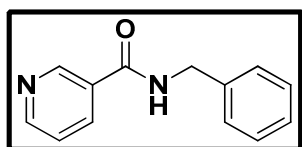
Colorless liquid.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 7.78 (d, *J* = 7.2 Hz, 2H), 7.49–7.36 (m, 3H), 6.47 (br s, 1H, NH), 3.45–3.38 (m, 2H), 1.61–1.54 (m, 2H), 1.31 (br s, 6H), 0.88 (t, *J* = 6.3 Hz, 3H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 167.5, 134.8, 131.1, 128.4, 126.8, 40.0, 31.4, 29.5, 26.6, 22.5, 13.9.

IR (KBr Disc, $\bar{\nu}$ /Cm⁻¹): 3321, 2929, 2857, 1632, 1578, 1541, 1491, 1310, 695.

28. **N-Benzylnicotinamide (3ad)**²⁵:

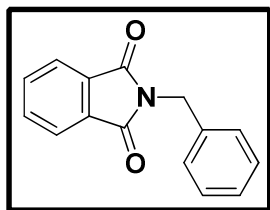


Pale yellow solid; m.p.: 72–73 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 8.93 (br s, 1H), 8.61 (br s, 1H), 8.12 (br s, 1H), 7.32–7.31 (br s, 6H), 4.61 (s, 2H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 165.5, 151.9, 147.8, 137.7, 135.3, 130.0, 128.7, 127.8, 127.6, 123.5, 44.0.

29. **2-Benzylisoindoline-1,3-dione (3ae)**²⁶:



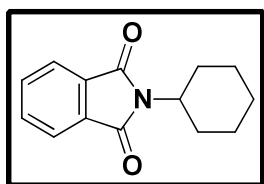
Colorless crystals; m.p.: 116–117 °C.

$^1\text{H NMR}$ (300 MHz, CDCl_3 , TMS) δ /ppm: 7.85–7.81 (m, 2H), 7.71–7.67 (m, 2H), 7.44–7.41 (m, 2H), 7.33–7.23 (m, 3H), 4.84 (s, 2H).

$^{13}\text{C NMR}$ (75 MHz, CDCl_3 , TMS) δ /ppm: 168.0, 136.3, 133.9, 132.1, 128.6, 128.5, 127.7, 123.3, 41.5.

IR (KBr Disc, $\bar{\nu}/\text{Cm}^{-1}$): 3459, 3086, 3060, 3035, 2947, 2852, 1775, 1765, 1715, 1611, 1603, 1583, 1491, 1466, 1391, 1331, 1298, 1276, 1184, 1101, 792, 763.

30. 2-Cyclohexylisoindoline-1,3-dione (3af)²⁷:

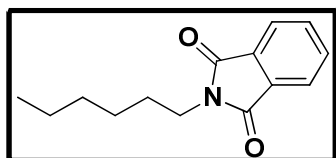


Colorless solid; m.p.: 169–171 °C.

$^1\text{H NMR}$ (300 MHz, CDCl_3 , TMS) δ /ppm: 7.82–7.79 (dd, $J = 3.3$ Hz, $J = 3$ Hz, 2H), 7.70–7.67 (dd, $J = 3$ Hz, $J = 3.3$ Hz, 2H), 4.15–4.06 (m, 1H), 2.26–2.14 (m, 2H), 1.89–1.71 (m, 5H), 1.44–1.25 (m, 3H).

$^{13}\text{C NMR}$ (75 MHz, CDCl_3 , TMS) δ /ppm: 168.4, 133.6, 132.0, 122.9, 50.8, 29.8, 26.0, 25.1.

31. 2-Hexylisoindoline-1,3-dione (3ag)²⁸:

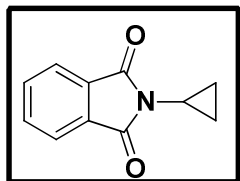


Colorless liquid.

$^1\text{H NMR}$ (300 MHz, CDCl_3 , TMS) δ /ppm: 7.84–7.81 (m, 2H), 7.72–7.69 (m, 2H), 3.67 (t, $J = 7.5$ Hz, 2H), 1.69–1.65 (m, 2H), 1.31 (br s, 6H), 0.89–0.85 (m, 3H).

$^{13}\text{C NMR}$ (75 MHz, CDCl_3 , TMS) δ /ppm: 168.1, 133.6, 132.0, 122.9, 37.8, 31.2, 28.3, 26.3, 22.3, 13.8.

32. 2-Cyclopropylisoindoline-1,3-dione (**3ah**)²⁹:



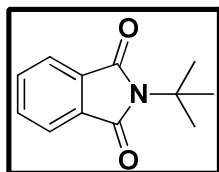
White solid; m.p.: 134–136 °C.

$^1\text{H NMR}$ (CDCl_3 , 300 MHz, TMS) δ /ppm: 7.83–7.80 (m, 2H), 7.72–7.69 (m, 2H), 2.75–2.68 (m, 1H), 1.04–1.01 (m, 4H).

$^{13}\text{C NMR}$ (CDCl_3 , 75 MHz, TMS) δ /ppm: 168.8, 133.9, 131.7, 123.0, 20.8, 5.1.

IR (KBr Disc, $\bar{\nu}/\text{Cm}^{-1}$): 3026, 1767, 1713, 1699, 1610, 1463, 1402, 1140, 946, 699.

33. *N*-*tert*-Butylphthalimide (**3ai**)³⁰:

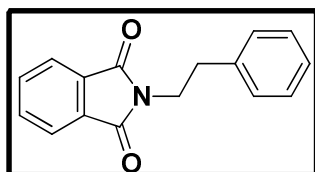


White solid; m.p.: 204–205 °C.

$^1\text{H NMR}$ (300 MHz, CDCl_3 , TMS) δ /ppm: 7.76 (br s, 2H), 7.68 (br s, 2H), 1.70/1.64 (s, 9H).

$^{13}\text{C NMR}$ (75 MHz, CDCl_3 , TMS) δ /ppm: 169.5, 133.6, 132.1, 122.5, 57.8, 29.1.

34. 2-(Phenethyl)isoindole-1,3-dione (**3aj**)³¹:



Colorless solid; m.p.: 130 °C.

¹H NMR (300 MHz, CDCl₃, TMS) δ/ppm: 7.84–7.81 (m, 2H), 7.71–7.68 (m, 2H), 7.26 (br s, 5H), 3.92 (t, *J* = 7.8 Hz, 2H), 2.99 (t, *J* = 7.2 Hz, 2H).

¹³C NMR (75 MHz, CDCl₃, TMS) δ/ppm: 168.1, 138.0, 133.9, 132.0, 128.8, 128.5, 126.6, 123.2, 39.2, 34.6.

IR (KBr Disc, $\bar{\nu}/\text{Cm}^{-1}$): 3020, 1770, 1710, 1614, 1496, 1429, 1396, 1359, 1083, 989, 869, 755, 633.

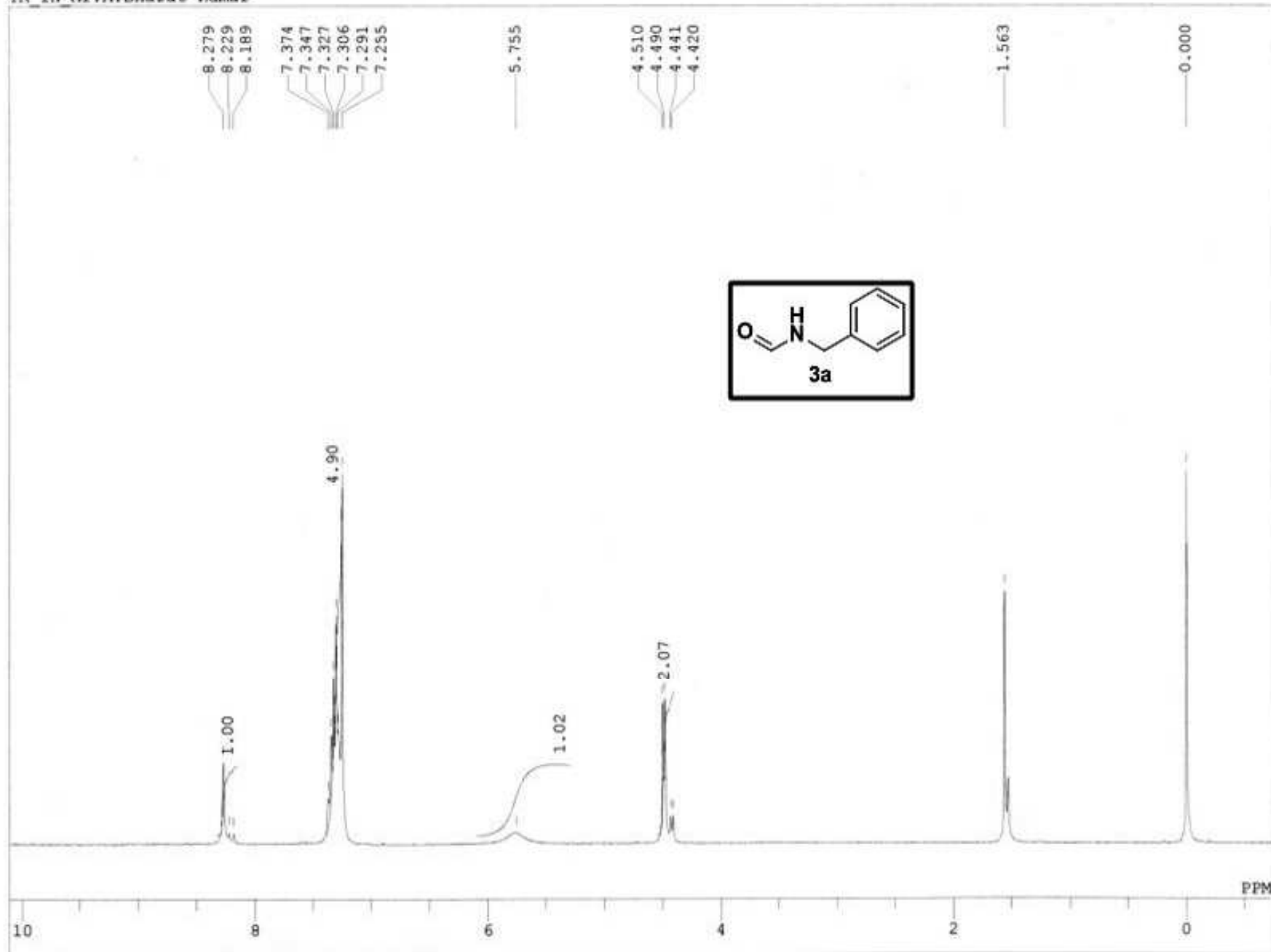
V. References:

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VI. Copies of ^1H and ^{13}C Spectra of Products

C:\K.N. Singh,,I.T\TA_1H.als
TA 1H Mr.A.Bharat Kumar

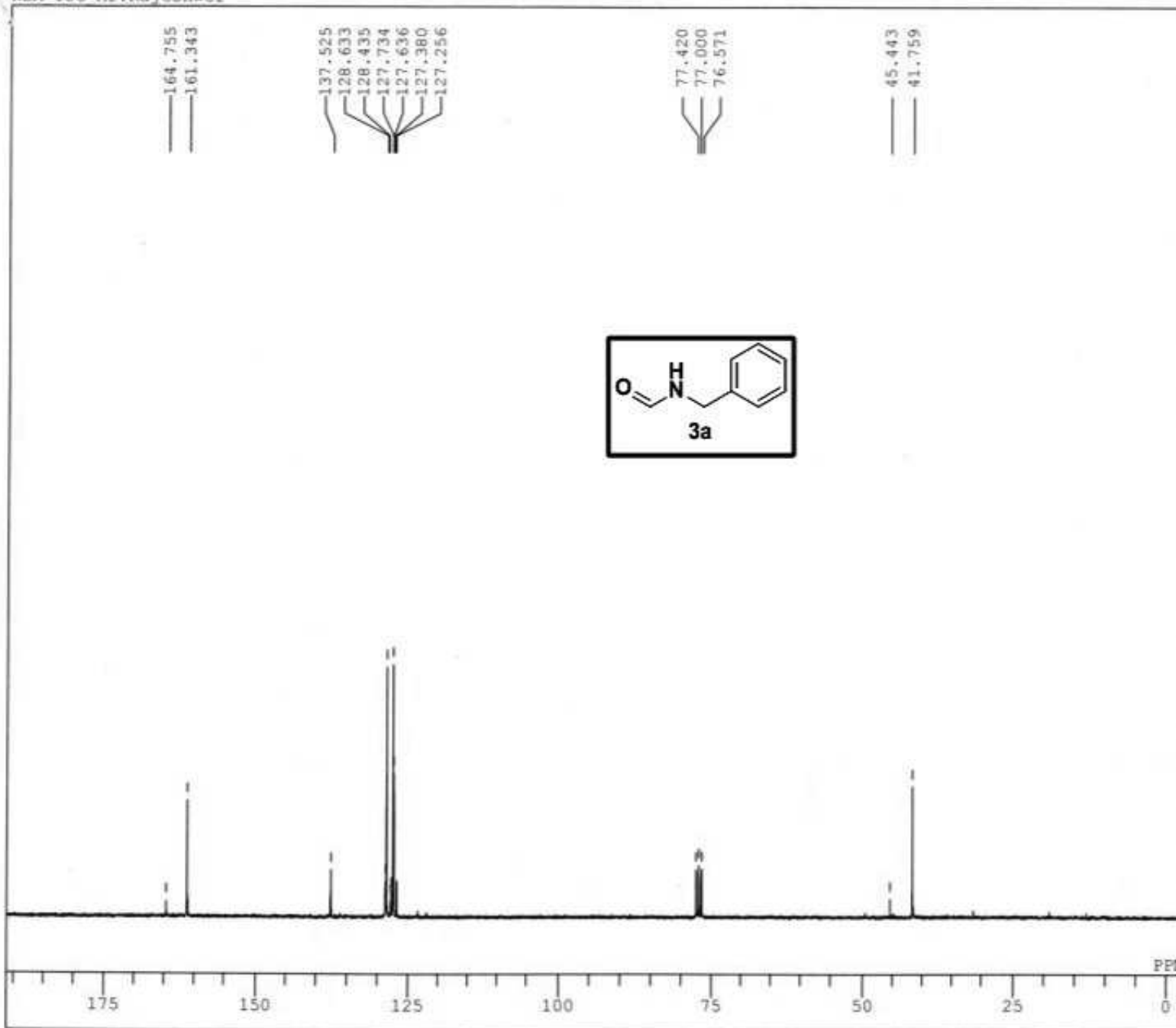


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

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DATIM Tue Jun 12 13:00:
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NBA_13C_Mr.Rajeshwer

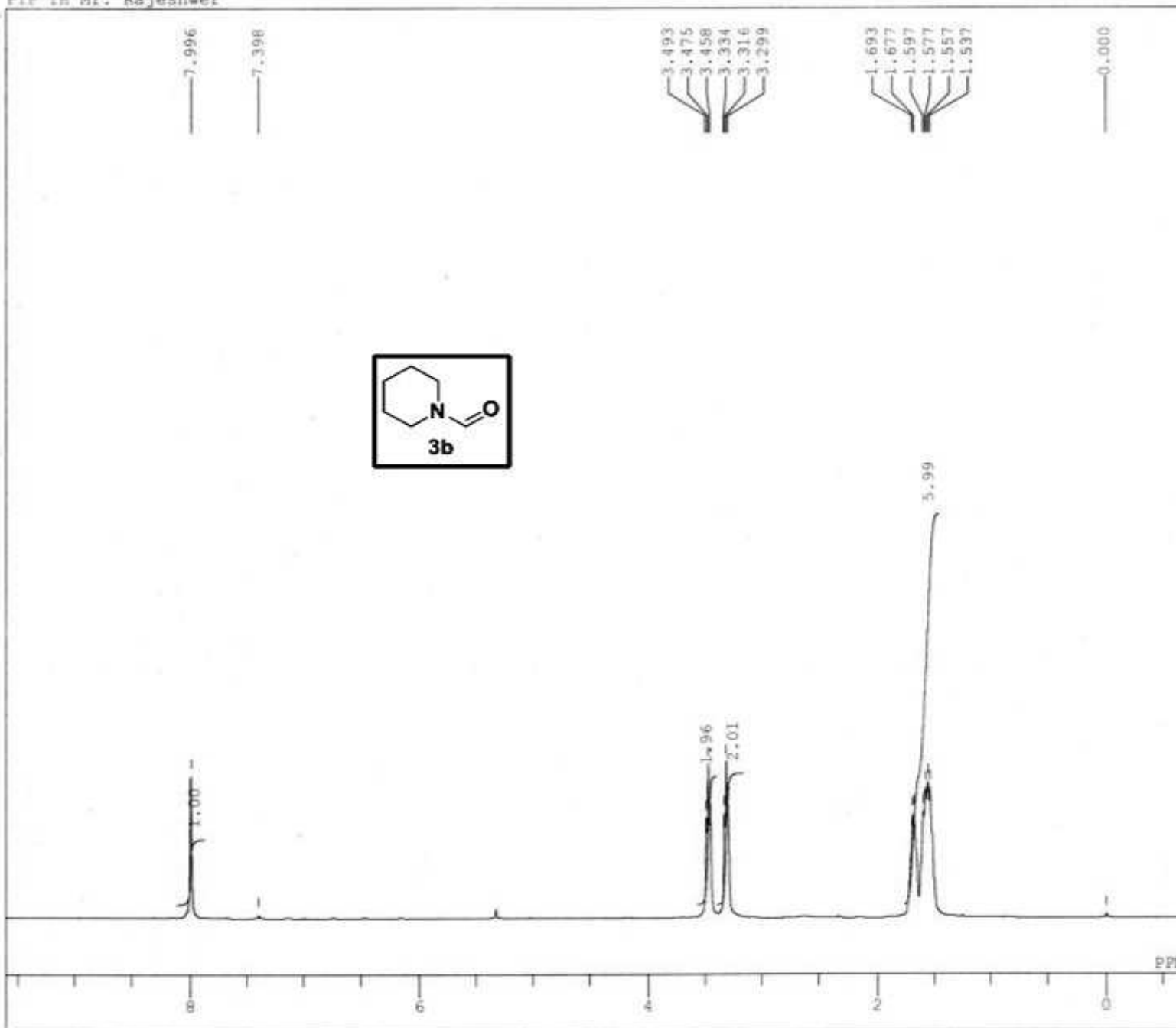


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

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OBSET 127.30 KHz
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PIP 1H Mr. Rajeshwer

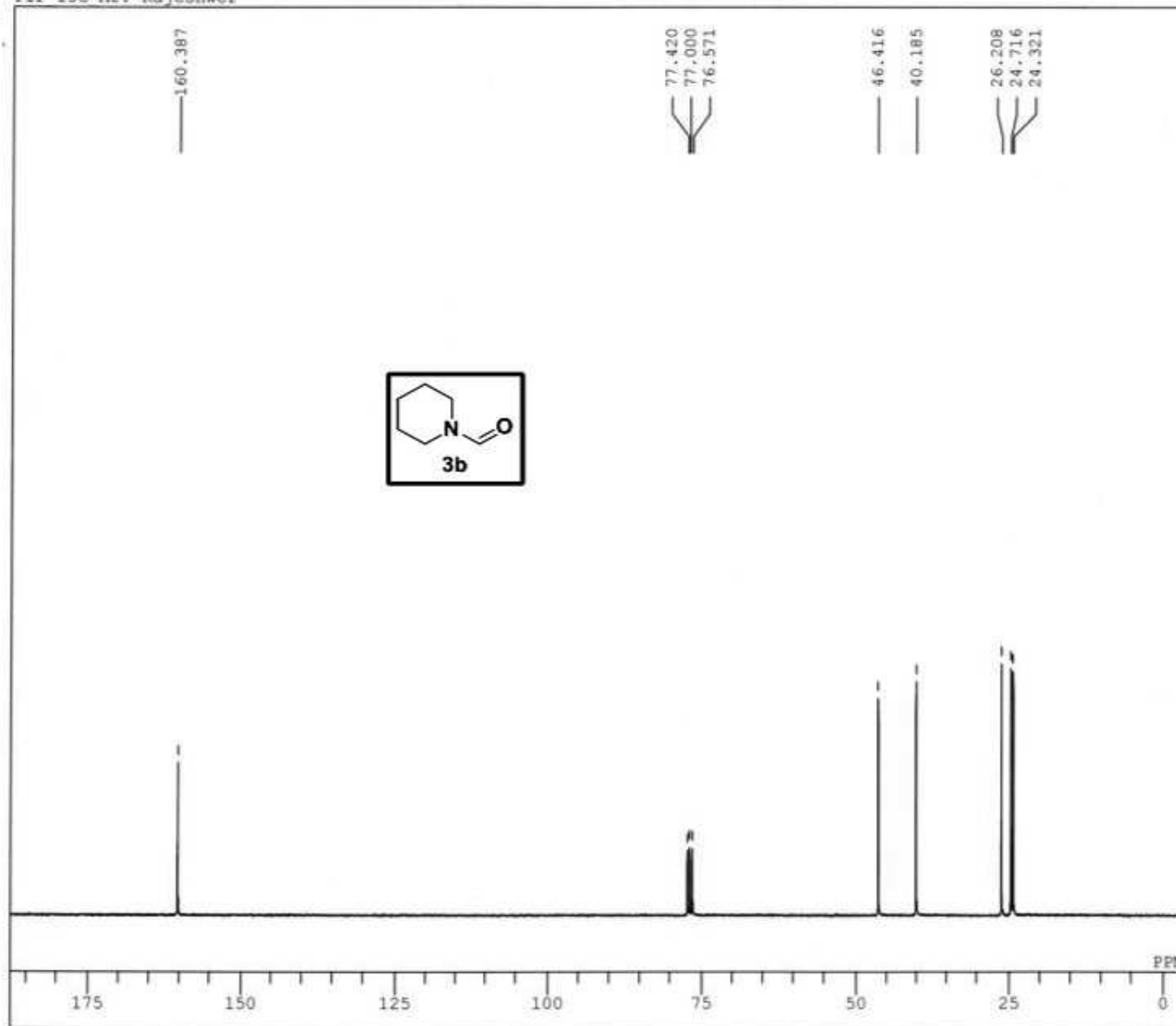


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\PIP_1H.a1
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OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
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BF 1.20 Hz
RGAIN 8

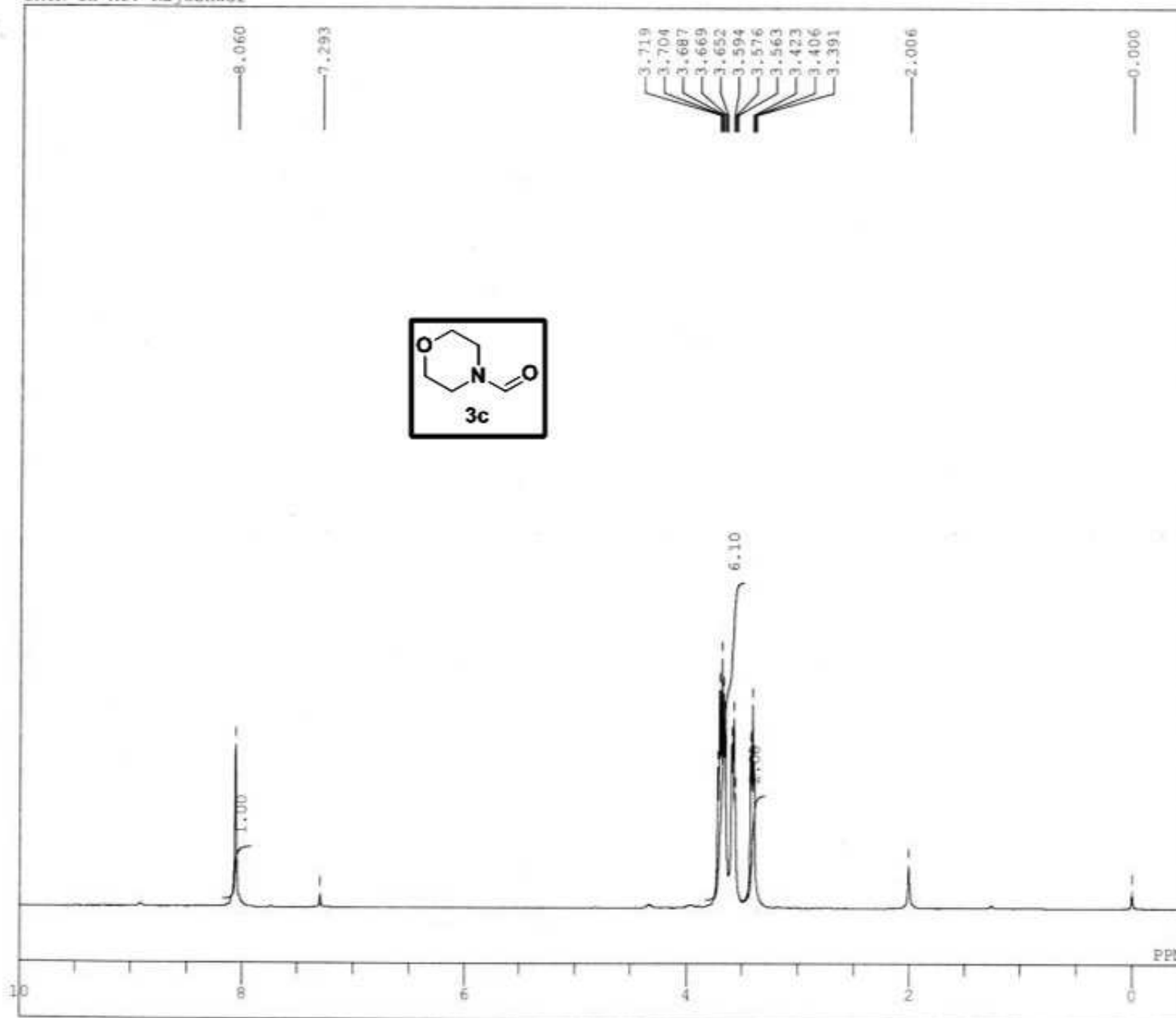
PIP 13C Mr. Rajeshwer



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

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COMNT PIP_13C Mr. Rajeshwer
DATIM Wed Jul 04 16:13:39 2012
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IRNUC 1H
CTEMP 20.5 c
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BF 1.20 Hz
RGAIN 24

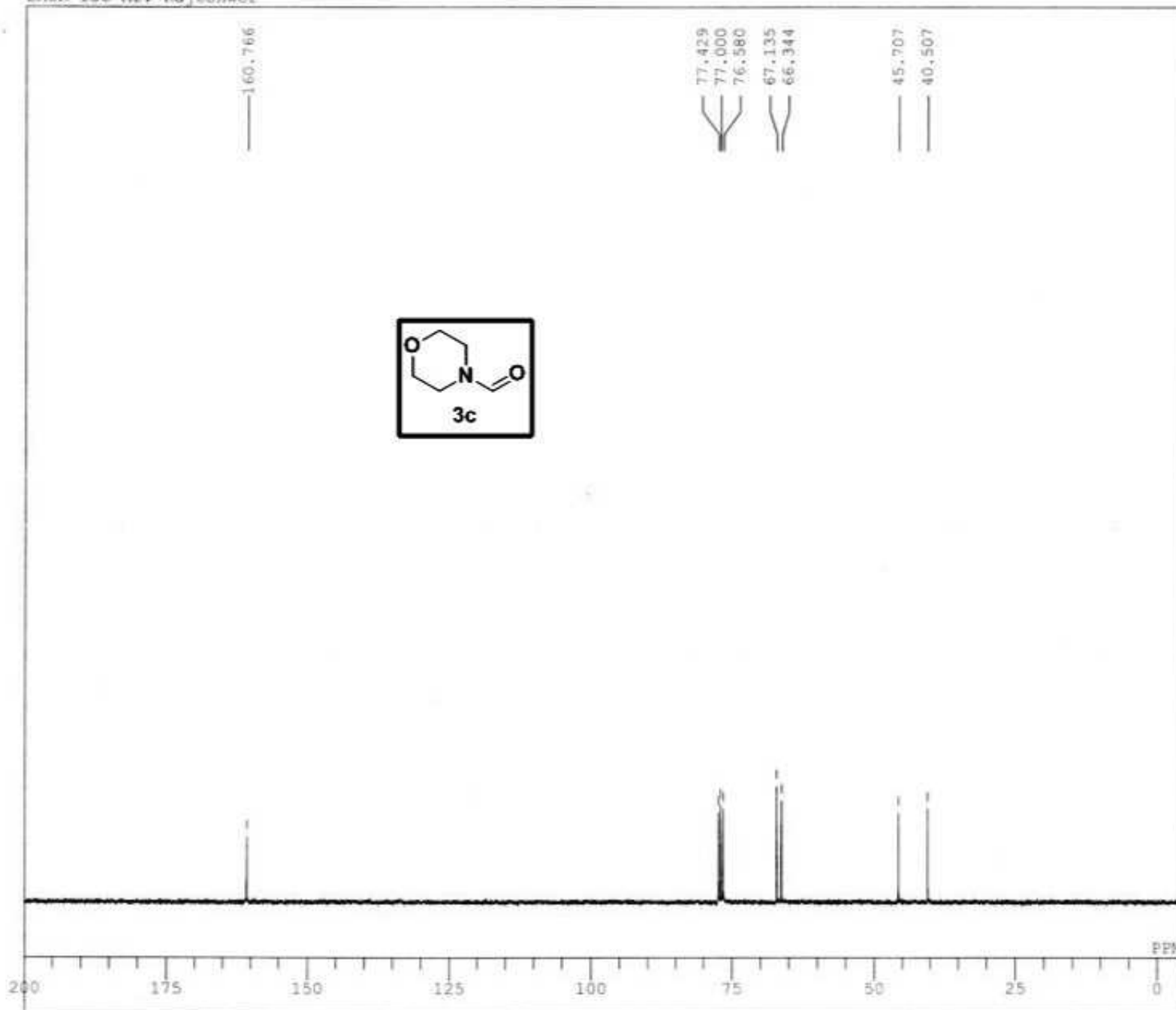


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

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PWI 5.2 us
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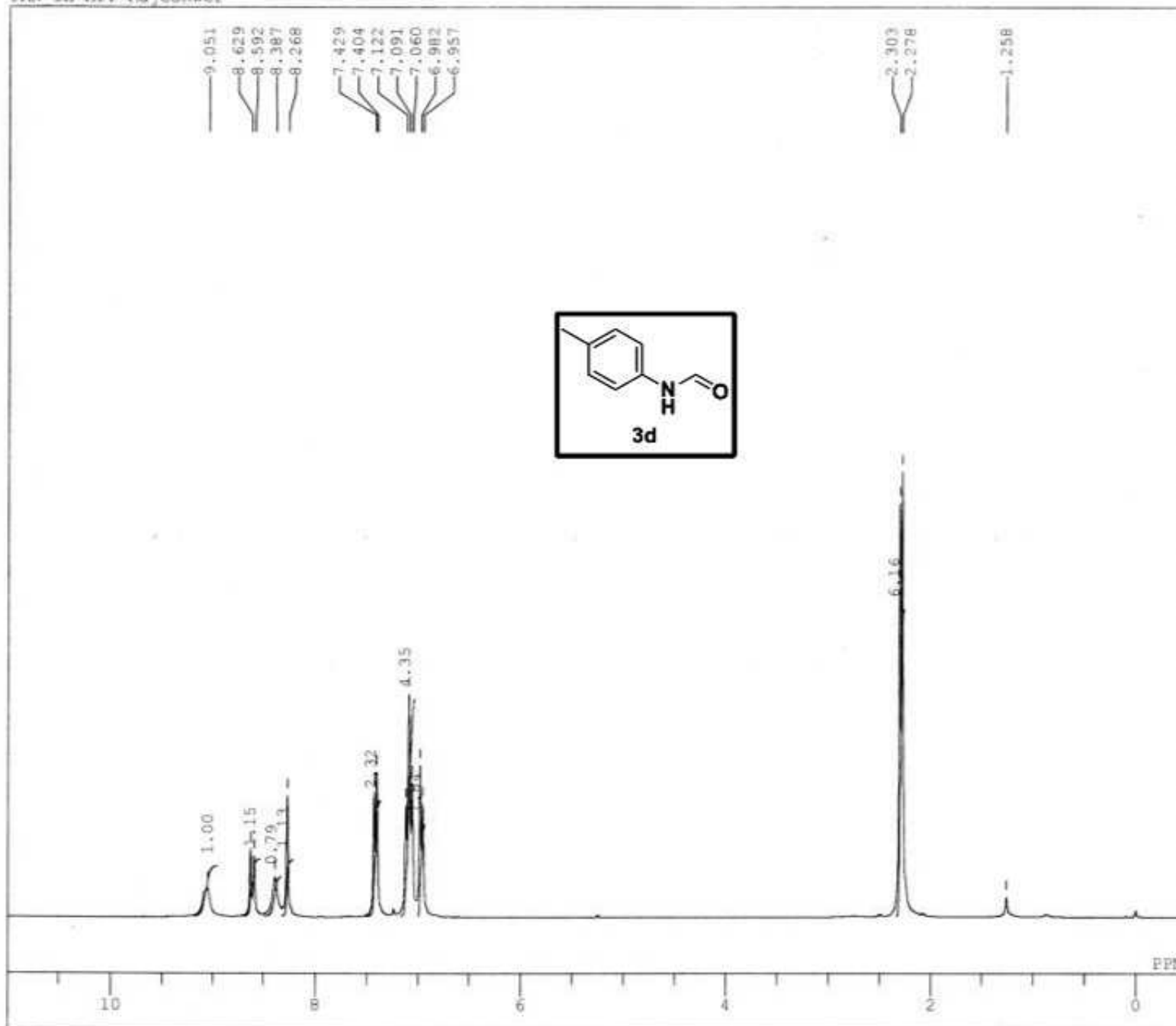


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

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PD 1.394 sec
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PAN 1H Mr. Rajeshwer

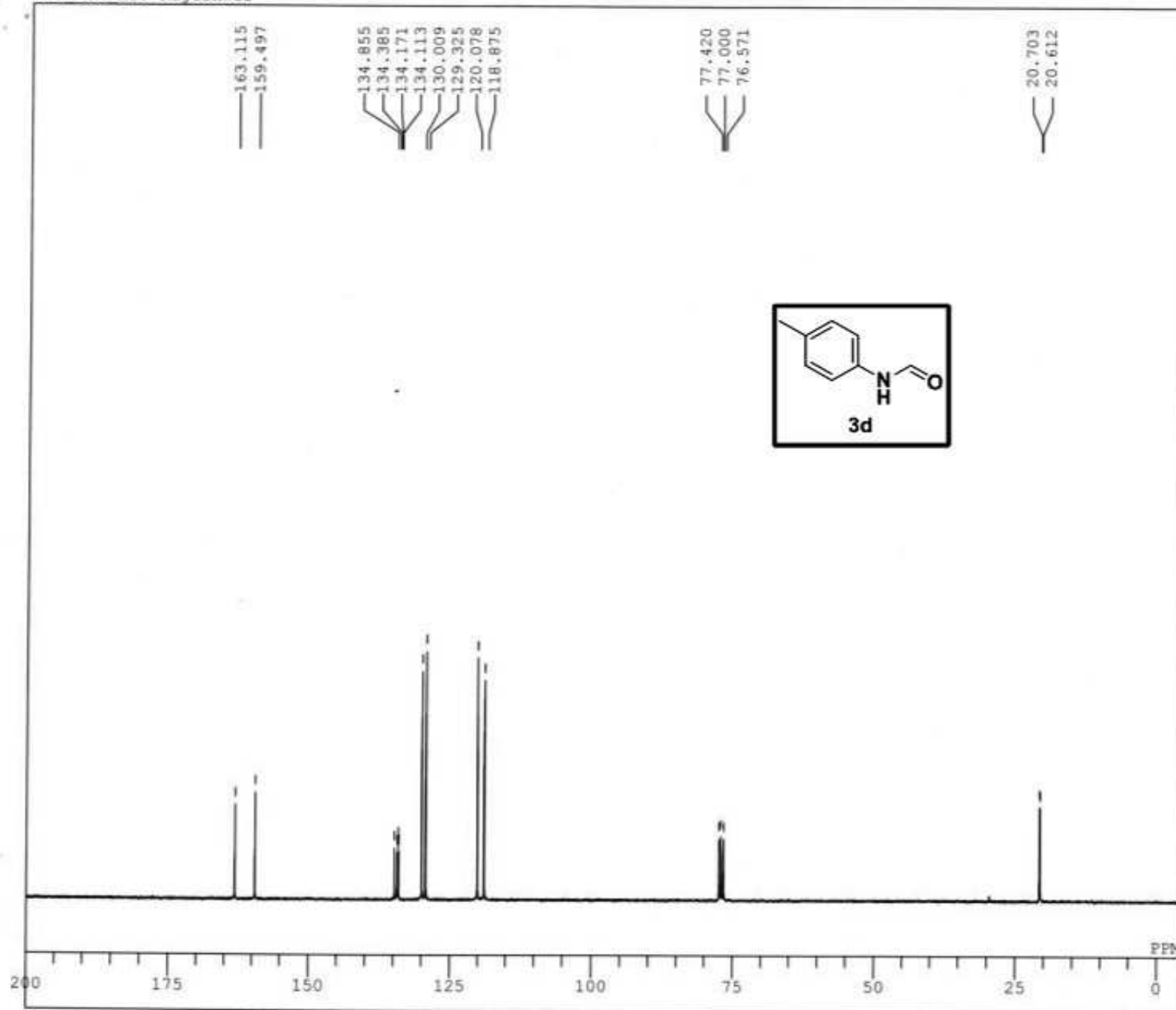


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

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RGAIN 11

PAN_13C_Mr. Rajeshwer

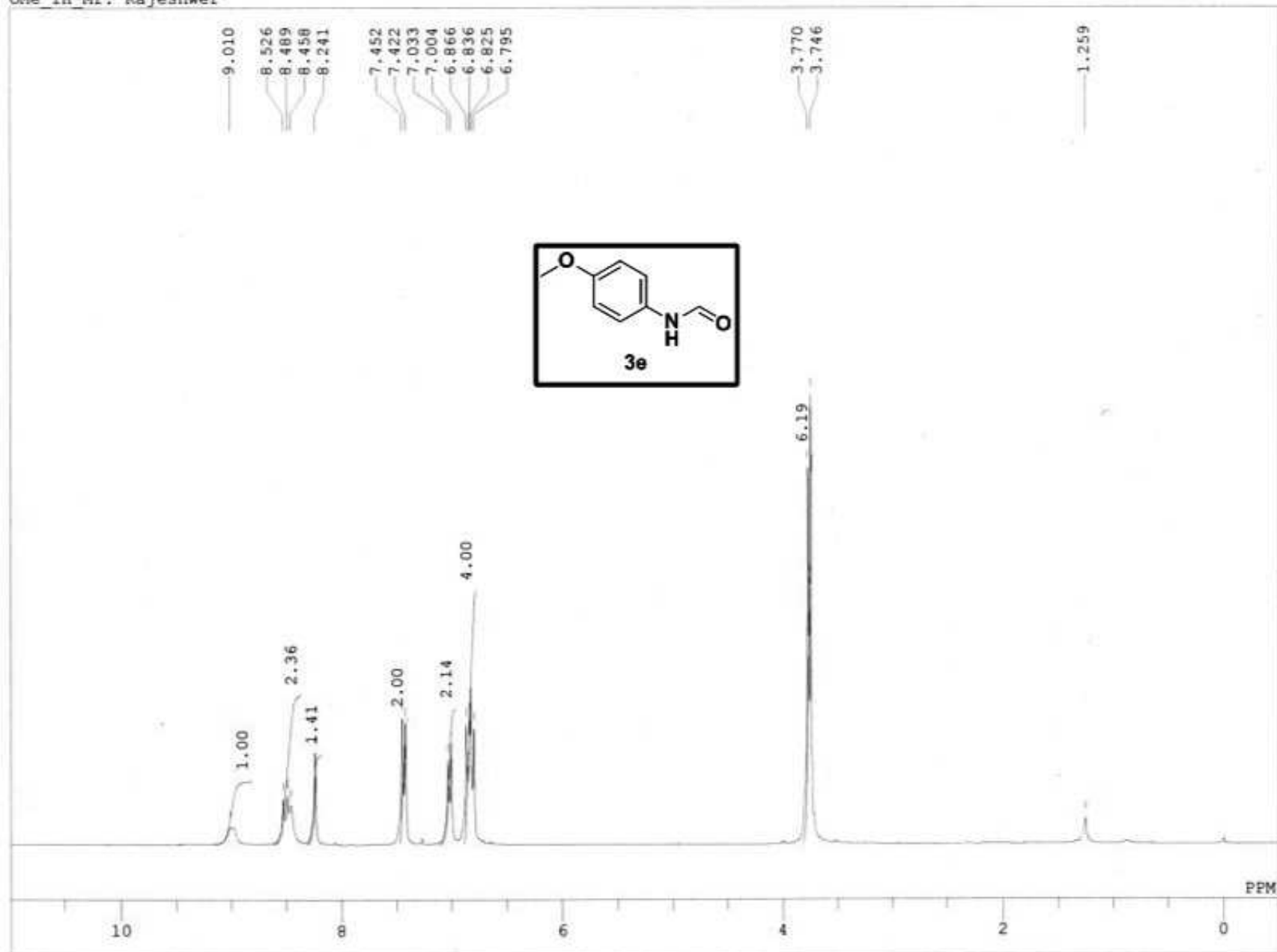


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
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DATIM Tue Jul 03 11:59:58 2012
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OBFIN 44.7 Hz
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PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 22.4 c
SLVNT CDCL3
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BF 1.20 Hz
RGAIN 25

C:\K.N. Singh,,I.T\OMe_1H.als
OMe 1H Mr. Rajeshwer

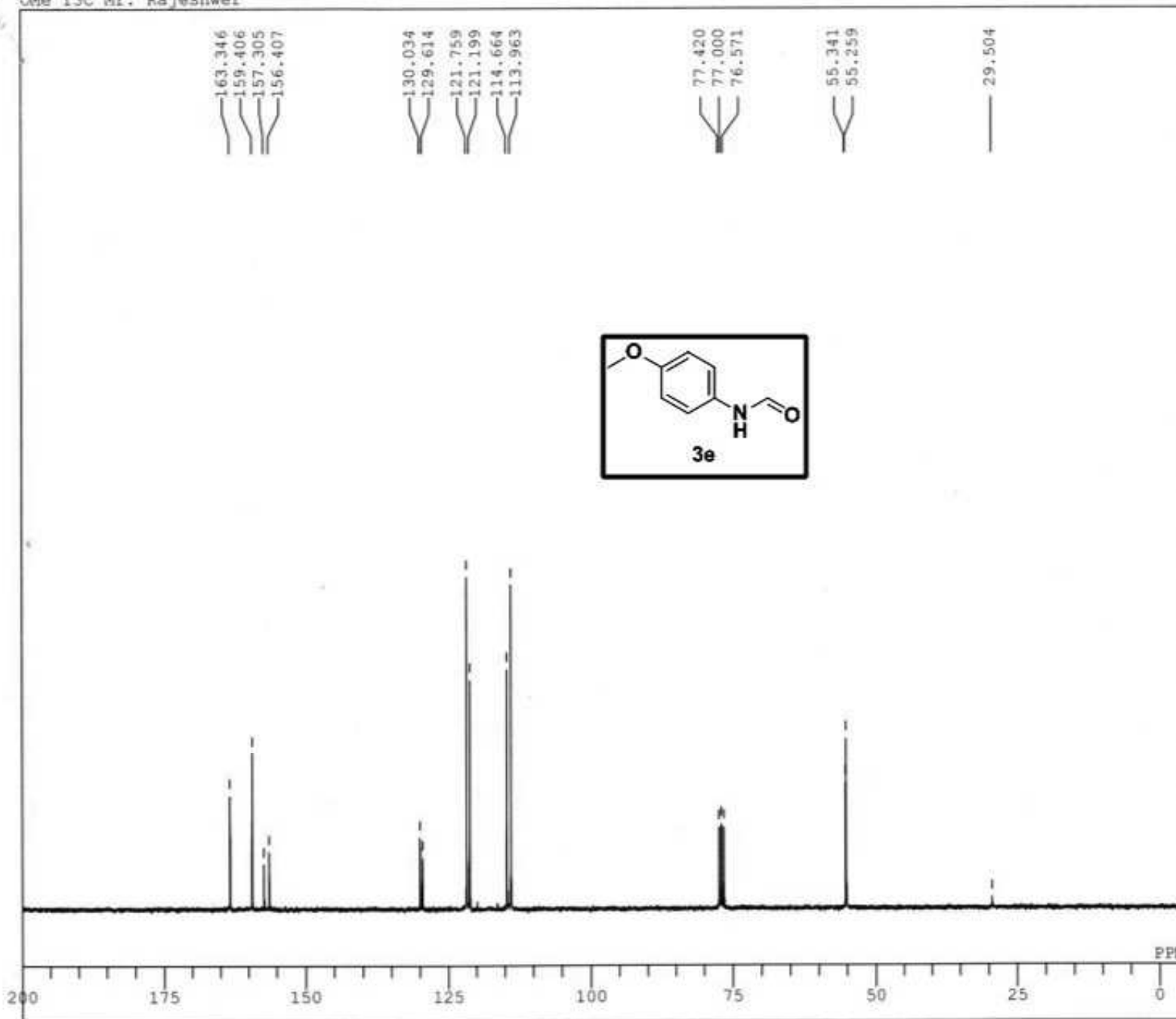


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

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BF 1.20 Hz
RGAIN 10

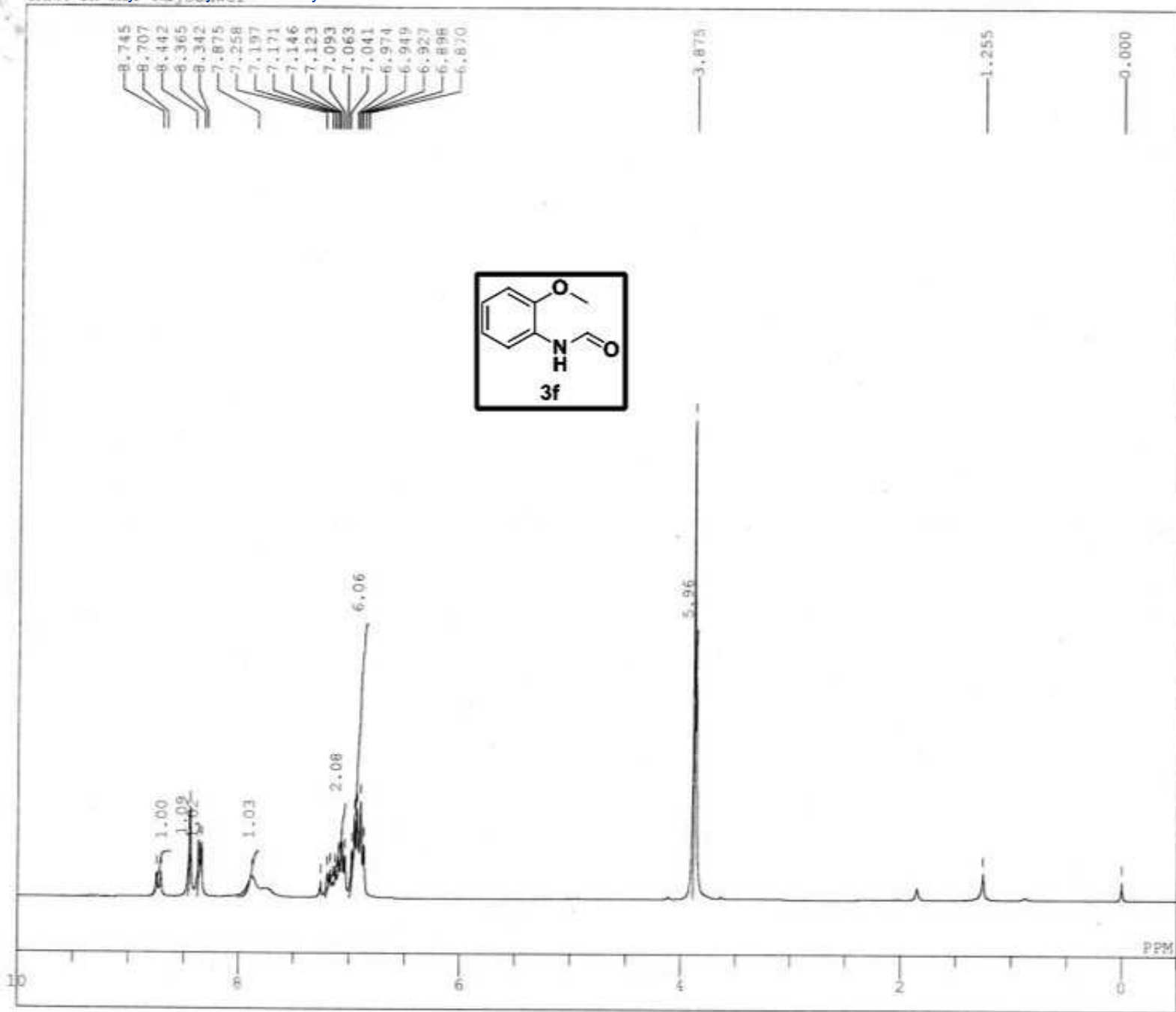
OMe 13C Mr. Rajeshwer



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON\DEFAULT.
COMNT OMe_13C_Mr. Rajeshwer
DATIM Mon Jul 16 15:52:34 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 229
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 24.7 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

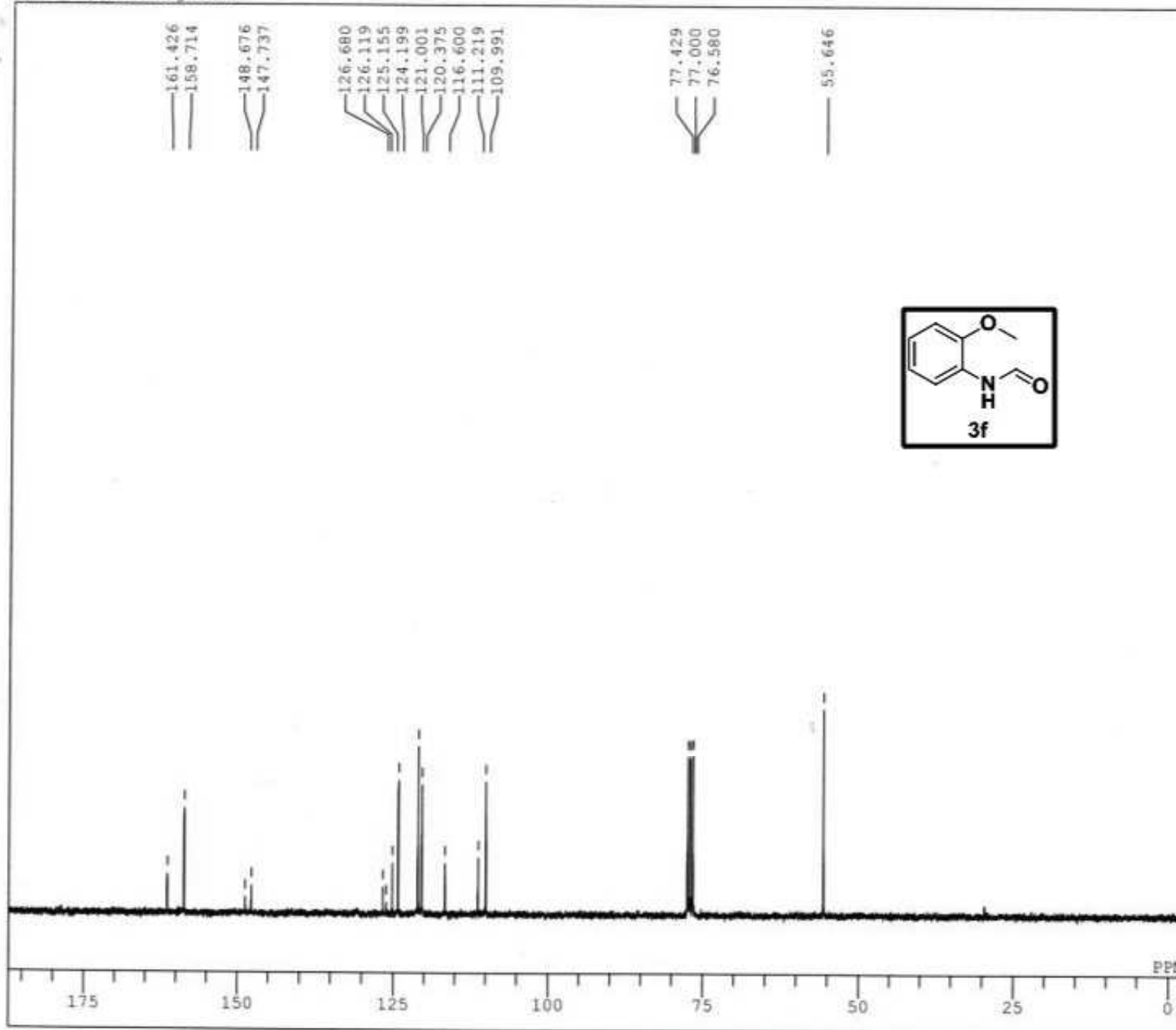


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\OANA_1H.e
COMNT OANA_1H_Mr. Rajeshwer
DATIM Thu Jul 19 17:19:16 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 54
ACQTM 3.447 sec
PD 1.547 sec
PWI 5.2 us
IRNUC 1H
CTEMP 21.5 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 13

OANA 13C Mr. Rajeshwer

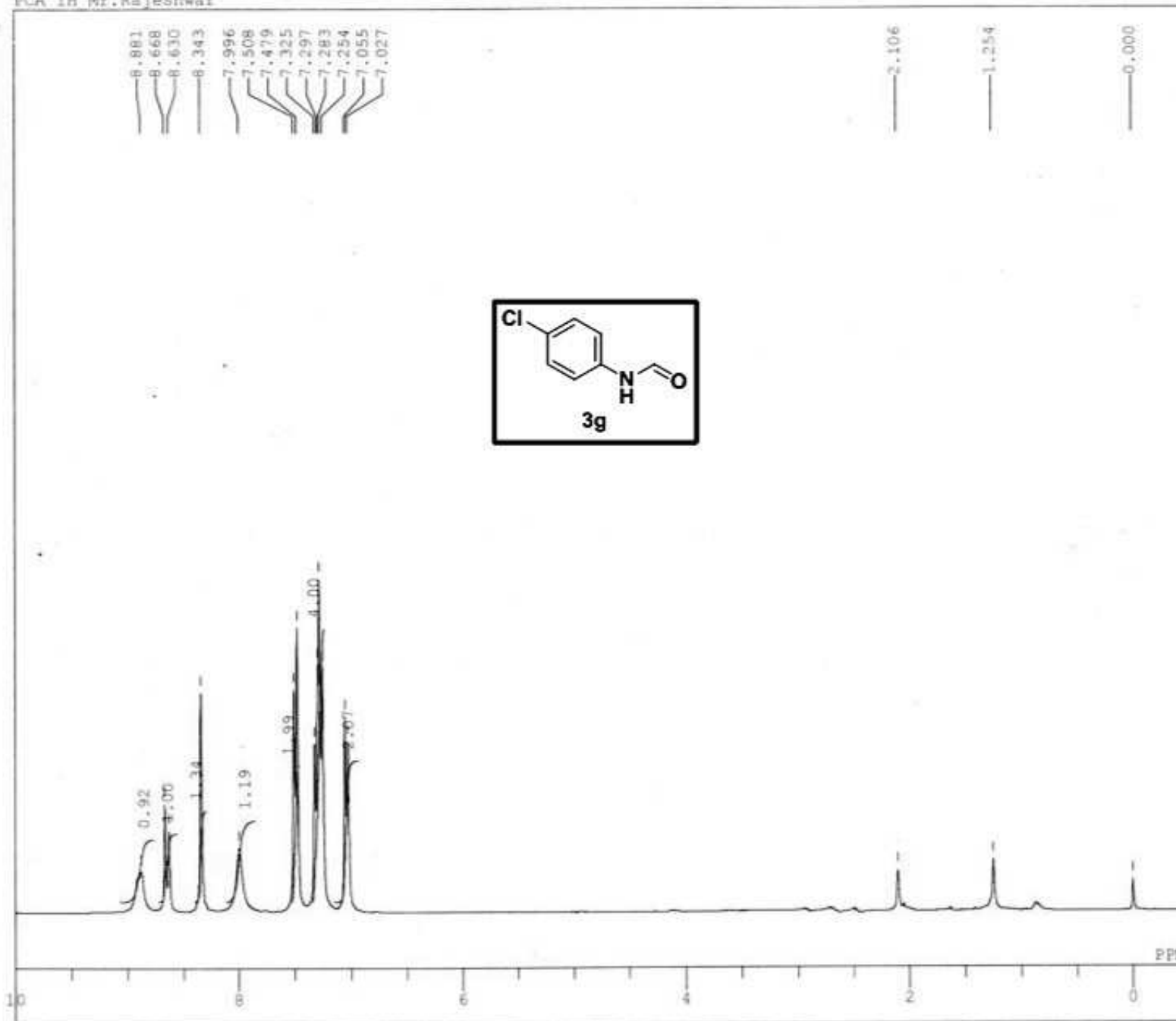


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT OANA_13C Mr. Rajeshwer
DATIM Thu Jul 19 17:37:30 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 283
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 24.1 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

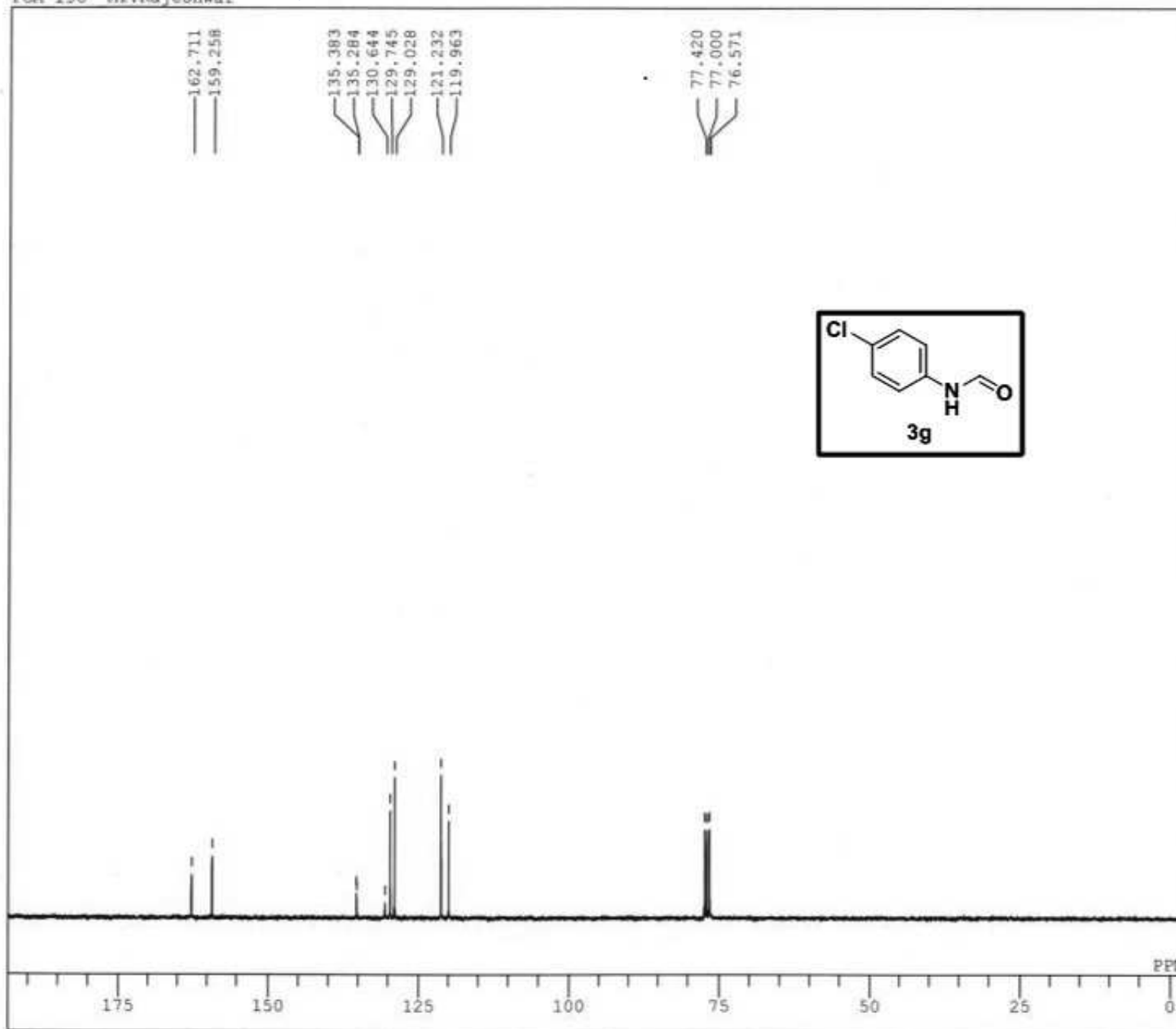
PCA_1H_Mr.Rajeshwar



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

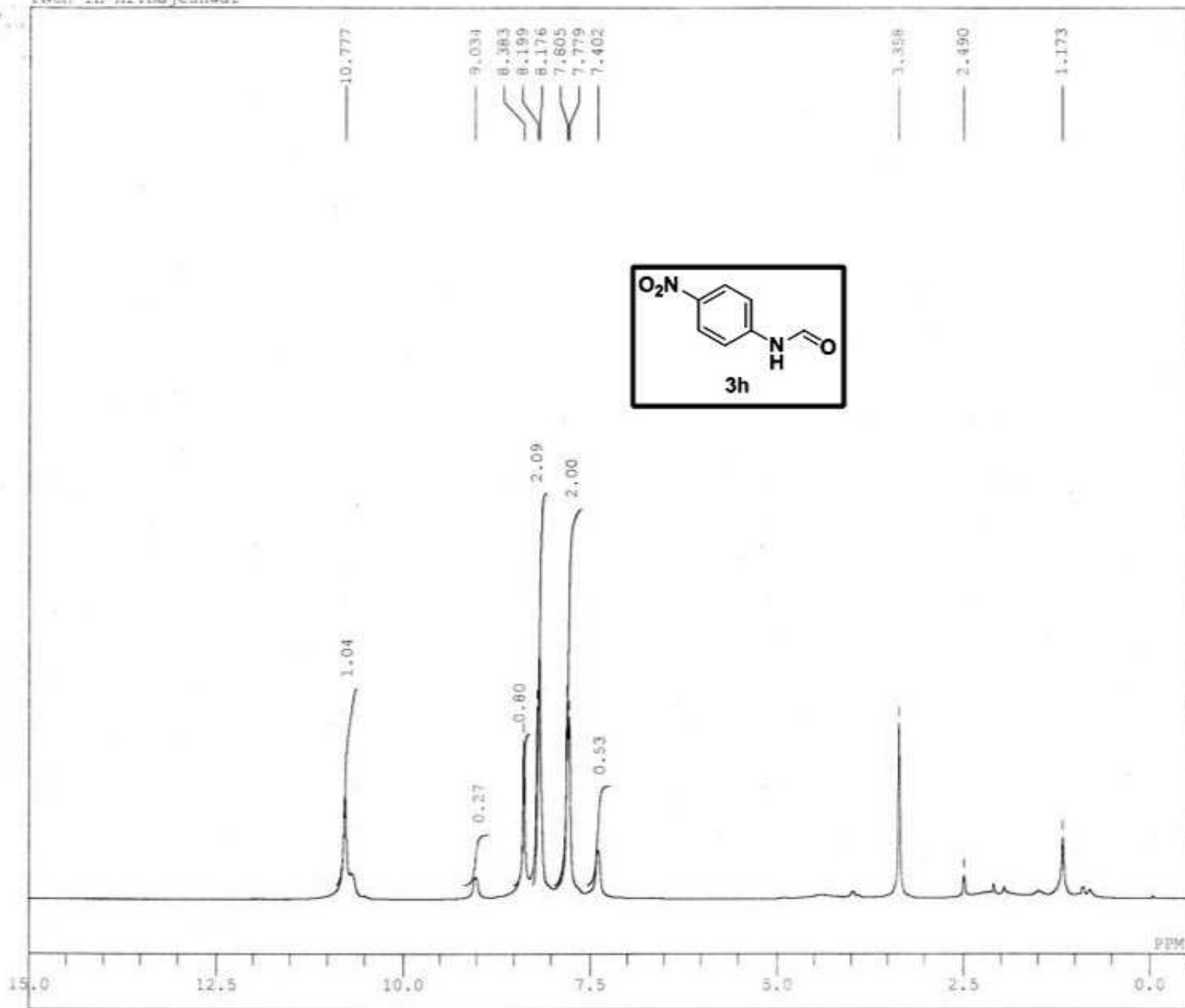
DFILE C:\K.N. Singh,,I.T\PCA_1H.al
COMNT PCA_1H_Mr.Rajeshwar
DATIM Tue Jul 10 13:13:47 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 36
ACQTM 3.447 sec
PD 1.547 sec
PWI 5.2 us
IRNUC 1H
CTEMP 19.1 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 14



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT PCA_13C Mr.Rajeshwar
DATIM Tue Jul 10 13:34:38 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 160
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 19.5 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23

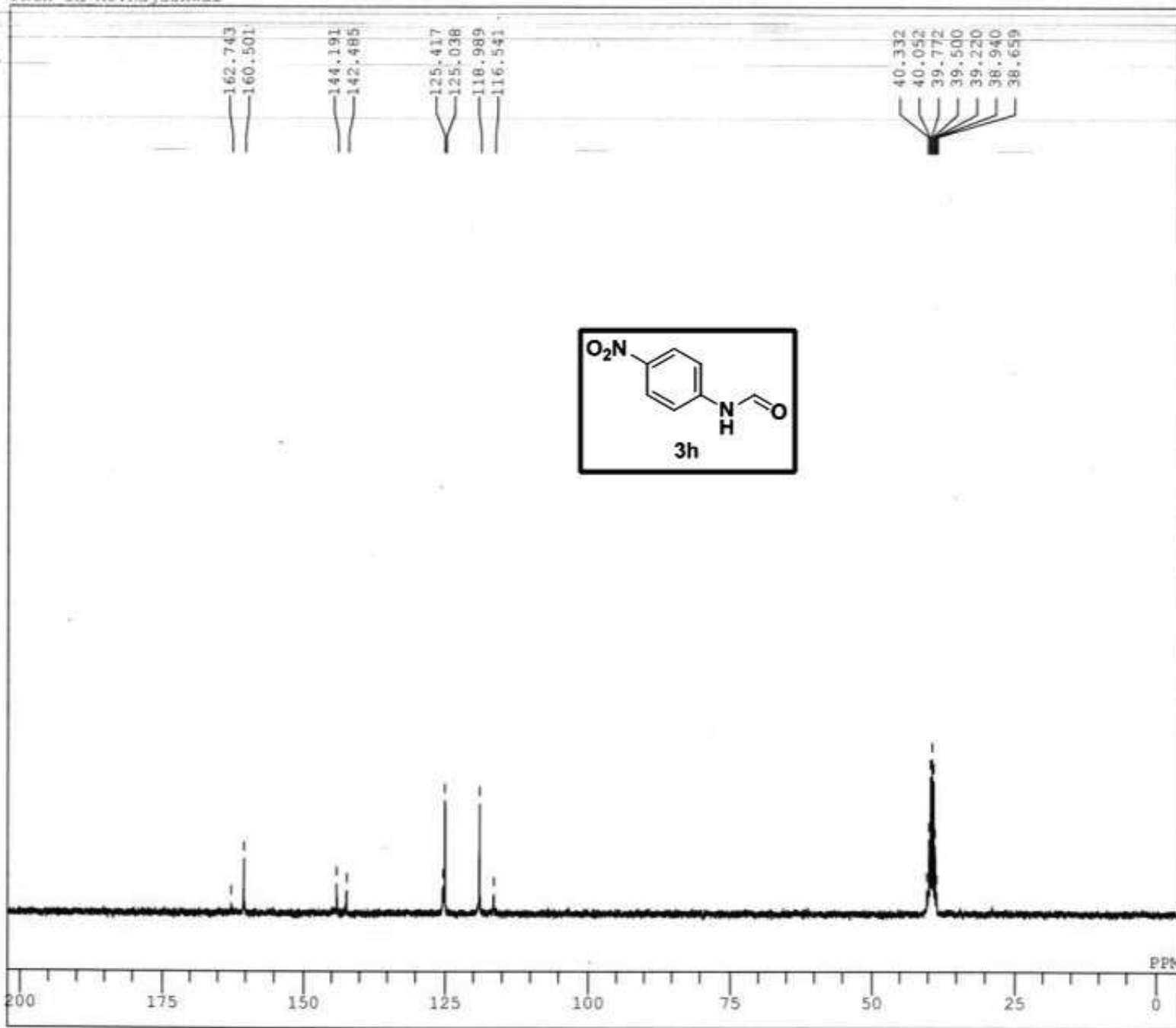


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\PNCH_1H.e
COMNT PNCH_1H_Mr.Rajeshwar
DATIM Wed Aug 22 12:06:45 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 32
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 21.1 c
SLVNT DMSO
EXREF 2.49 ppm
BF 1.20 Hz
RGAIN 13

PNCH 1H Mr. Rajeshwar

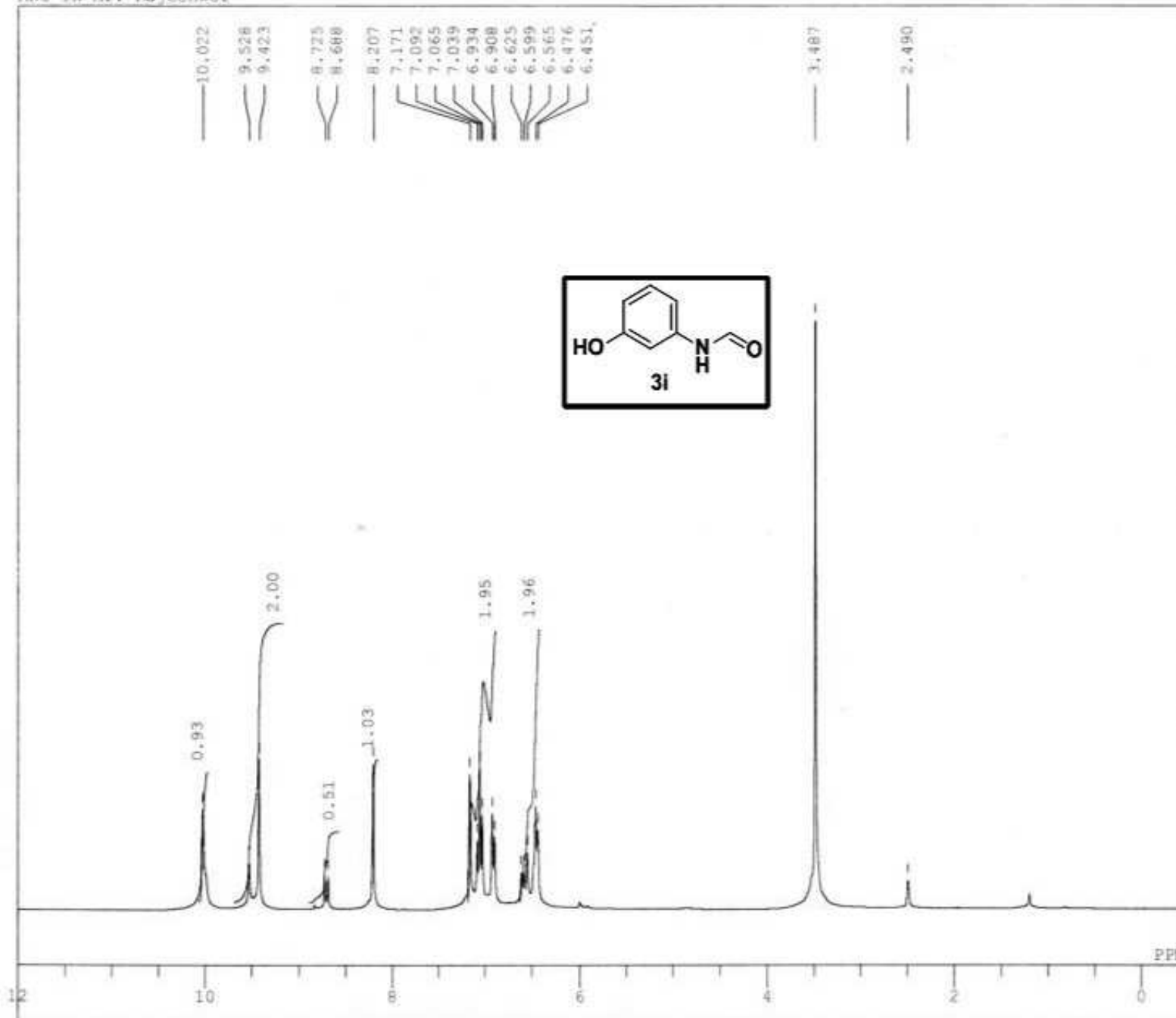


JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT PNCH 1H Mr. Rajeshwar
DATIM Wed Aug 22 12:14:59 2012
OBNUC 13C
EXMOD BCM
OBFREQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 100
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 24.8 c
SLVNT DMSO
EXREF 39.50 ppm
BF 1.20 Hz
RGAIN 24

MNO 1H Mr. Rajeshwer

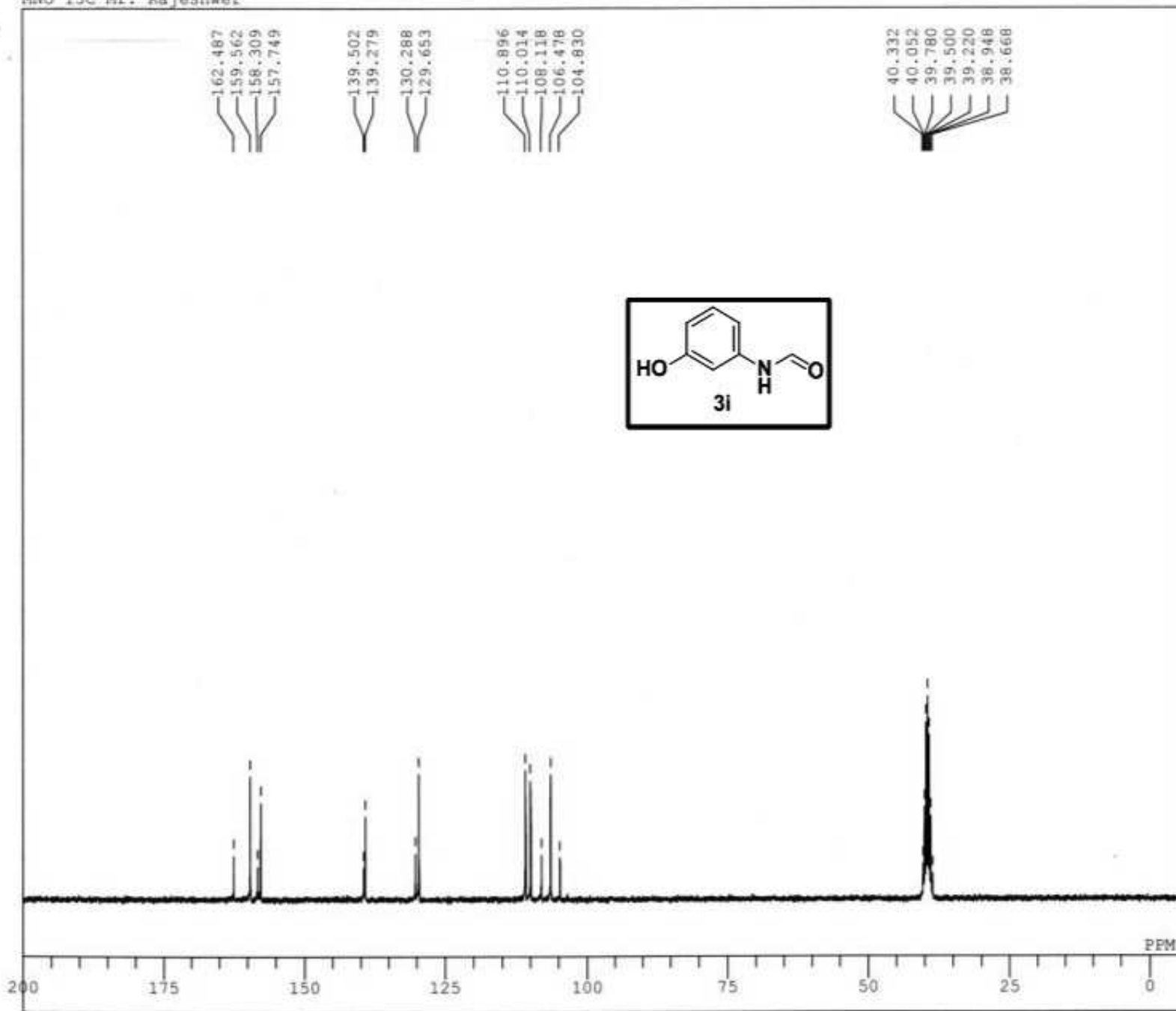


JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\MNO_1H.a1
COMNT MNO_1H Mr. Rajeshwer
DATIM Sat Jul 28 11:16:01 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 64
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 21.7 c
SLVNT DMSO
EXREF 2.49 ppm
BF 1.20 Hz
RGAIN 11

MNO 13C Mr. Rajeshwer

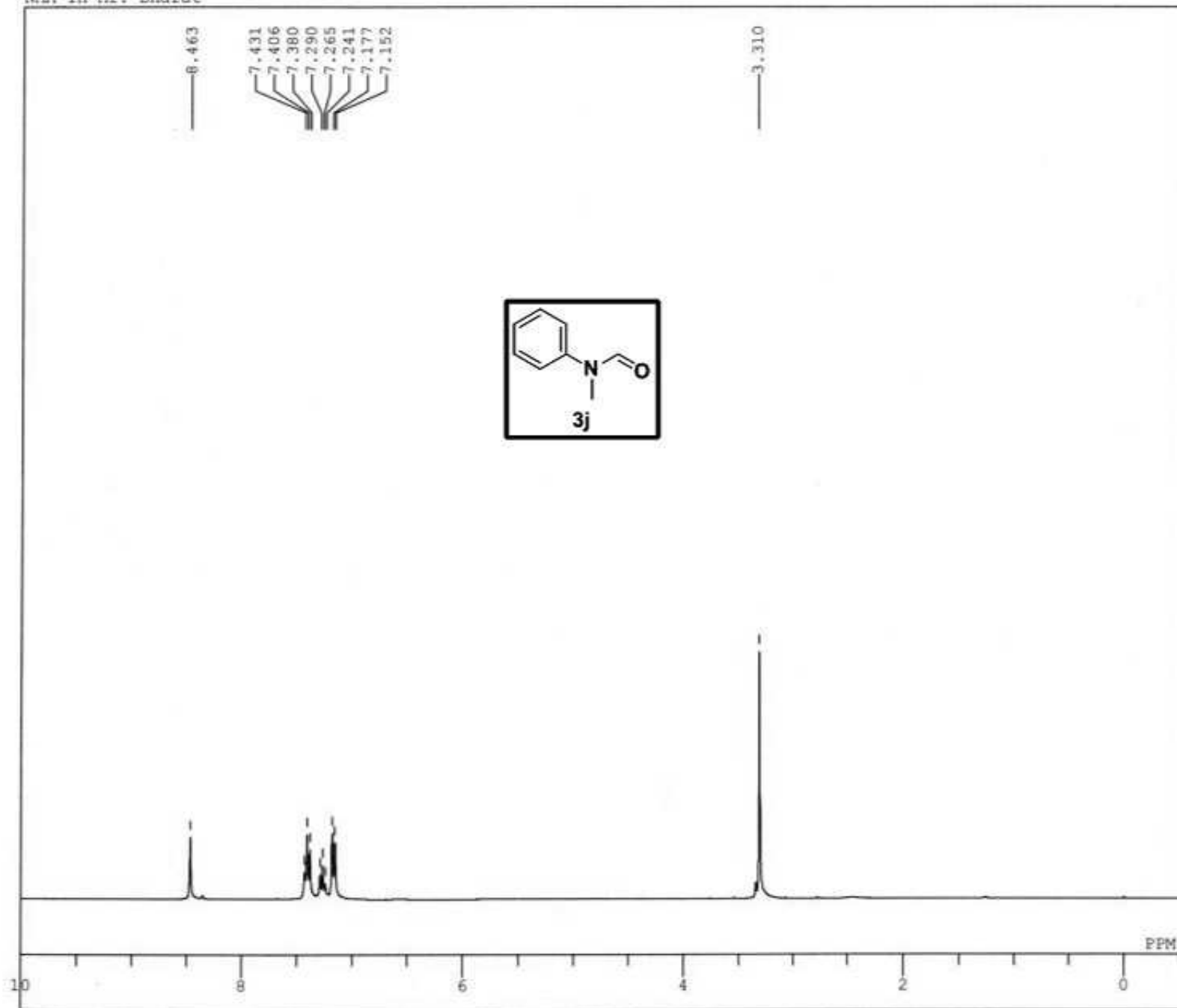


JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT MNO_13C_Mr. Rajeshwer
DATIM Sat Jul 28 11:30:01 2012
OBNUC 13C
EXMOD BCM
OBFREQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 202
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 21.6 c
SLVNT DMSO
EXREF 39.50 ppm
BF 1.20 Hz
RGAIN 24

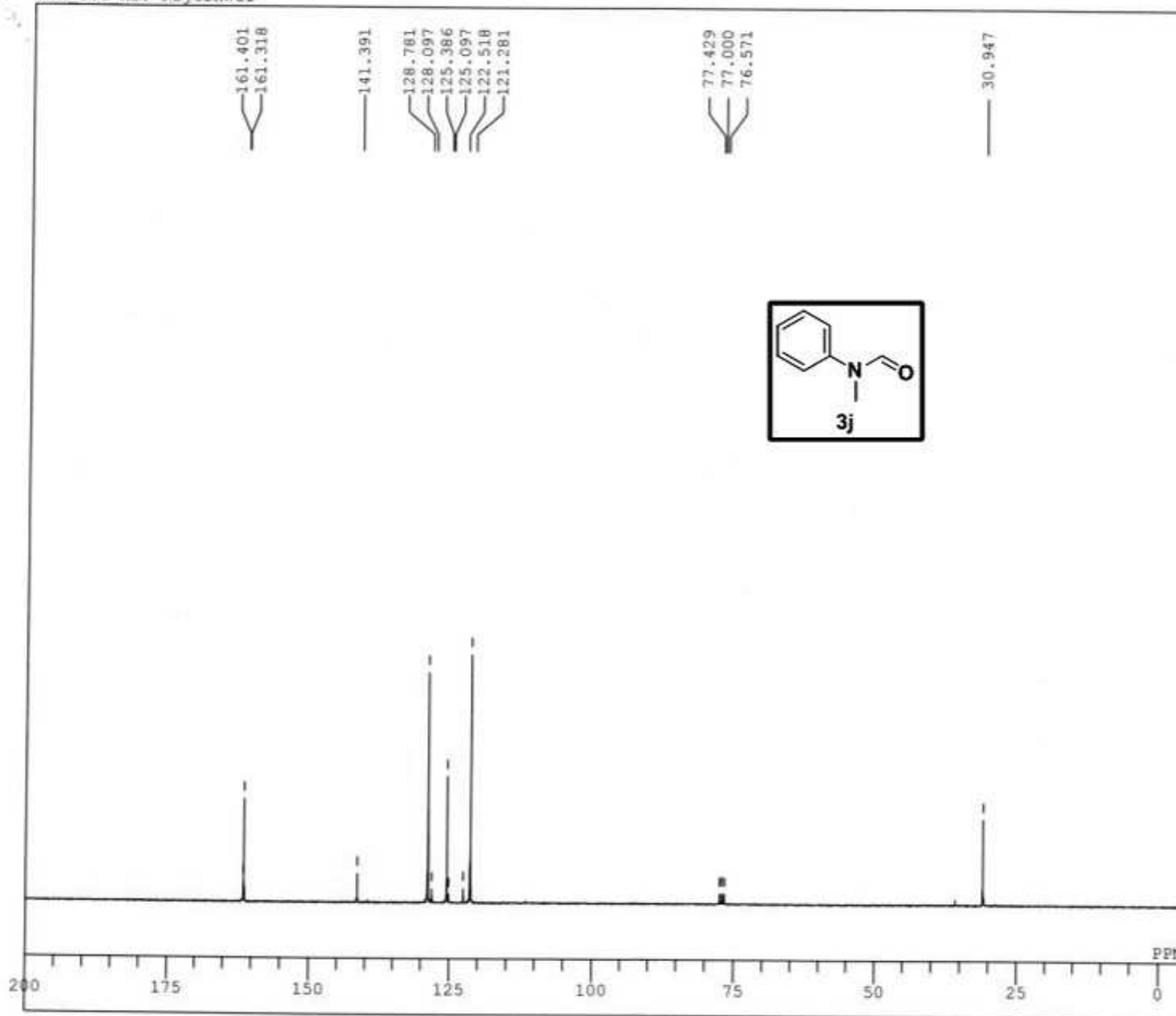
NMA_1H-Mr. Bharat



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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

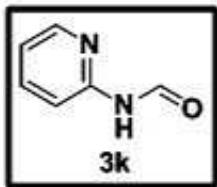
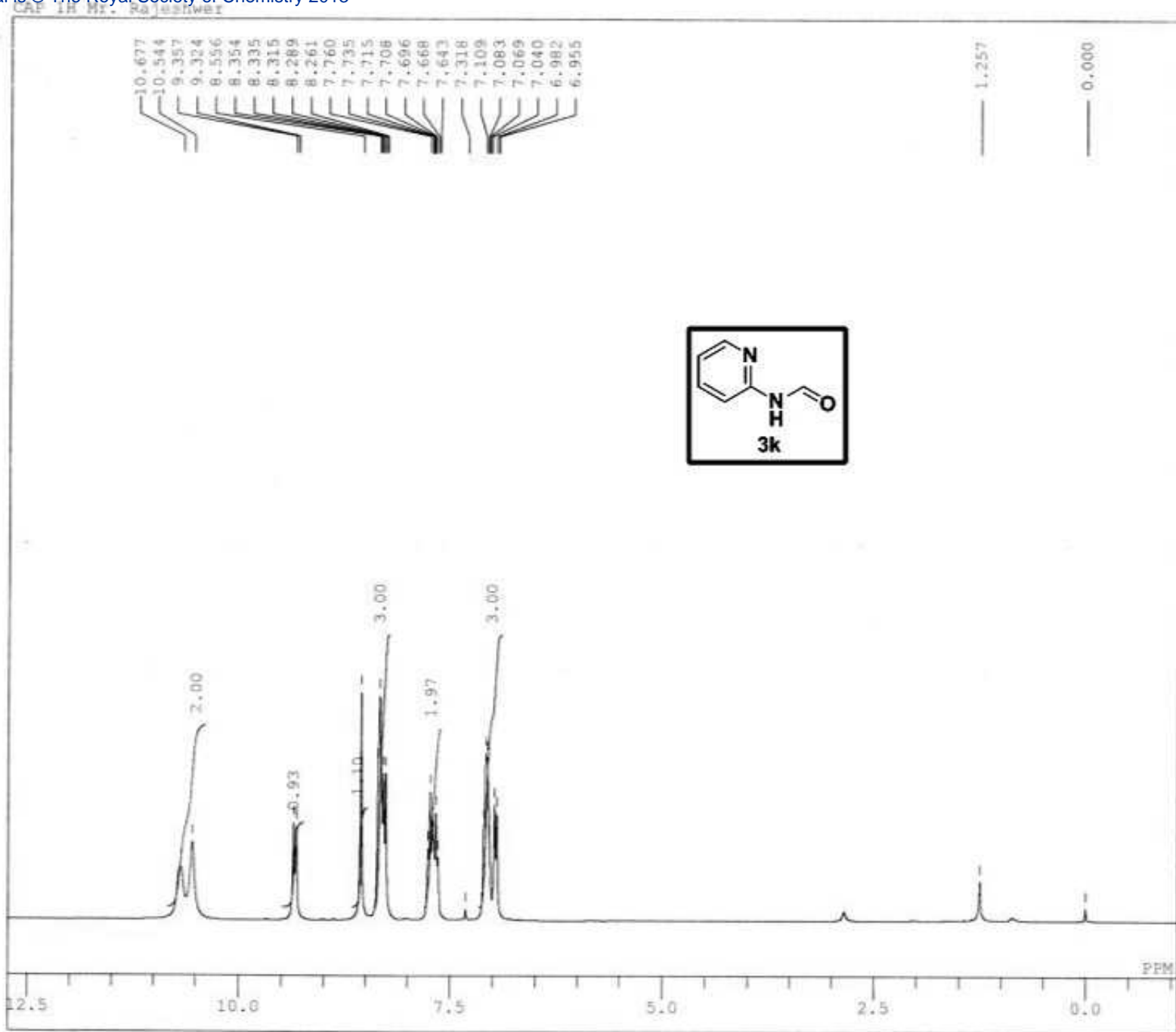
DFILE C:\K.N. Singh,,I.T\NMA_1H1NC
COMNT NMA_1H-Mr. Bharat
DATIM Sat Dec 01 13:55:16 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 32
ACQTM 5.446 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 19.3 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 10



JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT NMA_13C_Mr. Rajeshwer
DATIM Wed Jul 04 13:24:38 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 160
ACQTM 1.606 sec
FD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 20.9 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 22

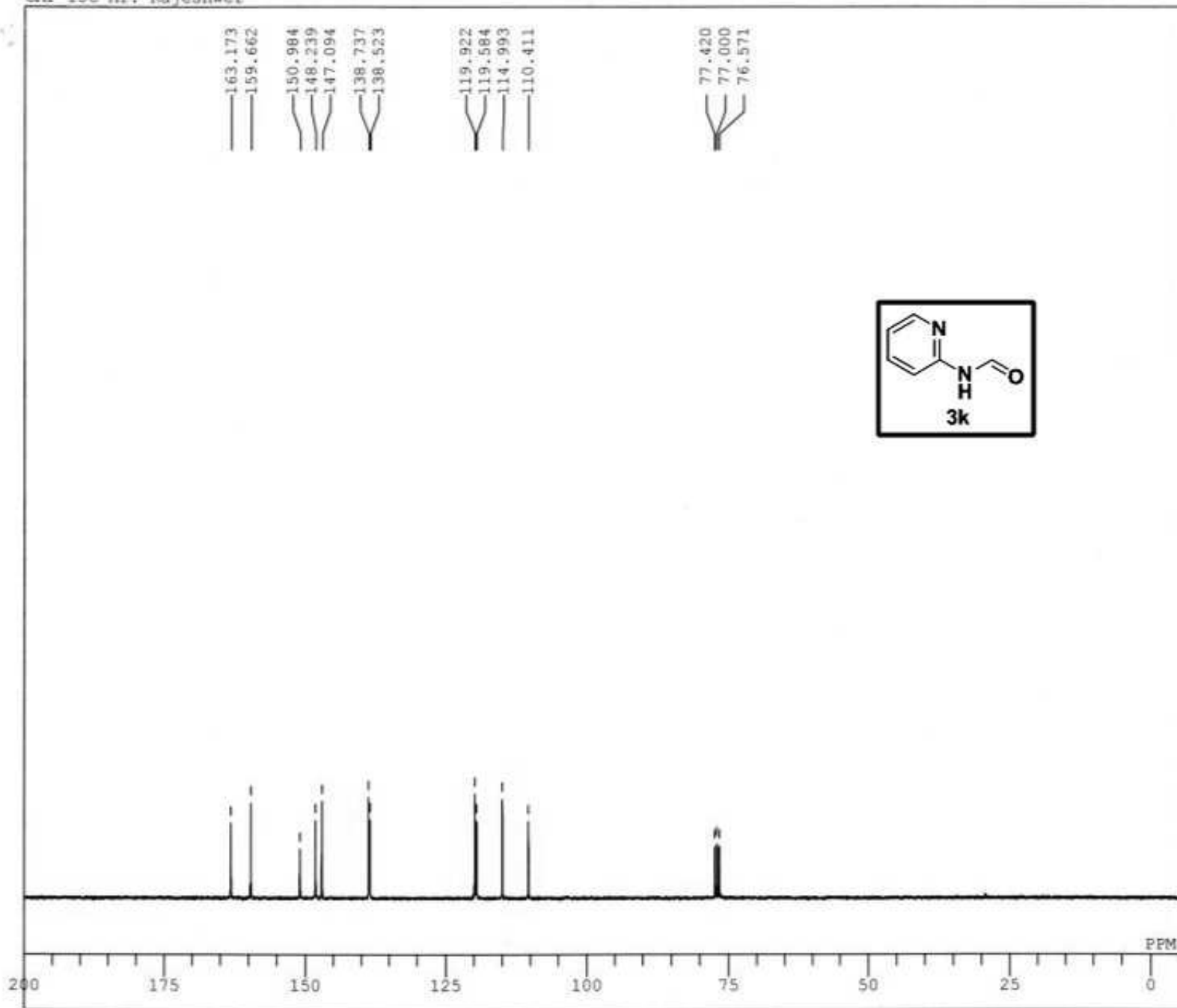


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\CAP_1H.al
COMNT CAP_1H Mr. Rajeshwer
DATIM Mon Jul 02 12:12:26 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 98
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 20.9 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 10

CAP 13C Mr. Rajeshwer

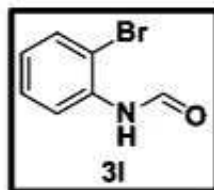
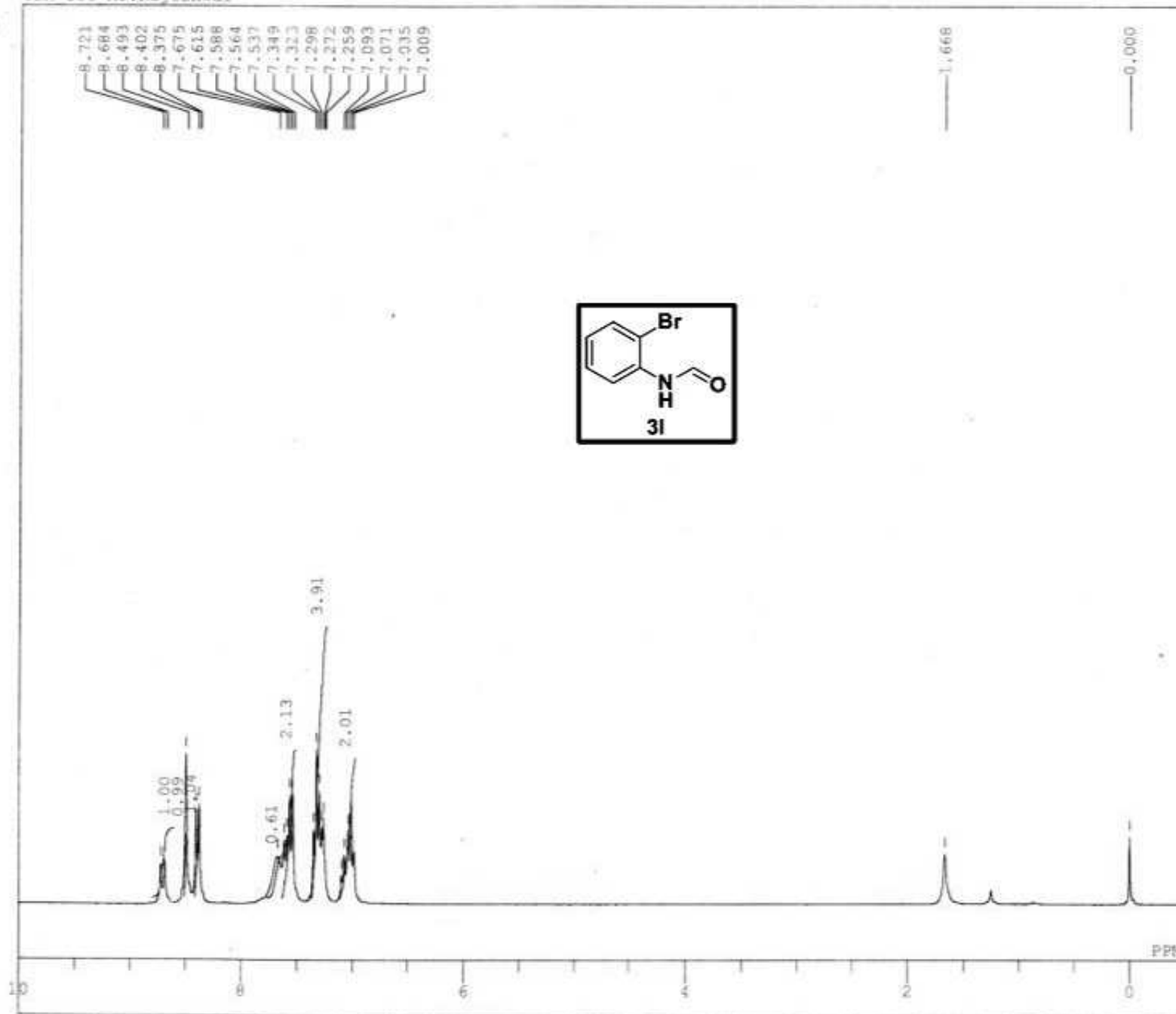


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON\DEFAULT.
COMT CAP_13C_Mr. Rajeshwer
DATIM Mon Jul 02 12:33:01 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 135
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 20.5 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

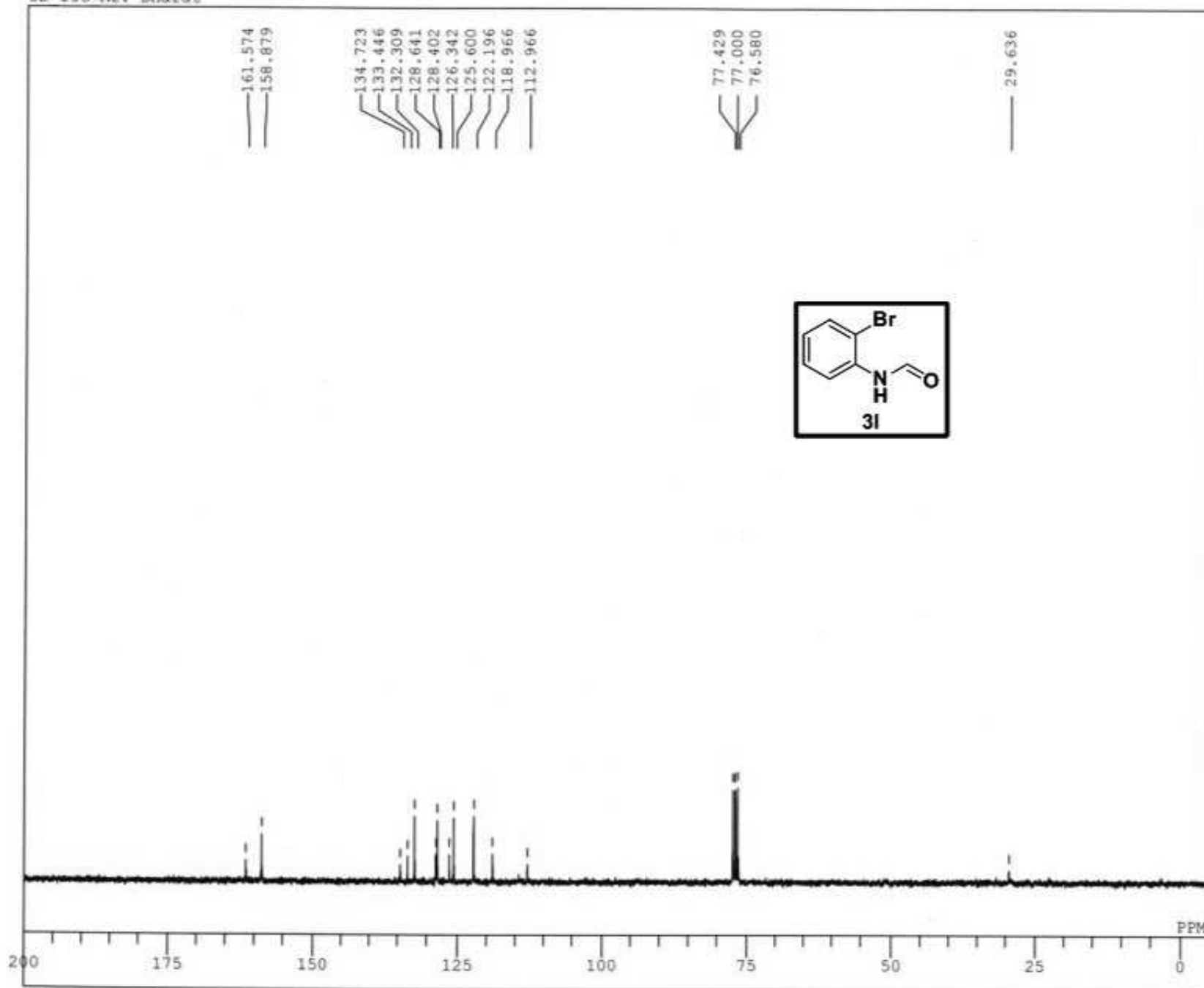
OBA_13C_Mr.Rajeshwar



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\OBA_1H.a1
COMNT OBA_13C_Mr.Rajeshwar
DATIM Mon Sep 10 12:04:51 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PWI 5.2 us
IRNUC 1H
CTEMP 20.5 c
SLVNT CDCl3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 18

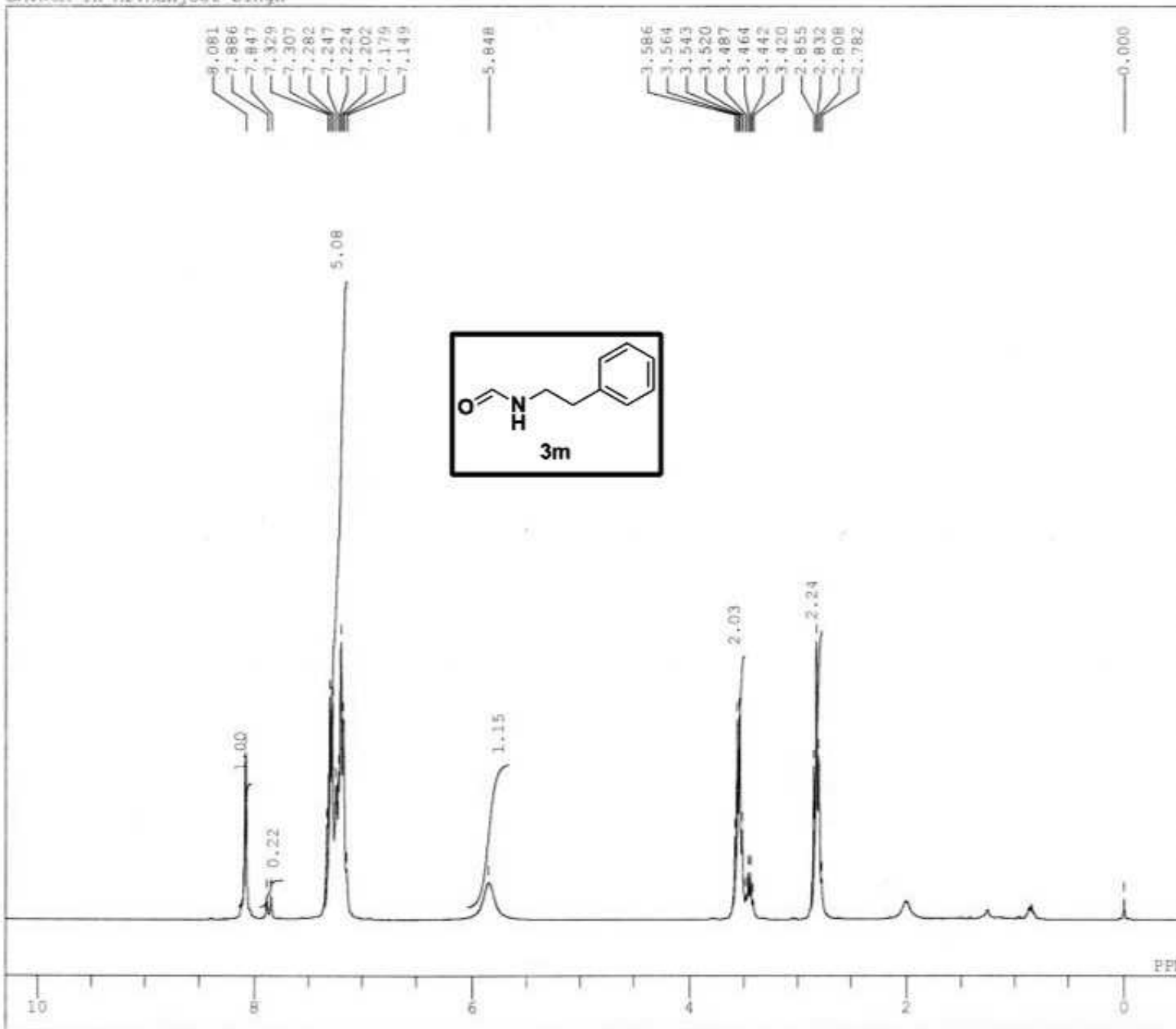


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEI
COMNT OB_13C_Mr. Bharat
DATIM Sat Dec 01 15:40:14 20:
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 171
ACQTM 1.606 sec
PD 1.394 sec
PWI 6.0 us
IRNUC 1H
CTEMP 19.1 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

EA.NCA 1H Mr.Manjeet Singh

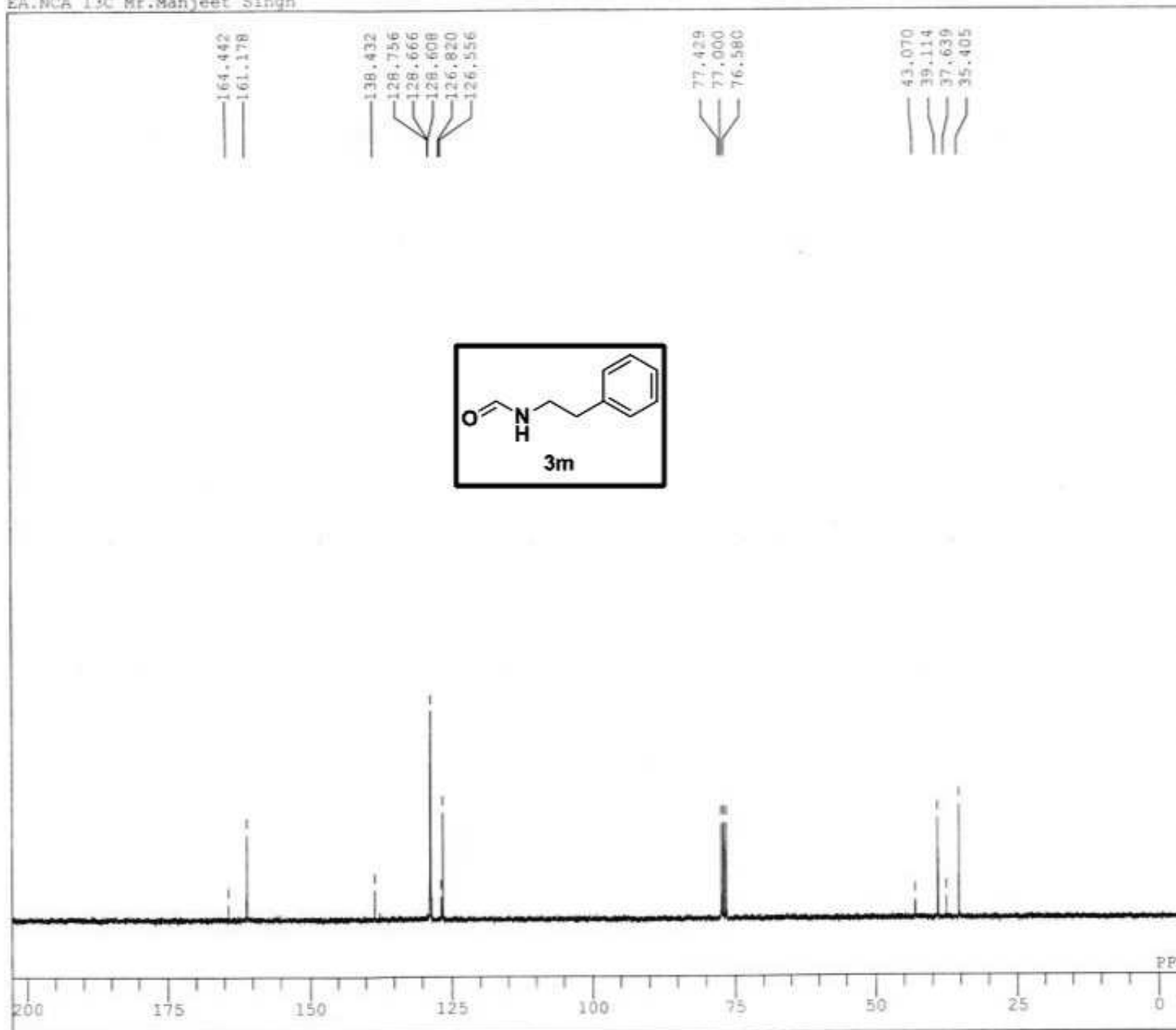


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\R.N. Rai\EA.NCA_1H.als
COMNT EA.NCA_1H Mr.Manjeet Singh
DATIM Wed Sep 12 13:04:21 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 8
ACQTM 3.447 sec
PD 1.547 sec
PWL 5.2 us
IRNUC 1H
CTEMP 22.5 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 12

EA.NCA 13C Mr.Manjeet Singh

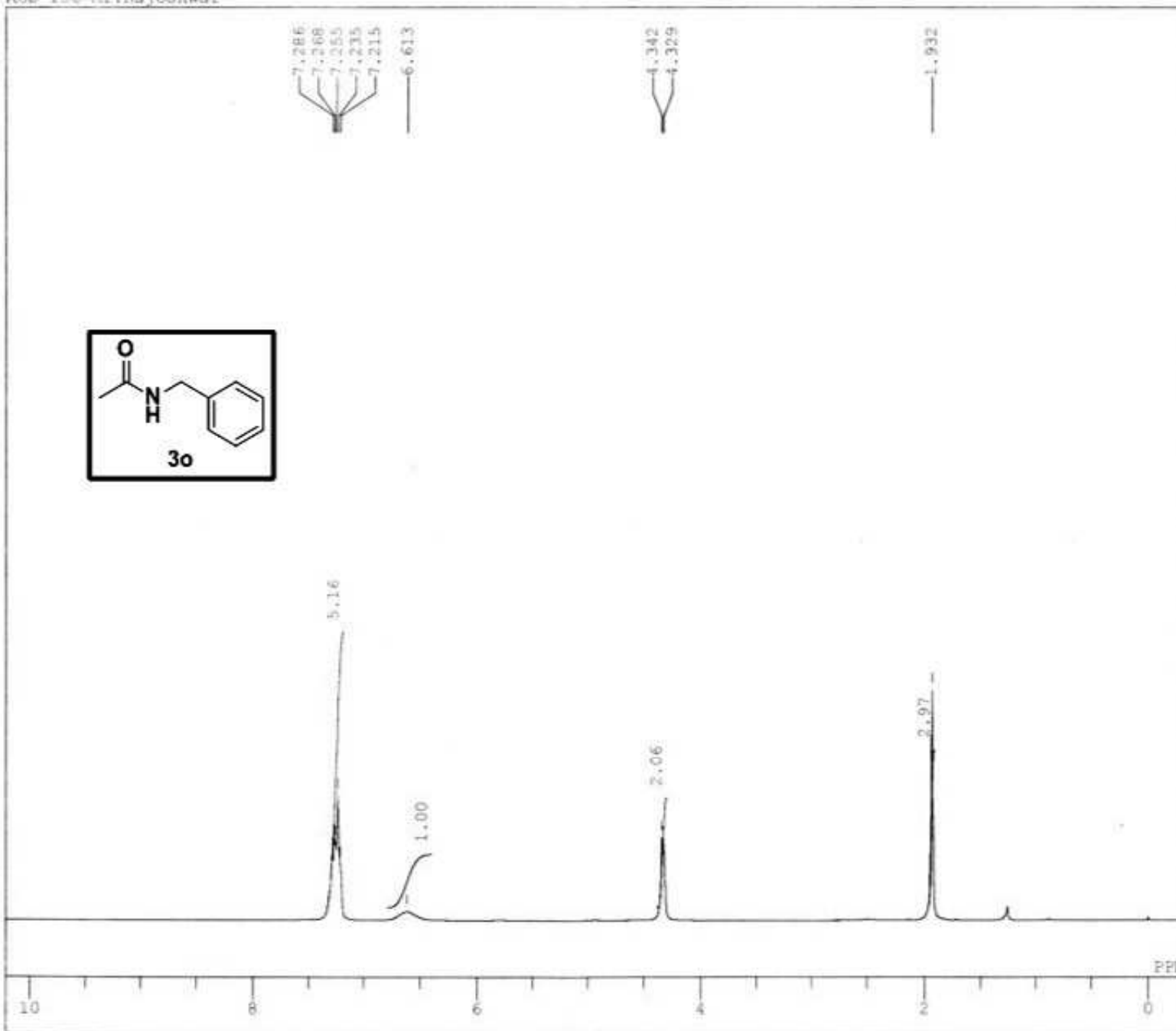


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Naqendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT EA.NCA 13C Mr.Manjeet Singh
DATIM Wed Sep 12 12:59:21 2012
OBNUC 13C
EXMOD BCM
OBFREQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 162
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 20.7 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

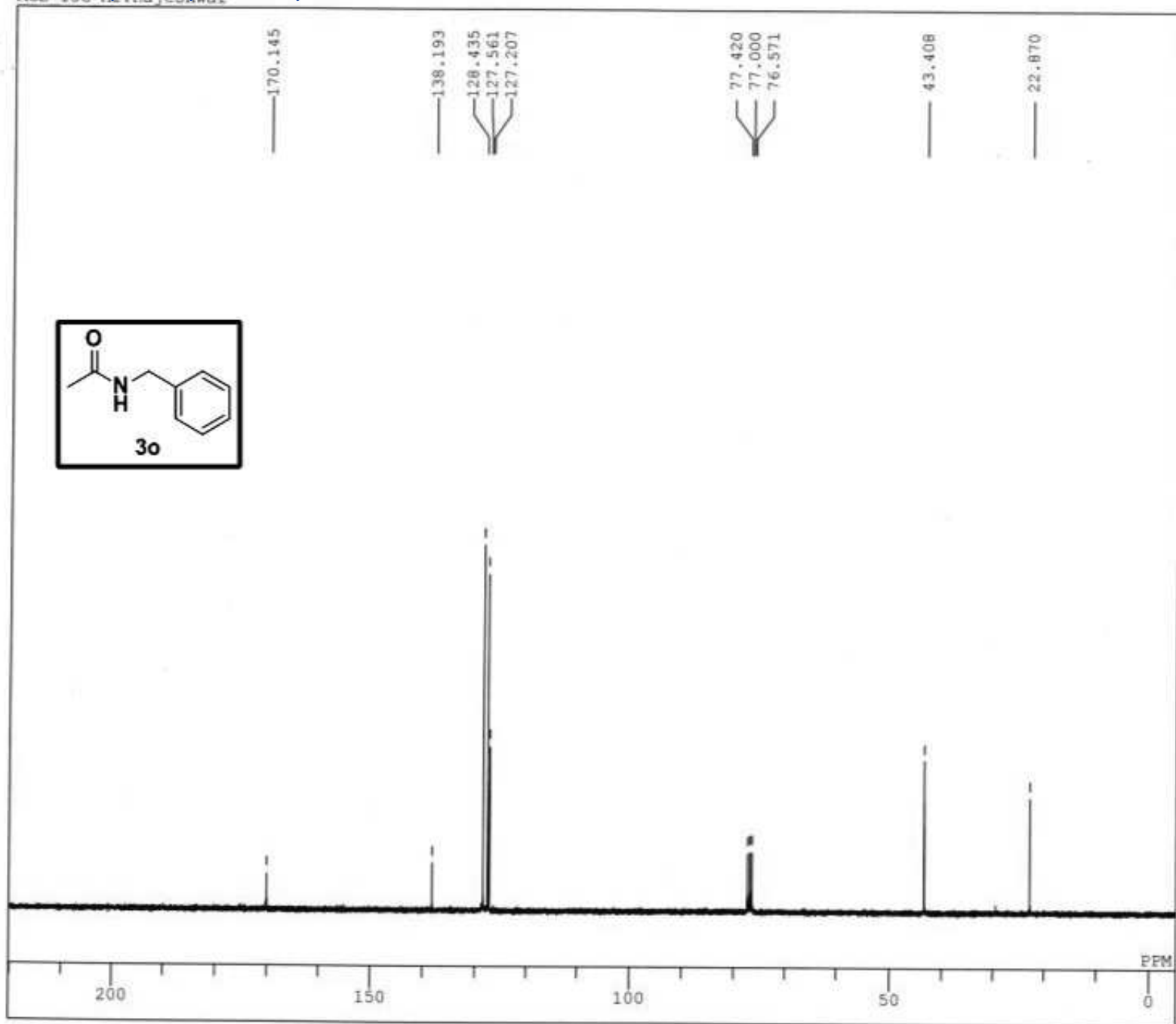
ACB_13C_Mr.Rajeshwar



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\ACB_13C.e
COMNT ACB_13C_Mr.Rajeshwar
DATIM Fri Jul 06 16:13:43 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 32
ACQTM 5.446 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 20.1 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 0.12 Hz
RGAIN 10

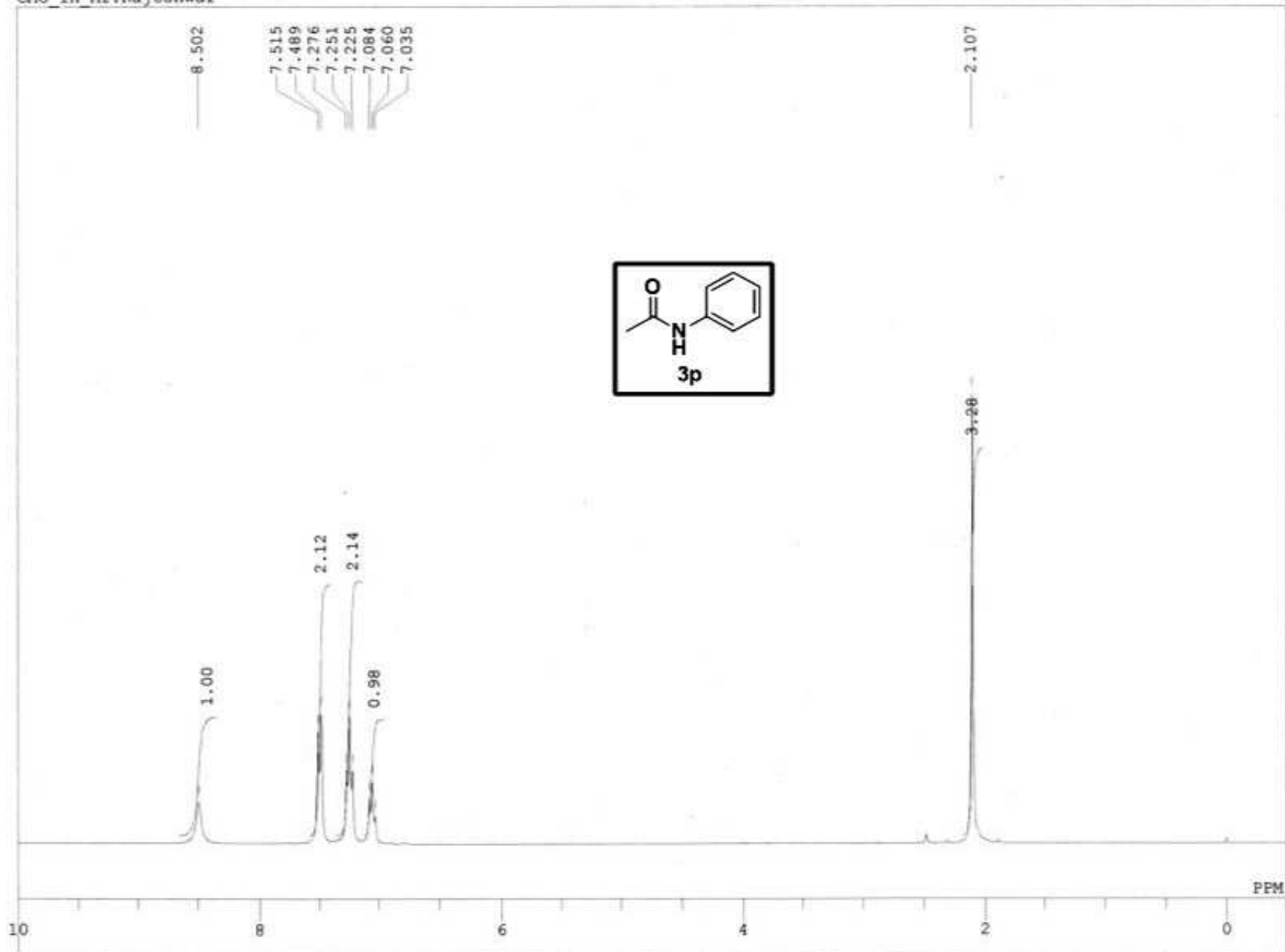
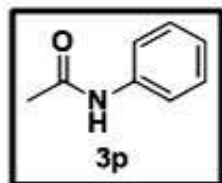


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\Data\ACB_13C2BCM
COMNT ACB_13C_Mr.Rajeshwar
DATIM Fri Jul 06 16:39:05 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 500
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 20.7 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 0.12 Hz
RGAIN 25

C:\K.N. Singh,,I.T\CAC_1H.als
CAC_1H Mr.Rajeshwar

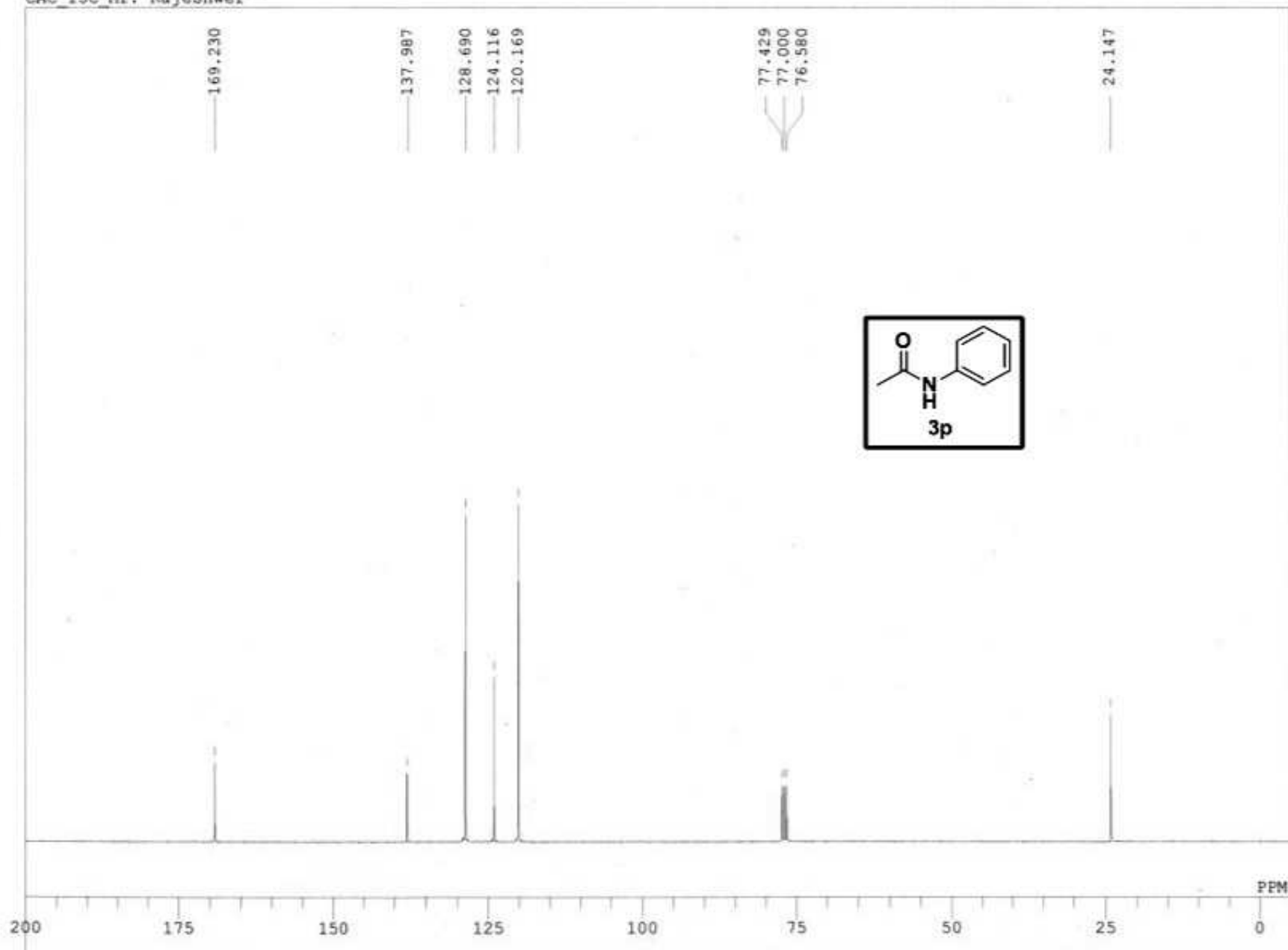


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\K.N. Singh,,I.
COMNT CAC_1H Mr.Rajeshw.
DATIM Tue Jun 26 16:15:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 8
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 21.7 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 10

C:\K.N. Singh,,I.T\CAC_13C.als
CAC_13C Mr. Rajeshwer

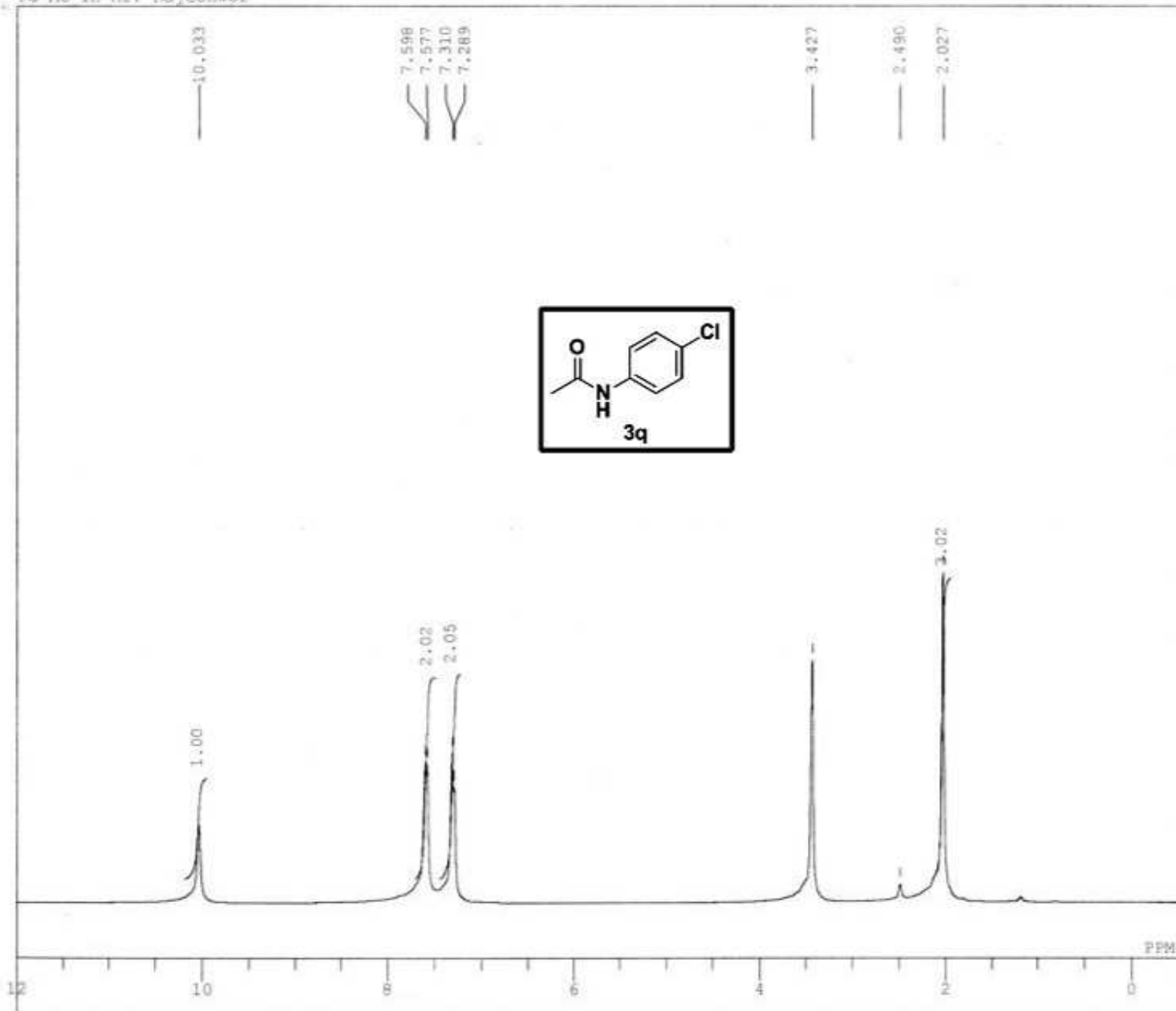


JEOL AL300 FNMNR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\K.N. Singh,,I.
COMNT CAC_13C_Mr. Rajes
DATIM Fri Jun 29 00:13:
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 3500
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 19.7 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24

PC-AC 1H Mr. Rajeshwer

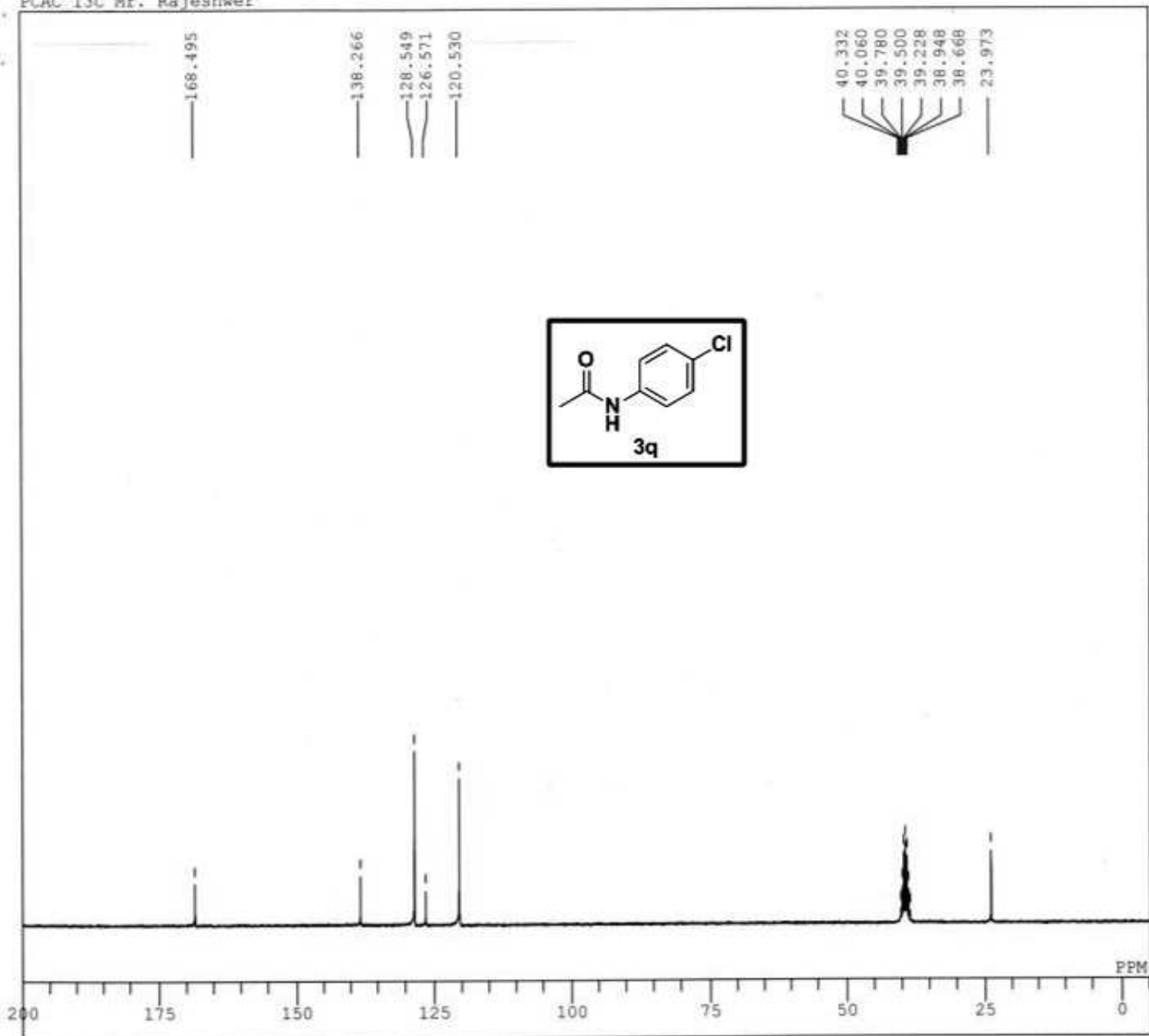


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\PC-AC_1H.
COMNT PC-AC 1H Mr. Rajeshwer
DATIM Sat Jul 28 10:58:39 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
FW1 5.2 us
IRNUC 1H
CTEMP 22.5 c
SLVNT DMSO
EXREF 2.49 ppm
BF 1.20 Hz
RGAIN 11

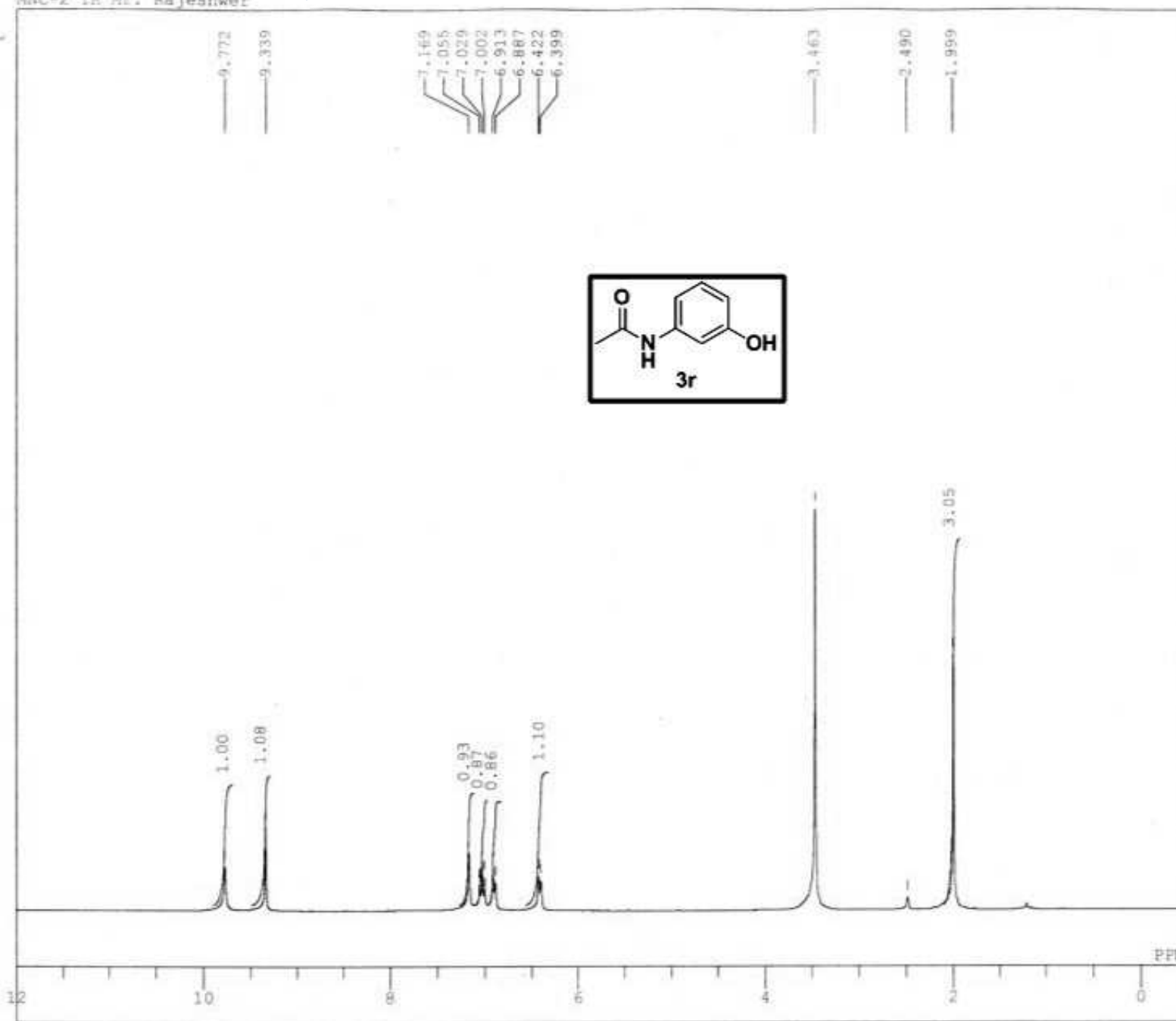
PCAC 13C Mr. Rajeshwer



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON\DEFAULT.ALS
COMNT PCAC 13C Mr. Rajeshwer
DATIM Sat Jul 28 11:45:18 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 274
ACQTM 1.606 sec
PD 1.394 sec
PWI 6.0 us
IRNUC 1H
CTEMP 21.9 c
SLVNT DMSO
EXREF 39.50 ppm
BF 1.20 Hz
RGAIN 23

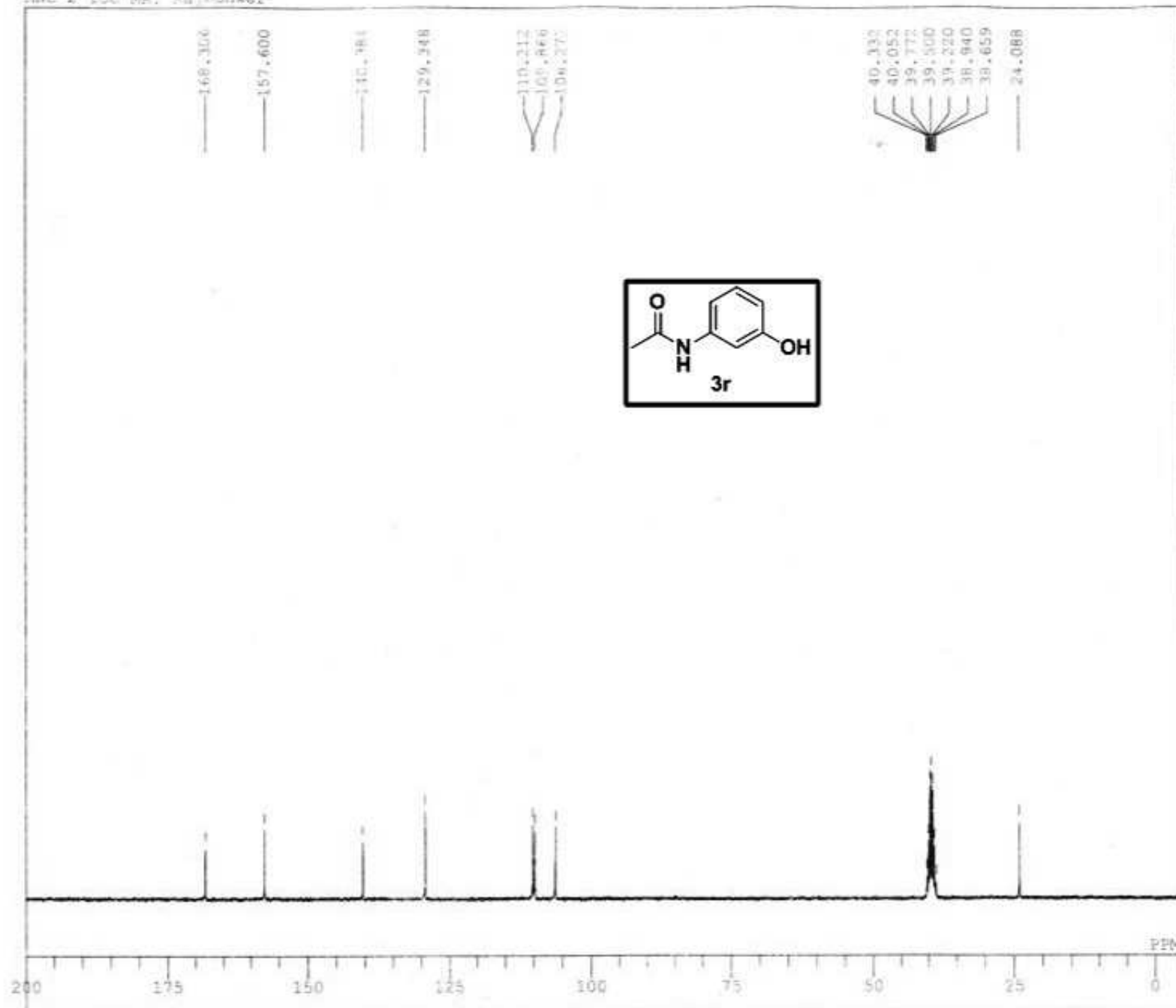


JEOL AL300 FTNMR
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VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.TVMNC-2_1H.
COMNT MNC-2_1H Mr. Rajeshwer
DATIM Tue Jul 31 12:56:40 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PWI 5.2 us
IRNUC 1H
CTEMP 20.6 c
SLVNT DMSO
EXREF 2.49 ppm
BF 1.20 Hz
RGAIN 11

MNC-2 13C MR. Rajeshw...

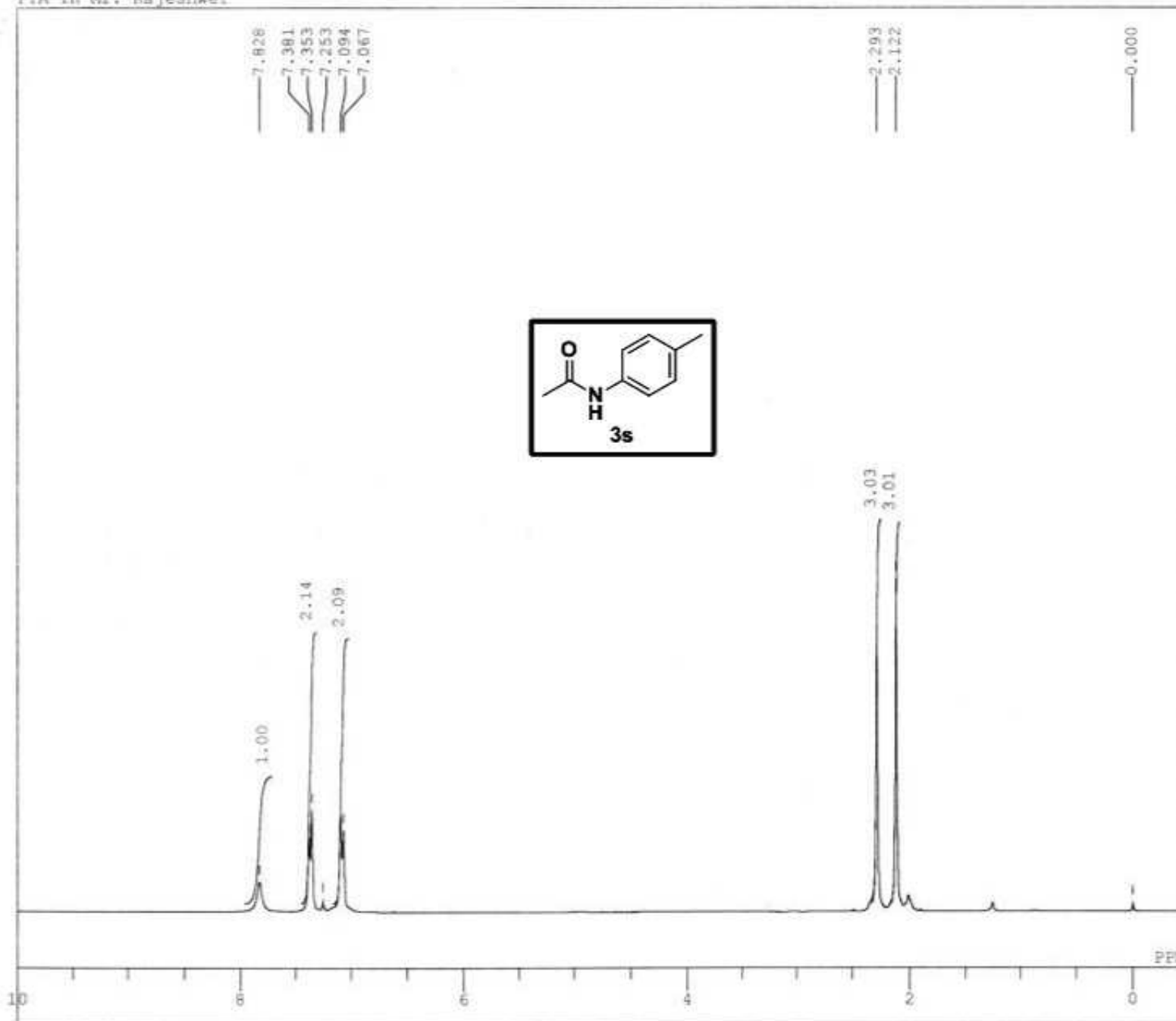


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh, I.T\MB
COMNT MNC-2 13C MR. Rajeshw
DATIM Tue Jul 31 13:25:43
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 277
ACQTM 1.406 sec
PD 1.394 sec
PWL 8.0 us
IRNUC 1H
CTEMP 23.5 c
SLVNT DMSO
EXREF 39.50 ppm
BF 1.20 Hz
RGAIN 22

PTA 1H Mr. Rajeshwer

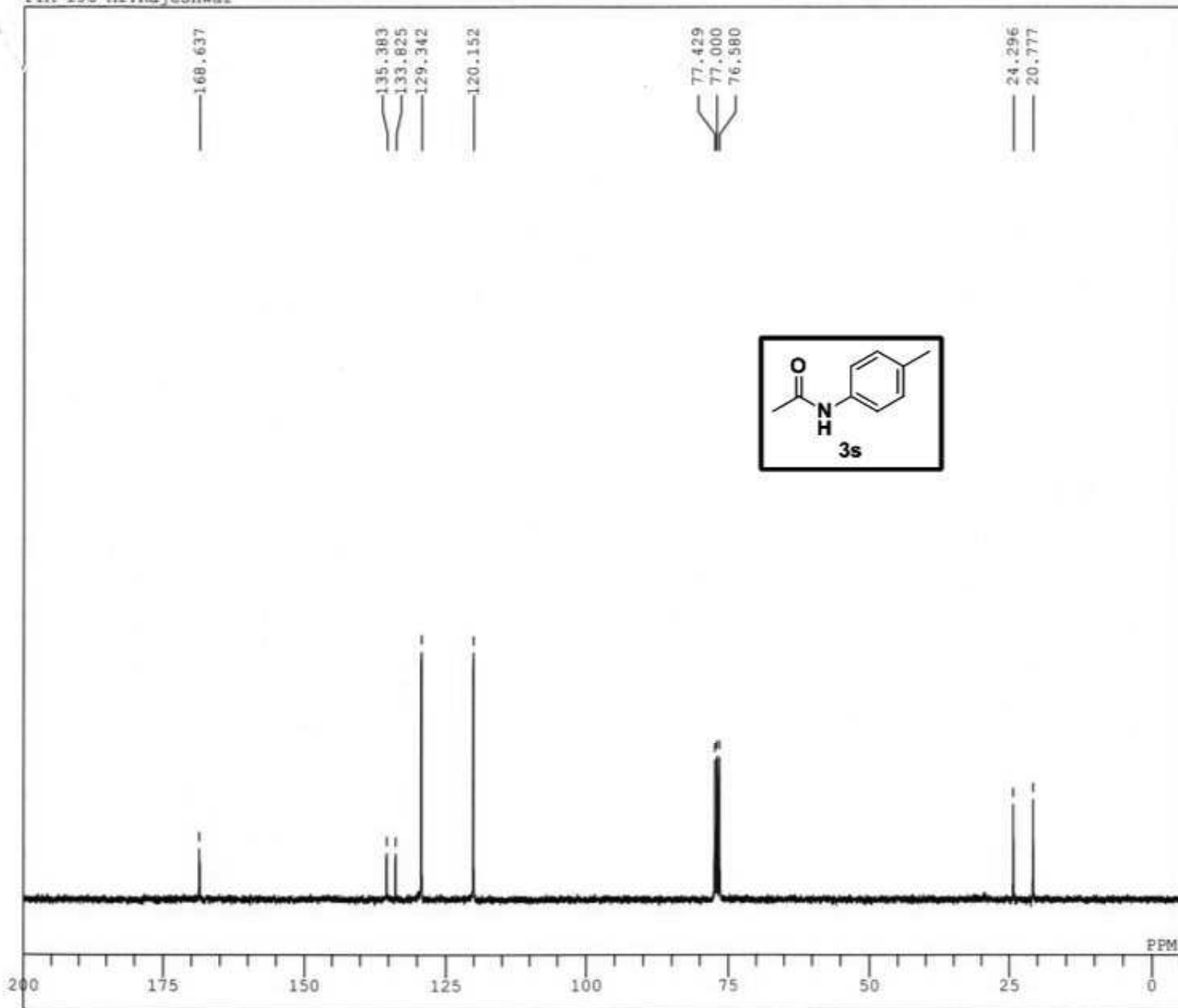


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\PTA_1H.a1
COMNT PTA_1H Mr. Rajeshwer
DATIM Tue Jul 17 12:02:15 2012
GBNUC 1H
EXMOD NON
GBFRQ 300.40 MHz
GBSET 130.00 KHz
GBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 67
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 18.1 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN -12

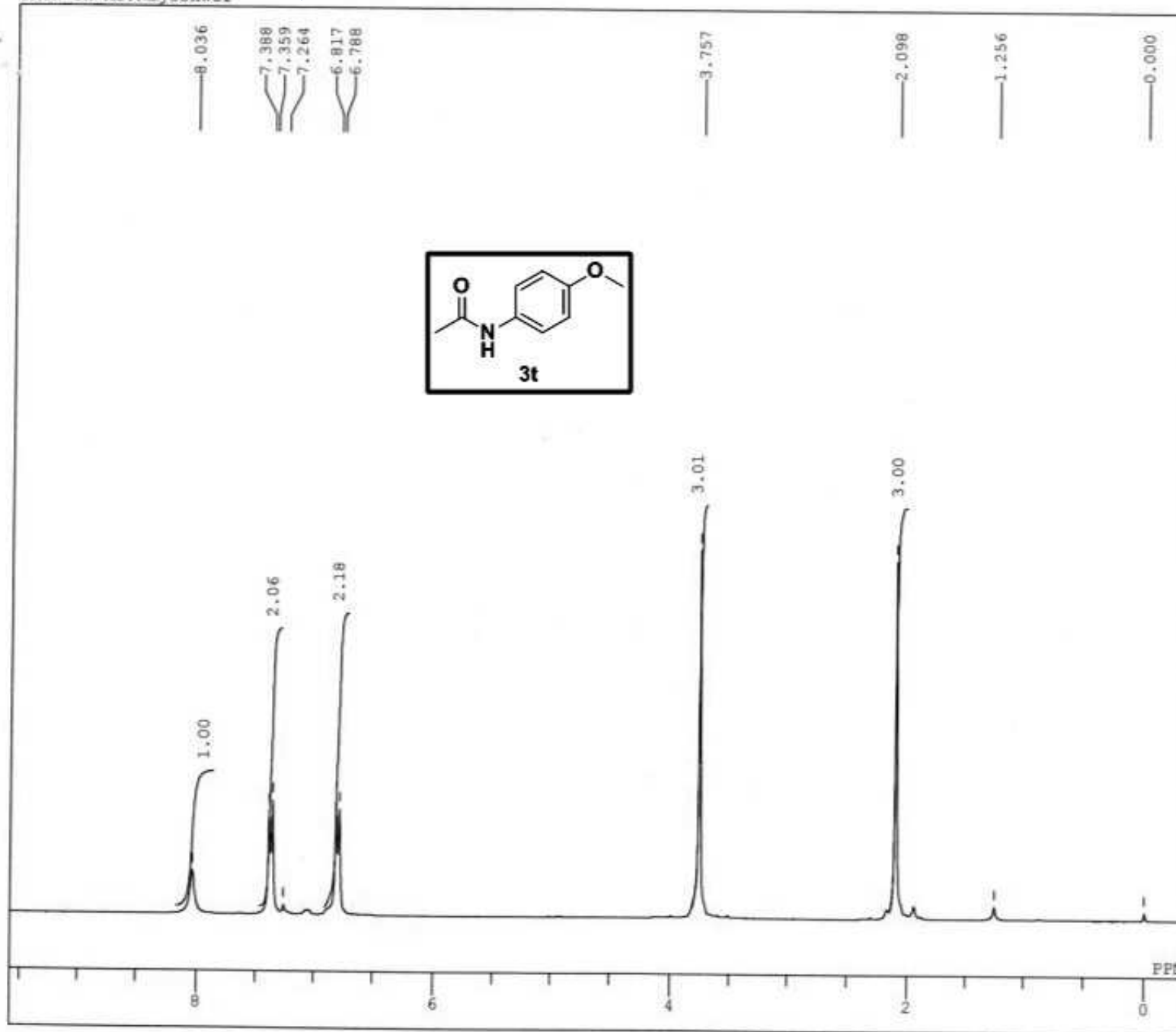
PTA 13C Mr.Rajeshwar



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

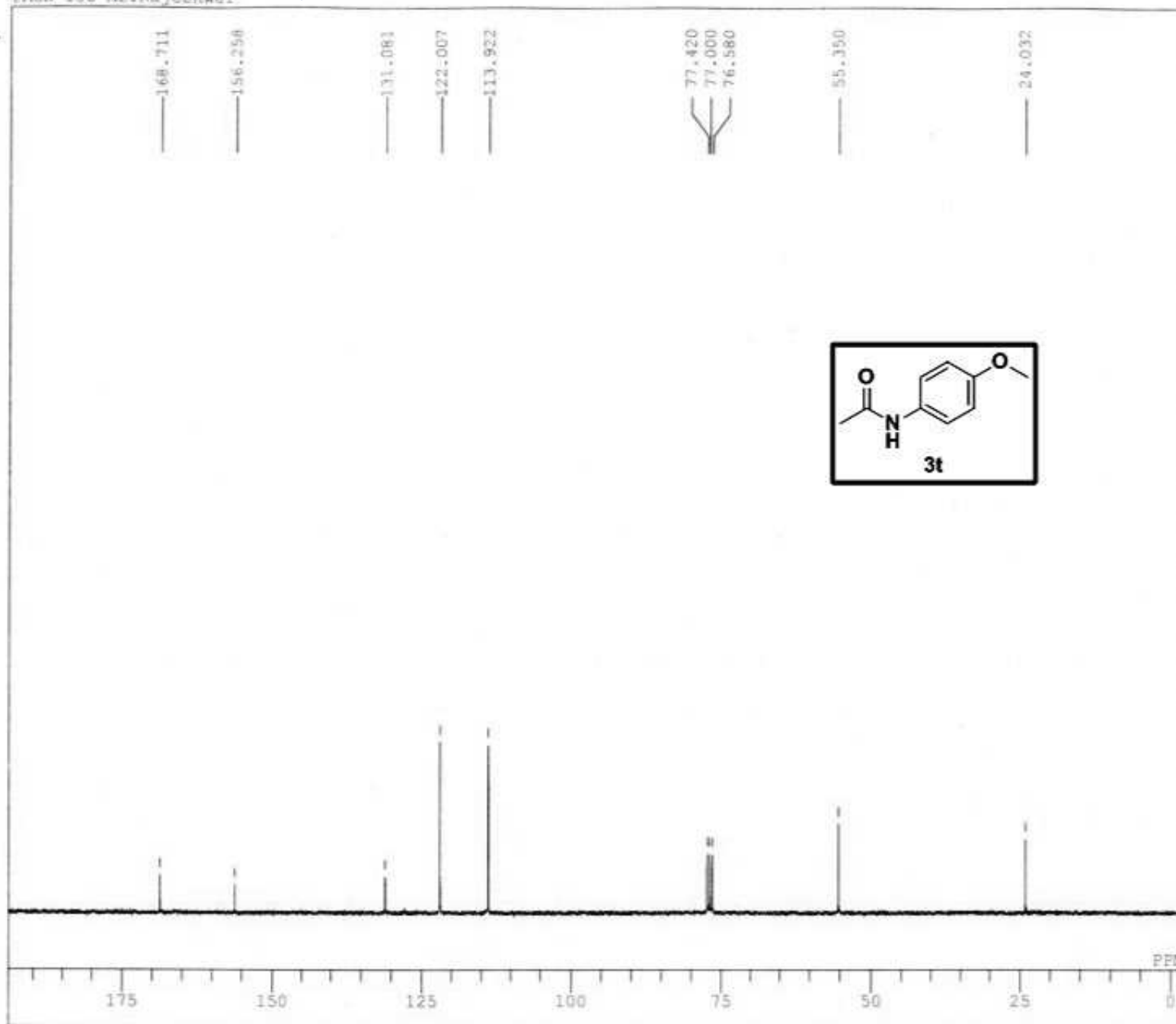
DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT PTA_13C_Mr.Rajeshwar
DATIM Wed Jul 18 17:13:07 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 539
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 25.9 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

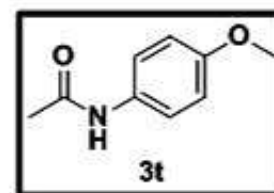
DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT PACN 1H Mr.Rajeshwer
DATIM Wed Jul 18 12:23:09 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 23.2 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 13

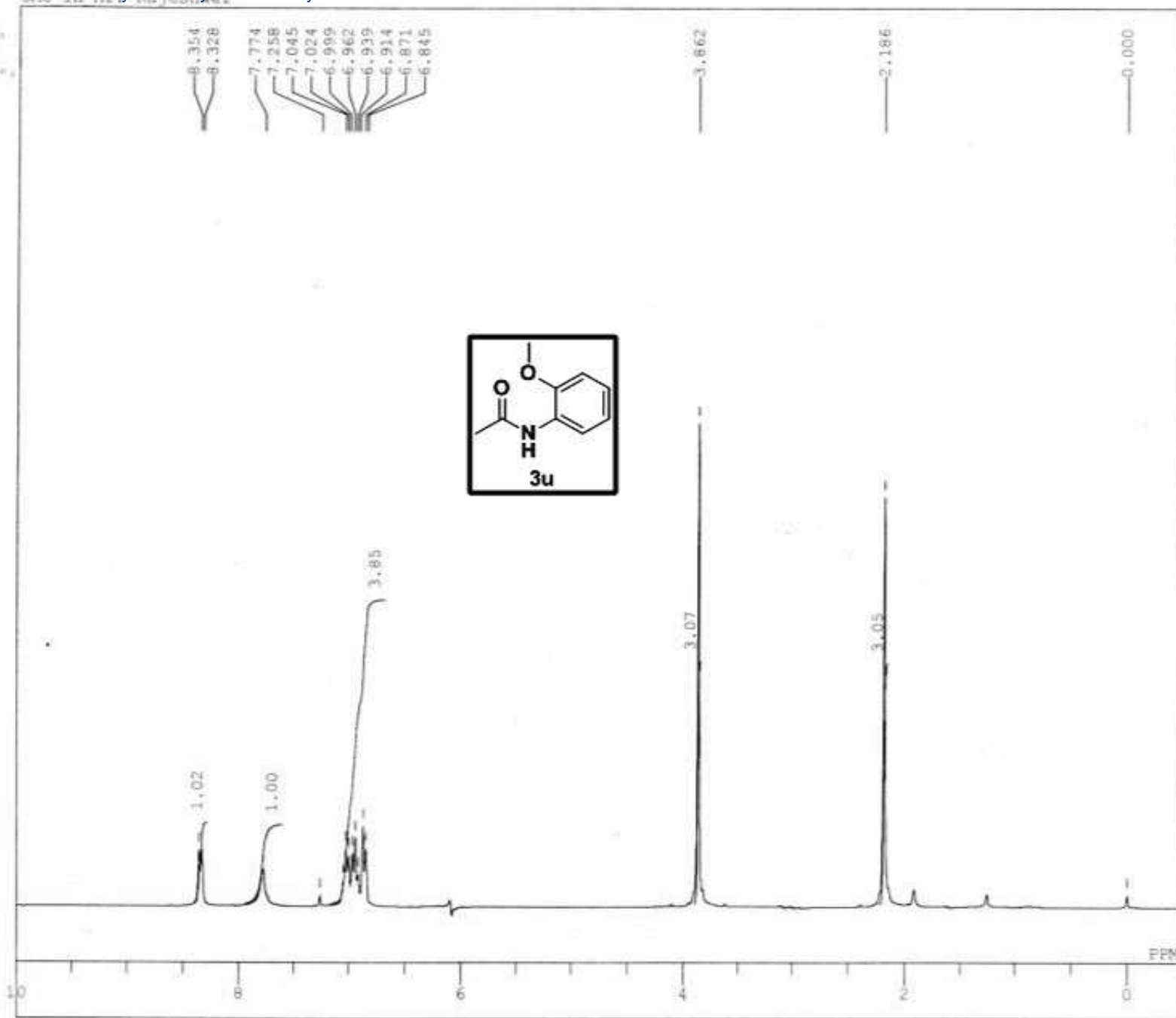


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\PACN_13C.
COMNT PACN 13C Mr.Rajeshwer
DATIM Wed Jul 18 12:18:40 2012
CNUC 13C
EXMOD BCM
OBFRO 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 98
ACQTM 1.606 sec
PD 1.394 sec
PWI 6.0 us
IRNUC 1H
CTEMP 22.0 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25



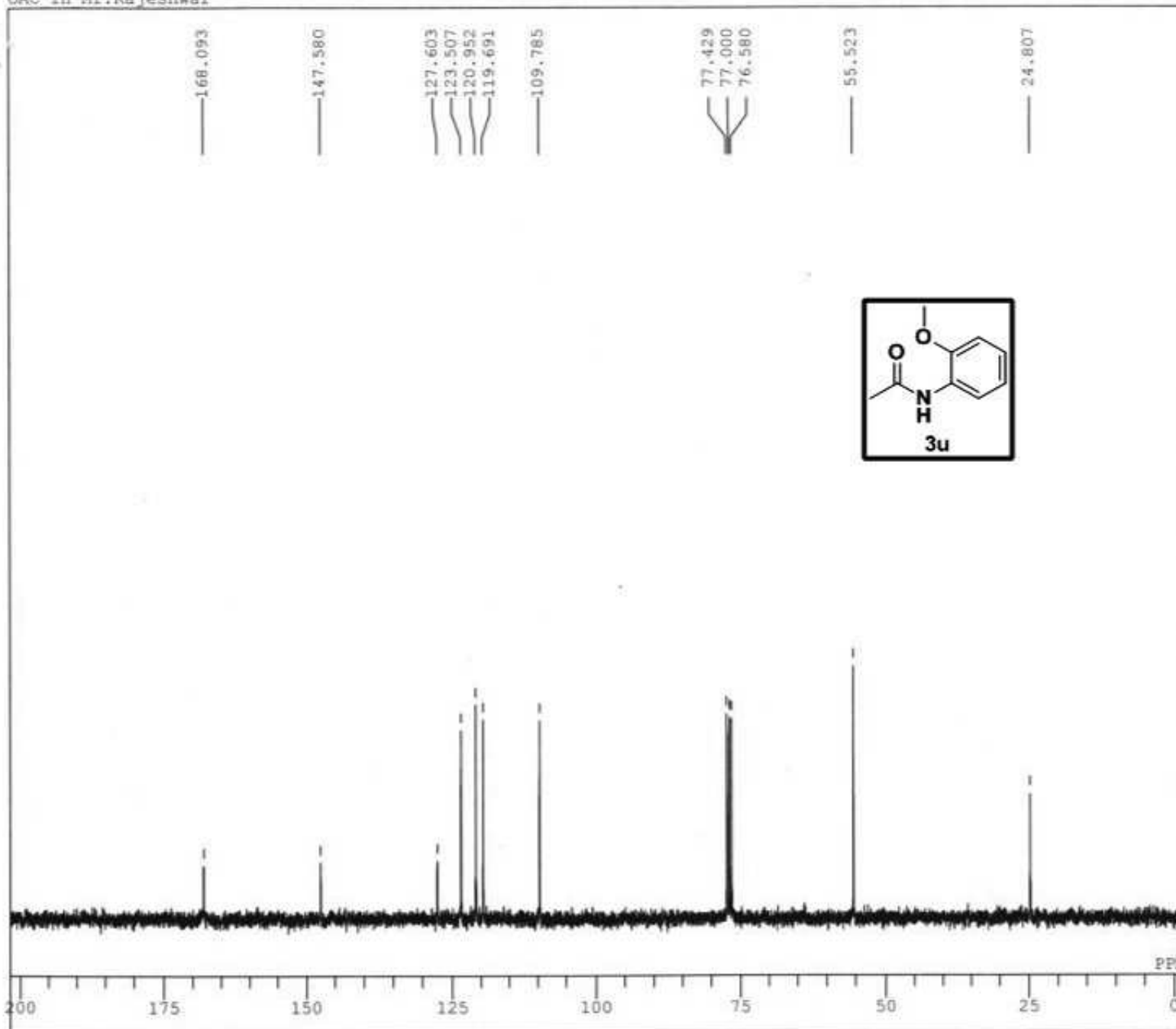


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,1.T\OAC_1H.a1
COMNT OAC_1H_Mr. Rajeshwer
DATIM Mon Jul 23 16:08:29 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 43
ACQTM 3.447 sec
PD 1.547 sec
PWI 5.2 us
IRNUC 1H
CTEMP 21.3 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 13

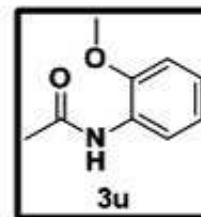
OAC 1H Mr.Rajeshwar



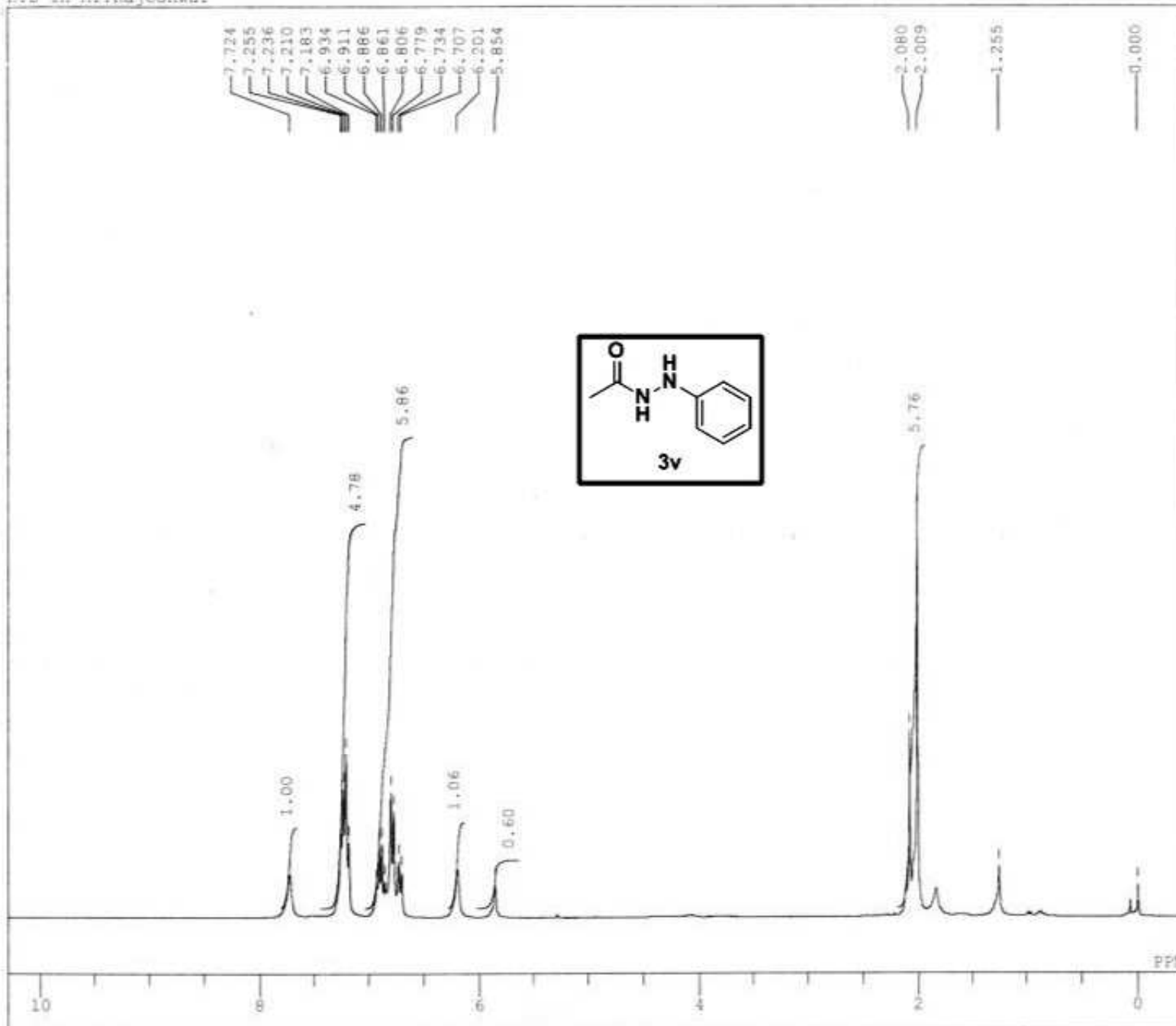
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\OAC_13C.e
COMNT OAC_1H Mr.Rajeshwar
DATIM Wed Jul 25 15:52:54 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 100
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 21.6 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24



HYD 1H Mr.Rajeshwar

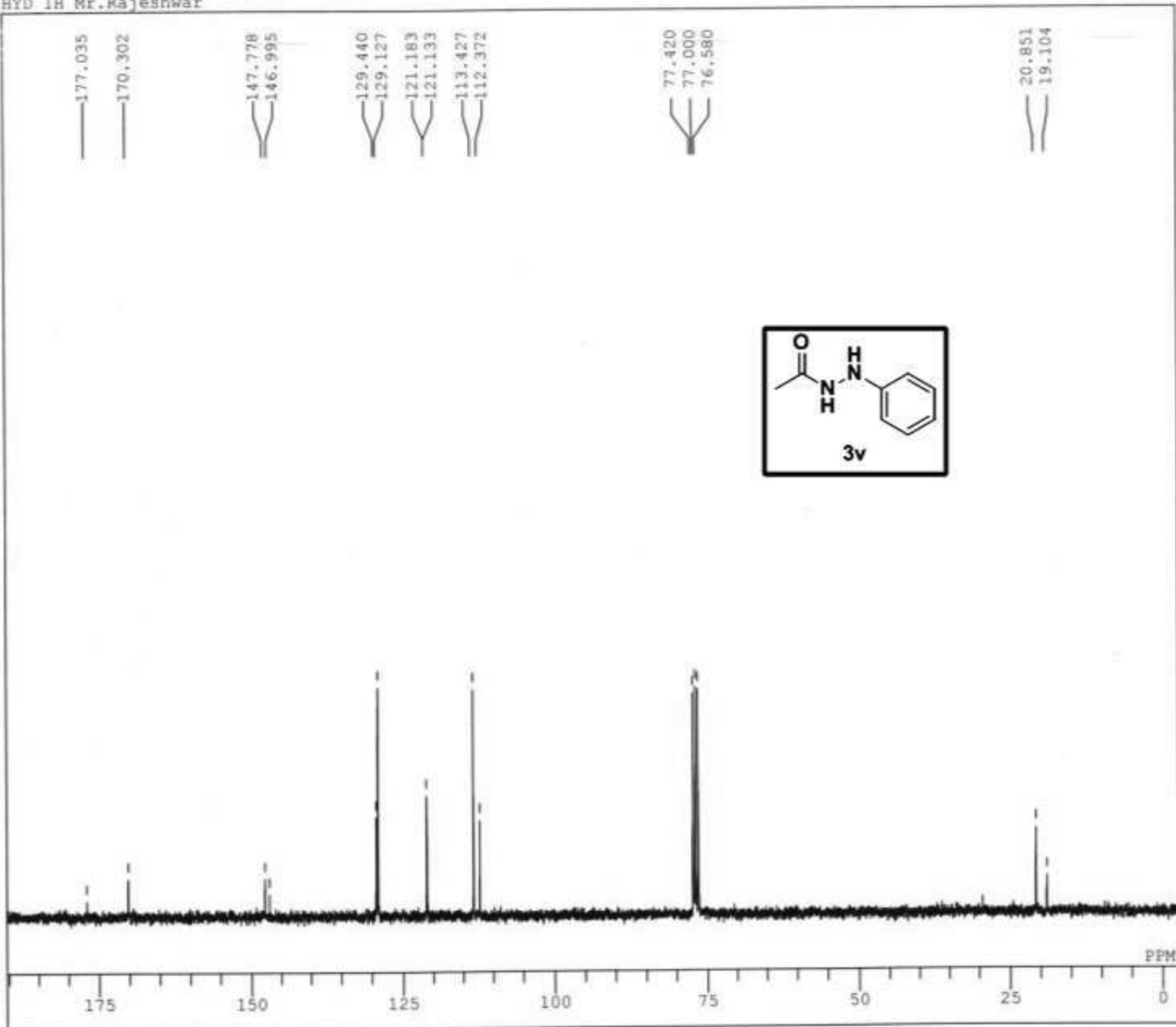


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\HYD_1H.a1
COMNT HYD_1H Mr.Rajeshwar
DATIM Fri Jul 27 14:17:18 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 32
ACQTM 5.446 sec
PD 1.547 sec
PWL 5.2 us
IRNUC 1H
CTEMP 20.7 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 14

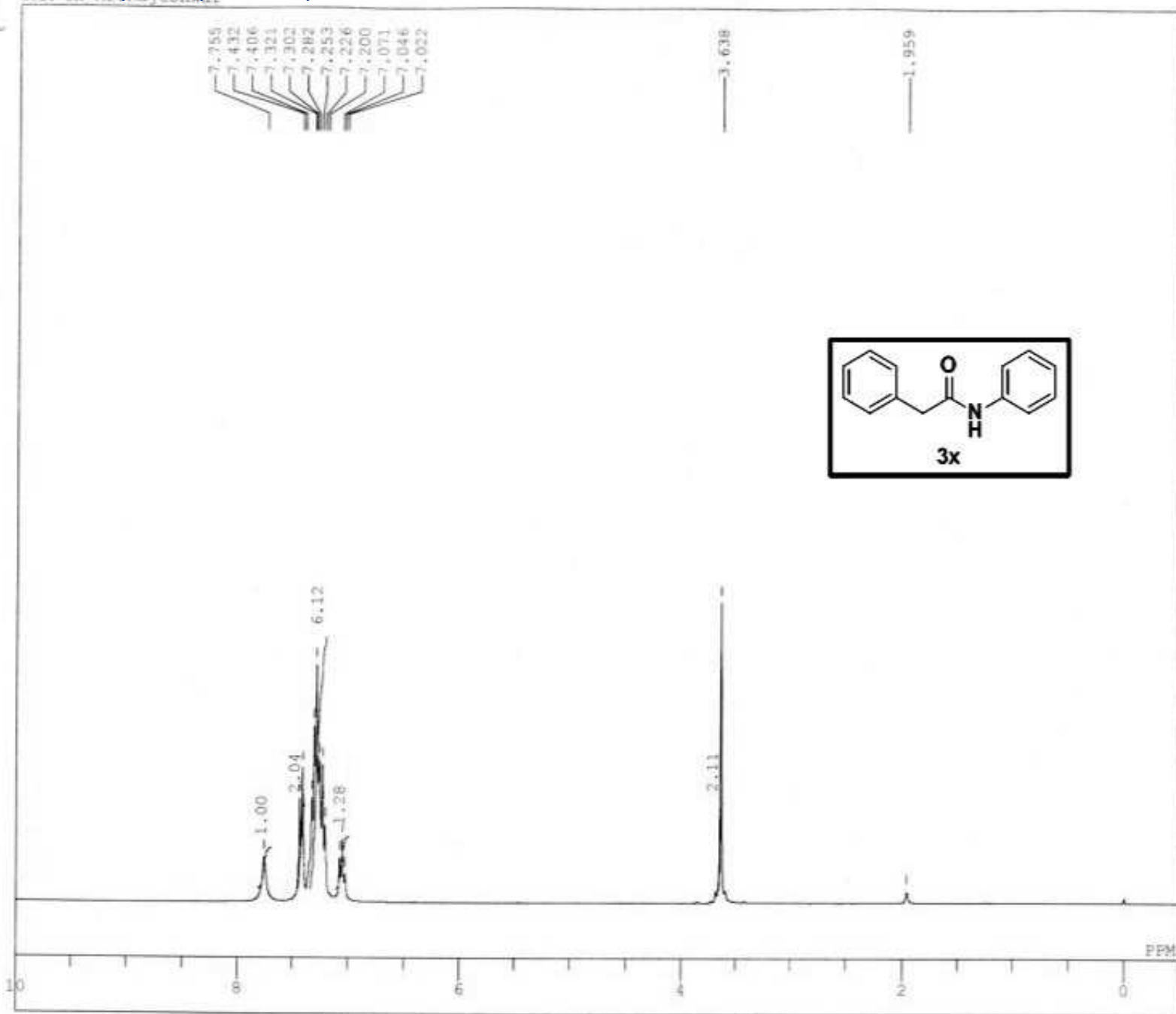
HYD 1H Mr.Rajeshwar



JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

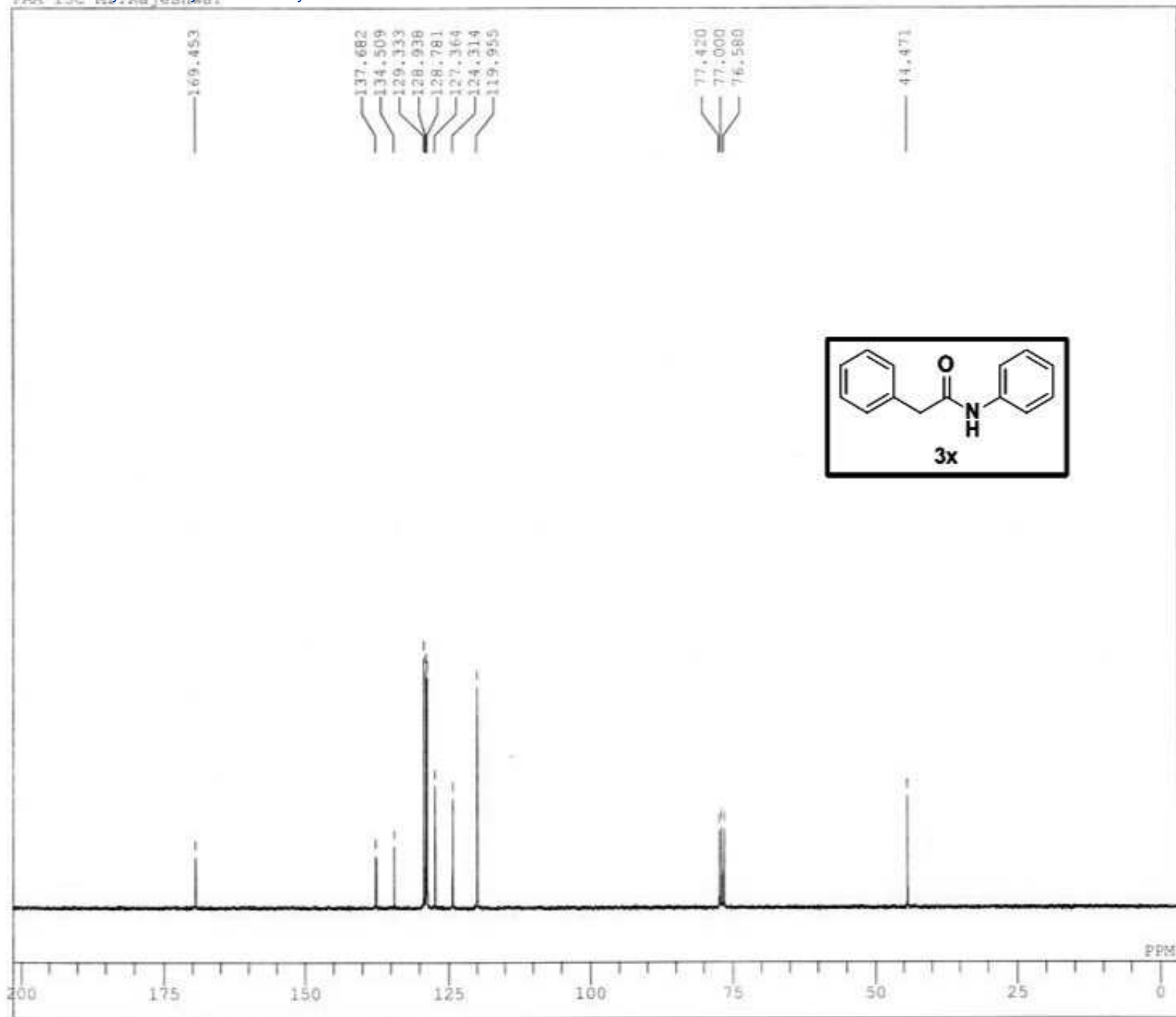
DFILE C:\WINNMR98\Data\HYD_1H_2BCM
COMNT HYD_1H Mr.Rajeshwar
DATIM Fri Jul 27 14:32:40 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 300
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 21.3 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\PAI_1H.a1
COMNT PAI_1H_Mr.Rajeshwar
DATIM Fri Sep 07 12:36:16 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 20.7 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 10

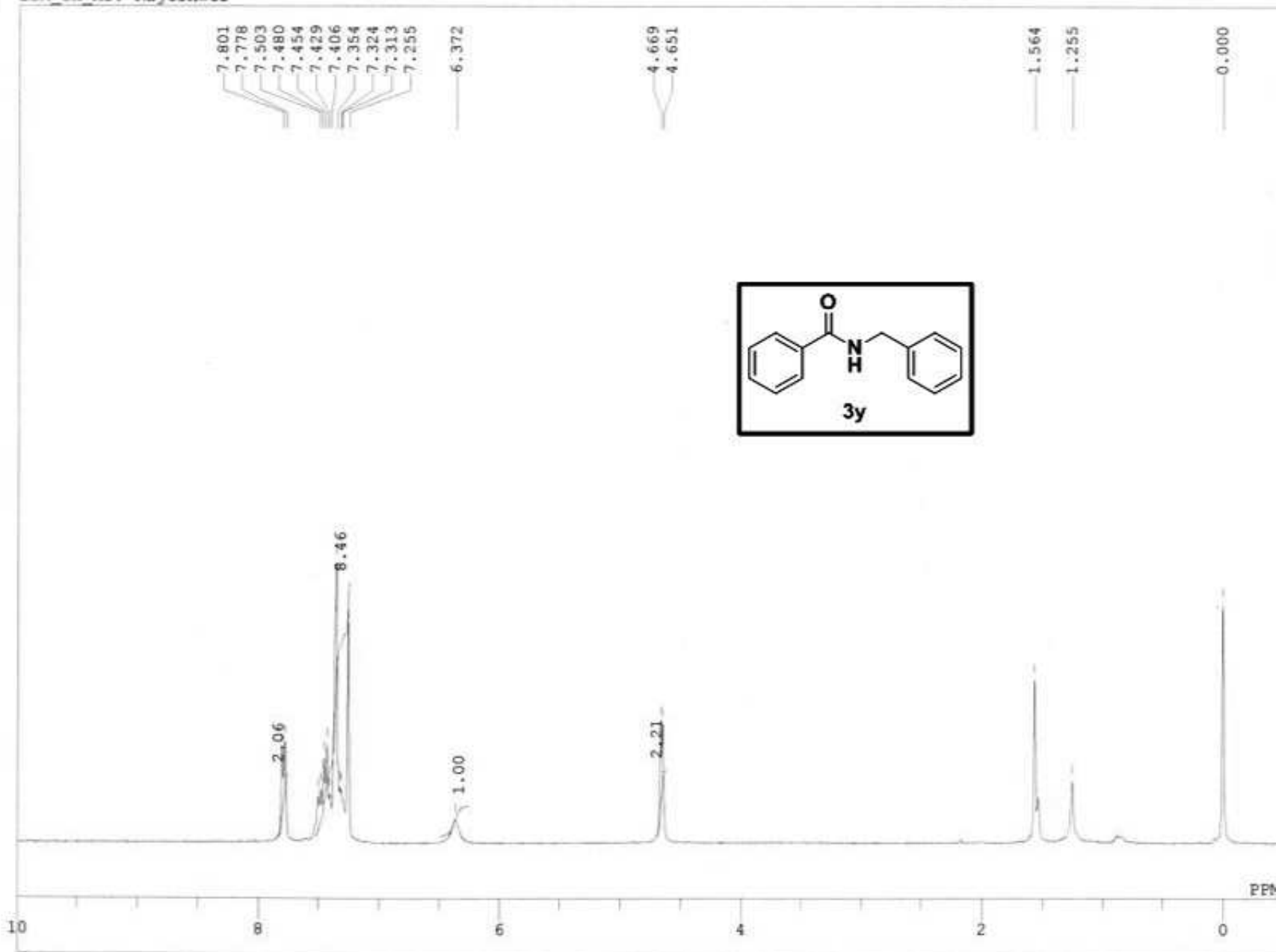


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT PAA_13C_Mr.Rajeshwar
DATIM Fri Sep 07 12:31:48 2012
OBNUC 13C
EXMOD BCM
OBFREQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 161
ACQTM 1.606 sec
PD 1.394 sec
FW1 6.0 us
IRNUC 1H
CTEMP 20.0 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

C:\K.N. Singh,,I.T\BBA_1H.als
BBA_1H Mr. Rajeshwer

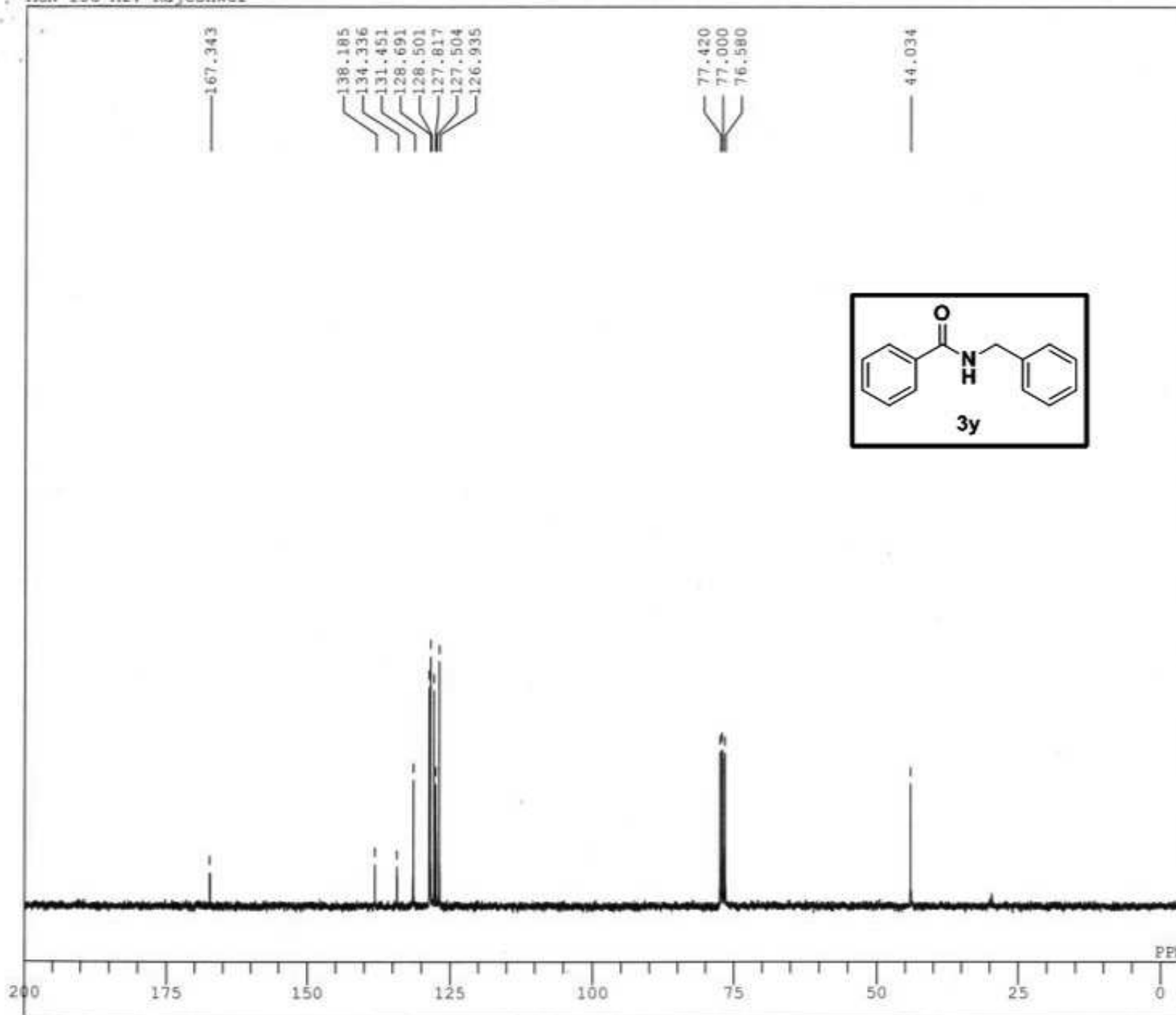


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\K.N. Singh,,I.'
COMNT BBA_1H Mr. Rajesh
DATIM Tue Apr 24 12:55:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 21
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 23.8 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 23

ACN 13C Mr. Rajeshwer

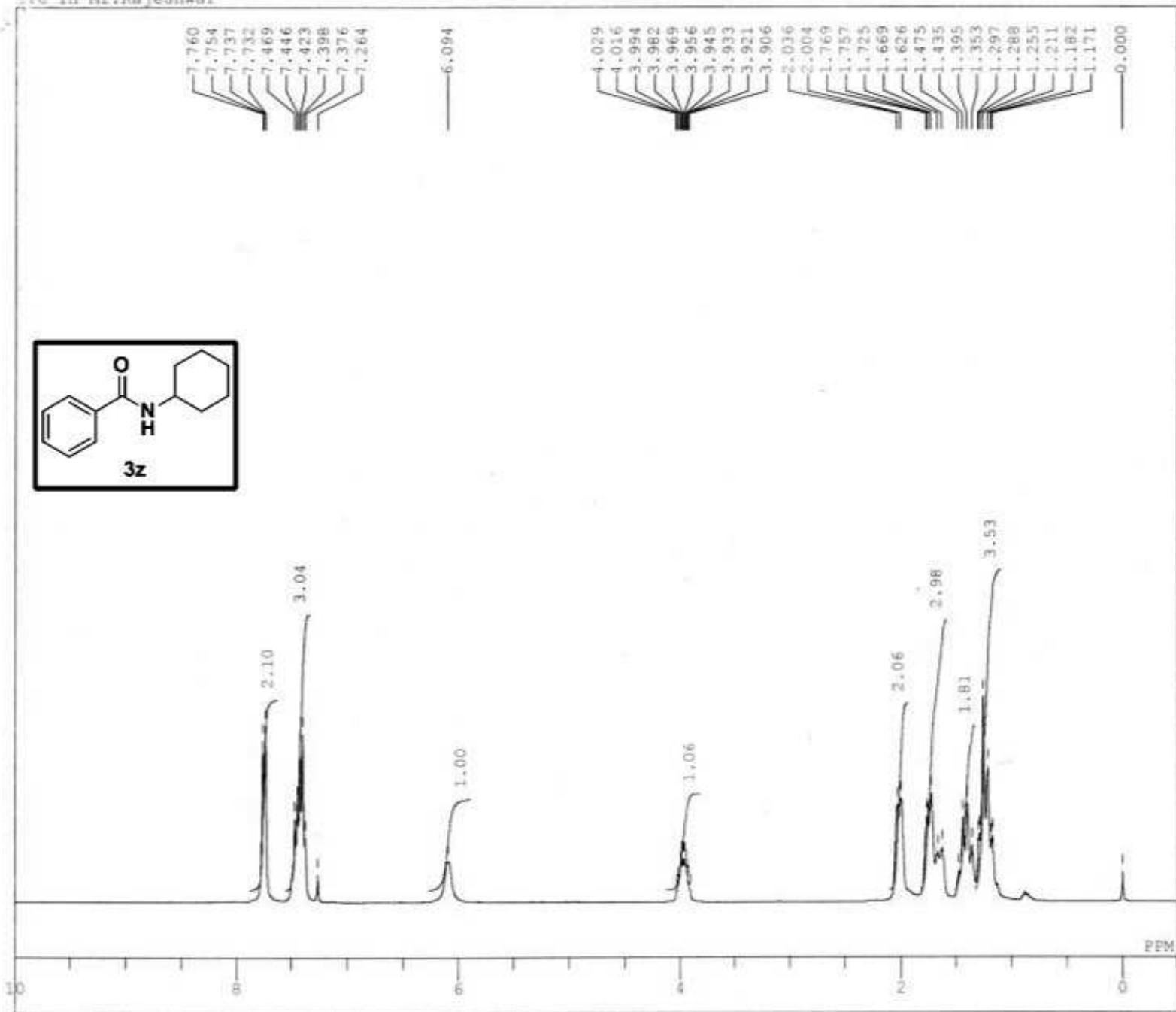
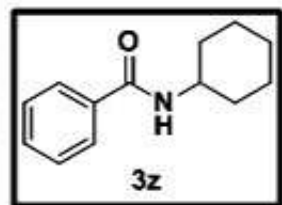


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,, I.T\ACN_13C.e
COMNT ACN_13C_Mr. Rajeshwer
DATIM Fri Jun 29 17:00:51 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 236
ACQTM 1.606 sec
PD 1.394 sec
FW1 6.0 us
IRNUC 1H
CTEMP 23.3 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

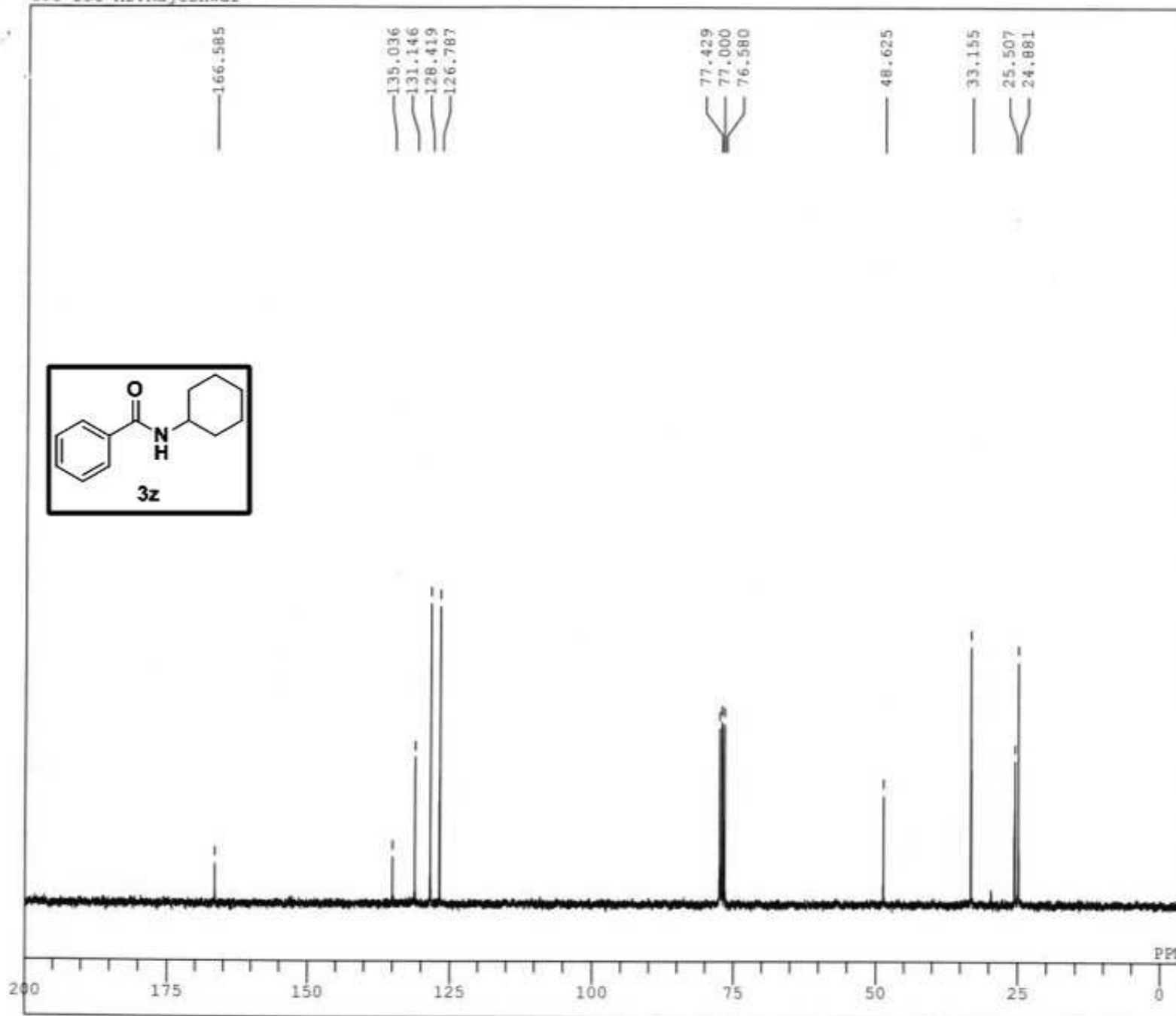
CYC_1H Mr.Rajeshwar



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\CYC_1H.al
COMNT CYC_1H Mr.Rajeshwar
DATIM Mon Jul 09 13:18:58 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 32
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 19.5 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 12

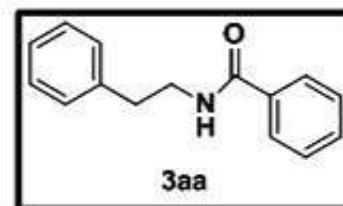
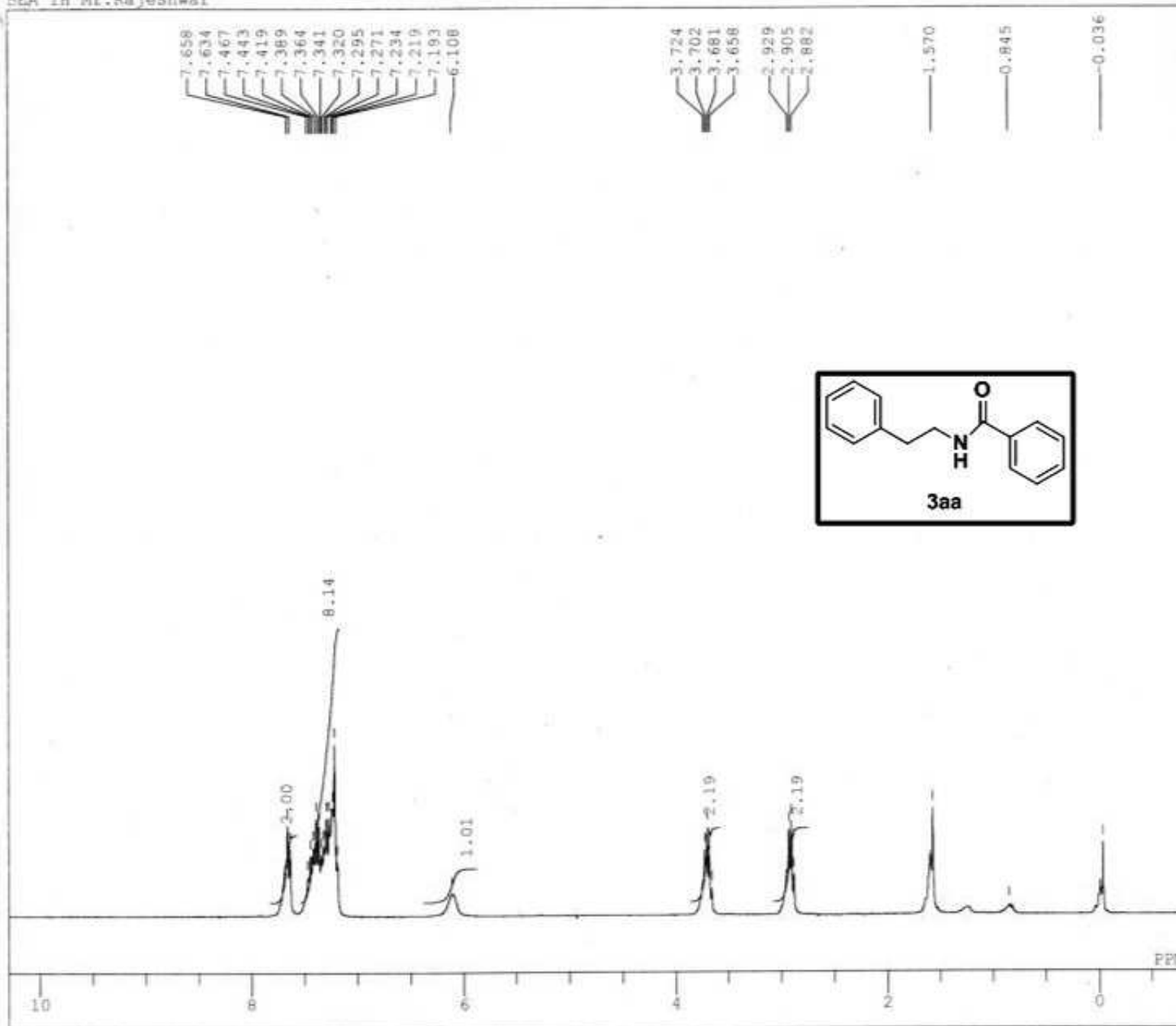


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT CYC_13C_Mr.Rajeshwar
DATIM Mon Jul 09 13:33:54 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 200
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 19.8 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

BEA_1H_Mr.Rajeshwar

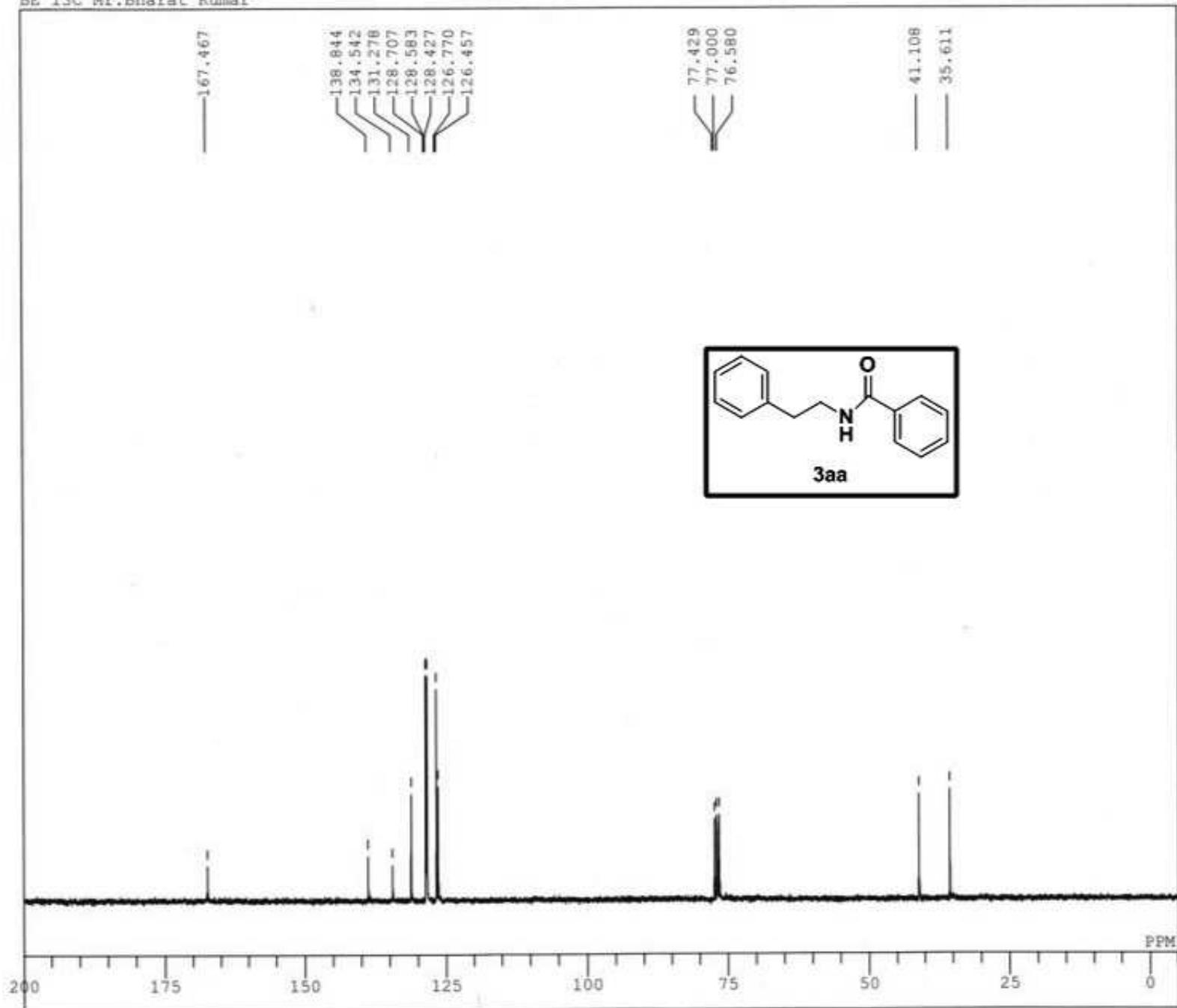


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\BEA_1H.a1
COMNT BEA_1H_Mr.Rajeshwar
DATIM Thu Sep 13 11:17:49 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 18.4 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 21

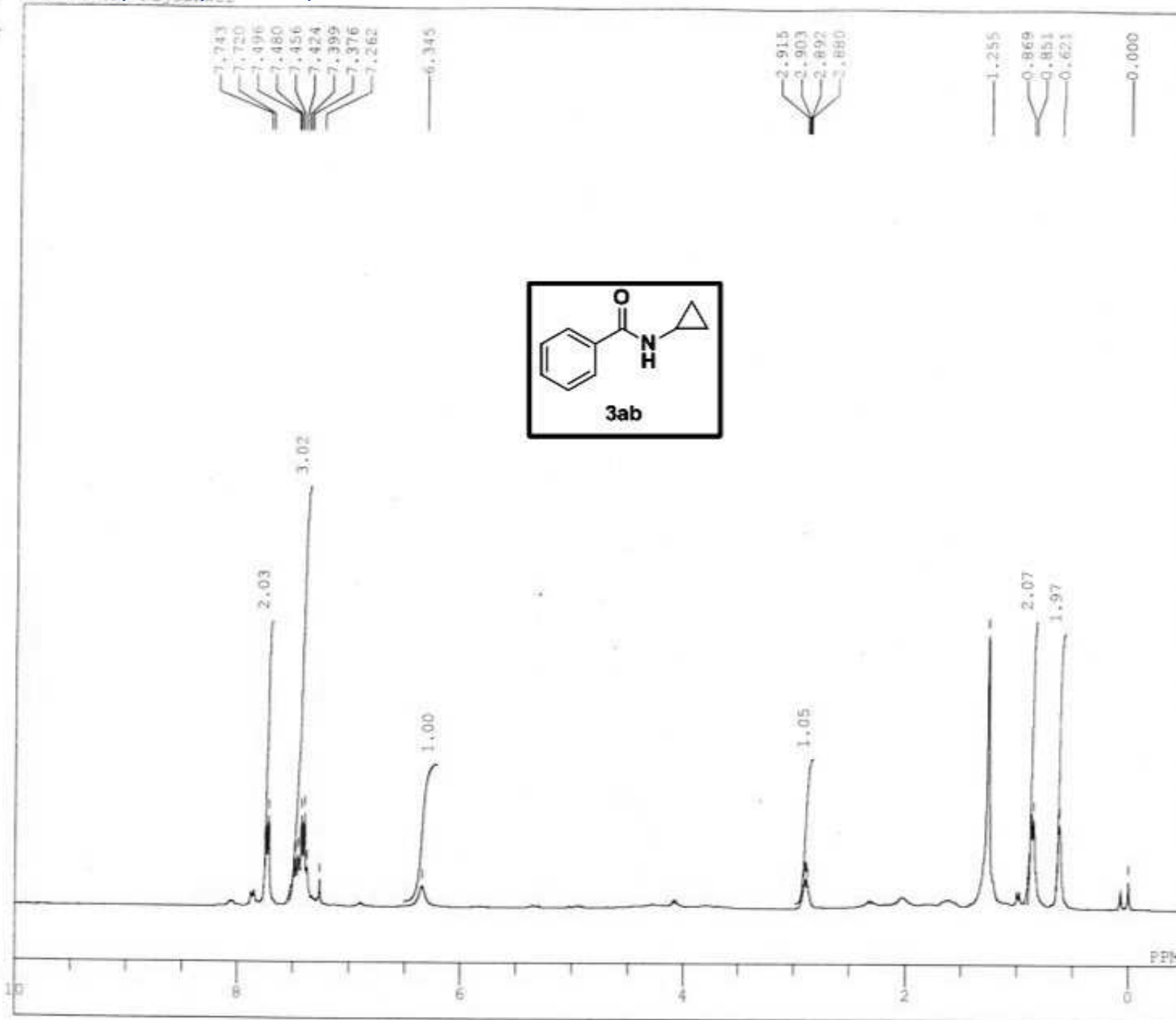
BE 13C Mr. Bharat Kumar



JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON\DEFAULT.
COMNT BE_13C_Mr.Bharat Kumar
DATIM Thu Nov 29 11:08:58 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 133
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 20.7 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

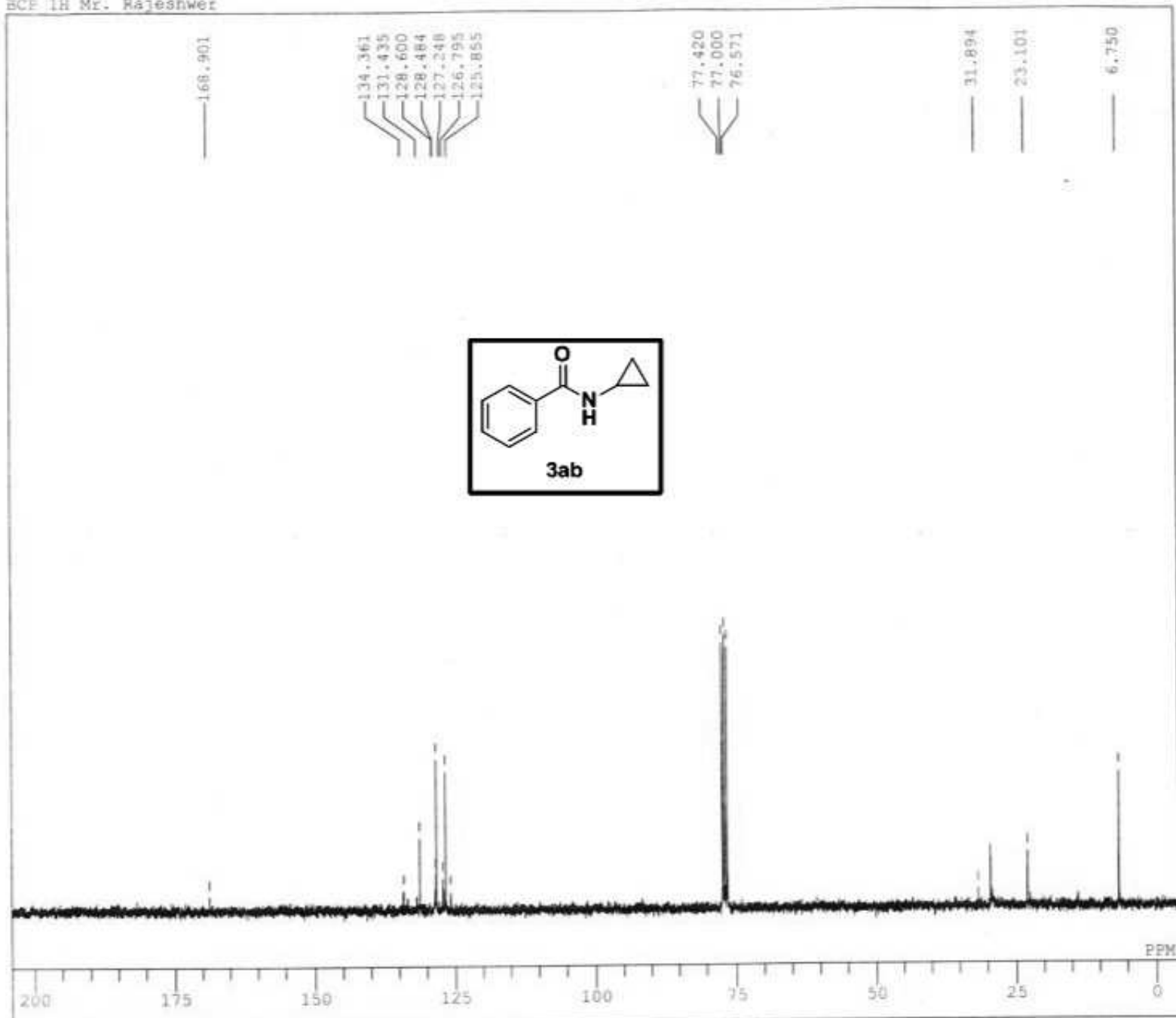


JEOL AL300 FTNMR
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Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\BCP_1H.a1
COMNT BCP_1H Mr. Rajeshwer
DATIM Thu Sep 06 16:15:17 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 32
ACQTM 5.446 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 20.1 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 14

BCP 1H Mr. Rajeshwer

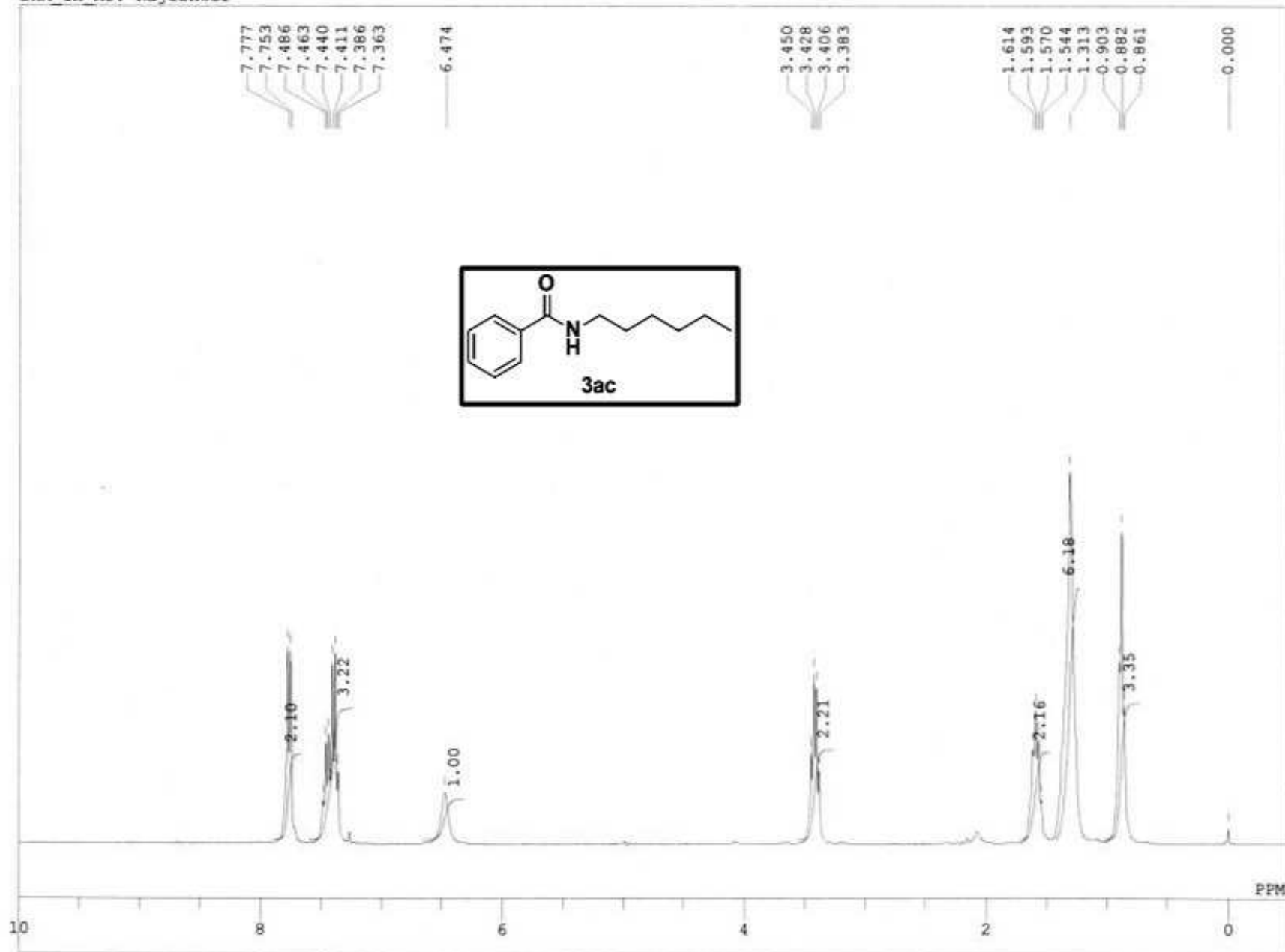


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.W. Singh,,I.T\BCP_13C.e
COMNT BCP_1H_Mr. Rajeshwer
DATIM Thu Sep 06 16:28:09 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 250
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 20.7 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

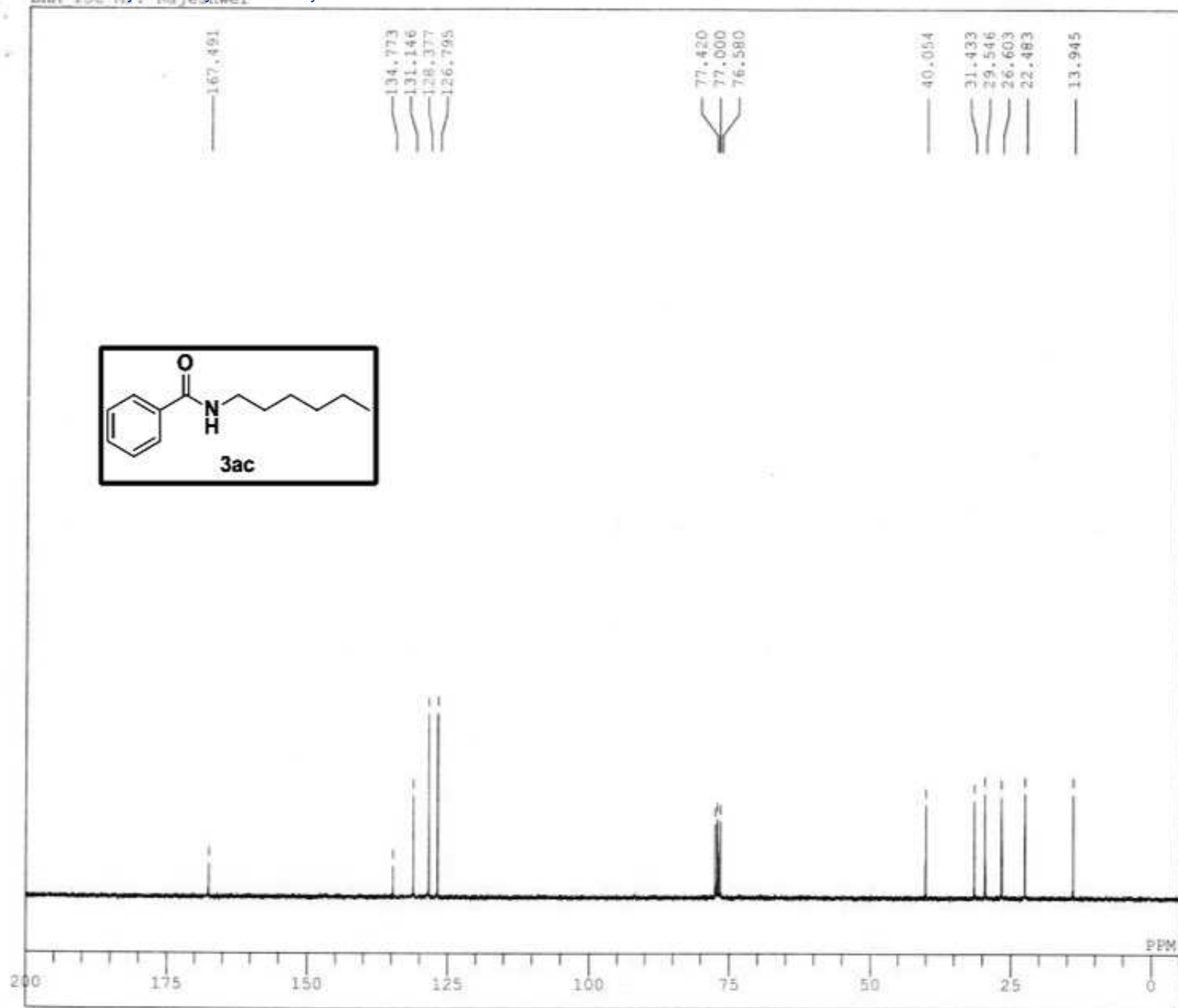
C:\K.N. Singh,,I.T\BHA_1H.als
BHA_1H Mr. Rajeshwer



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

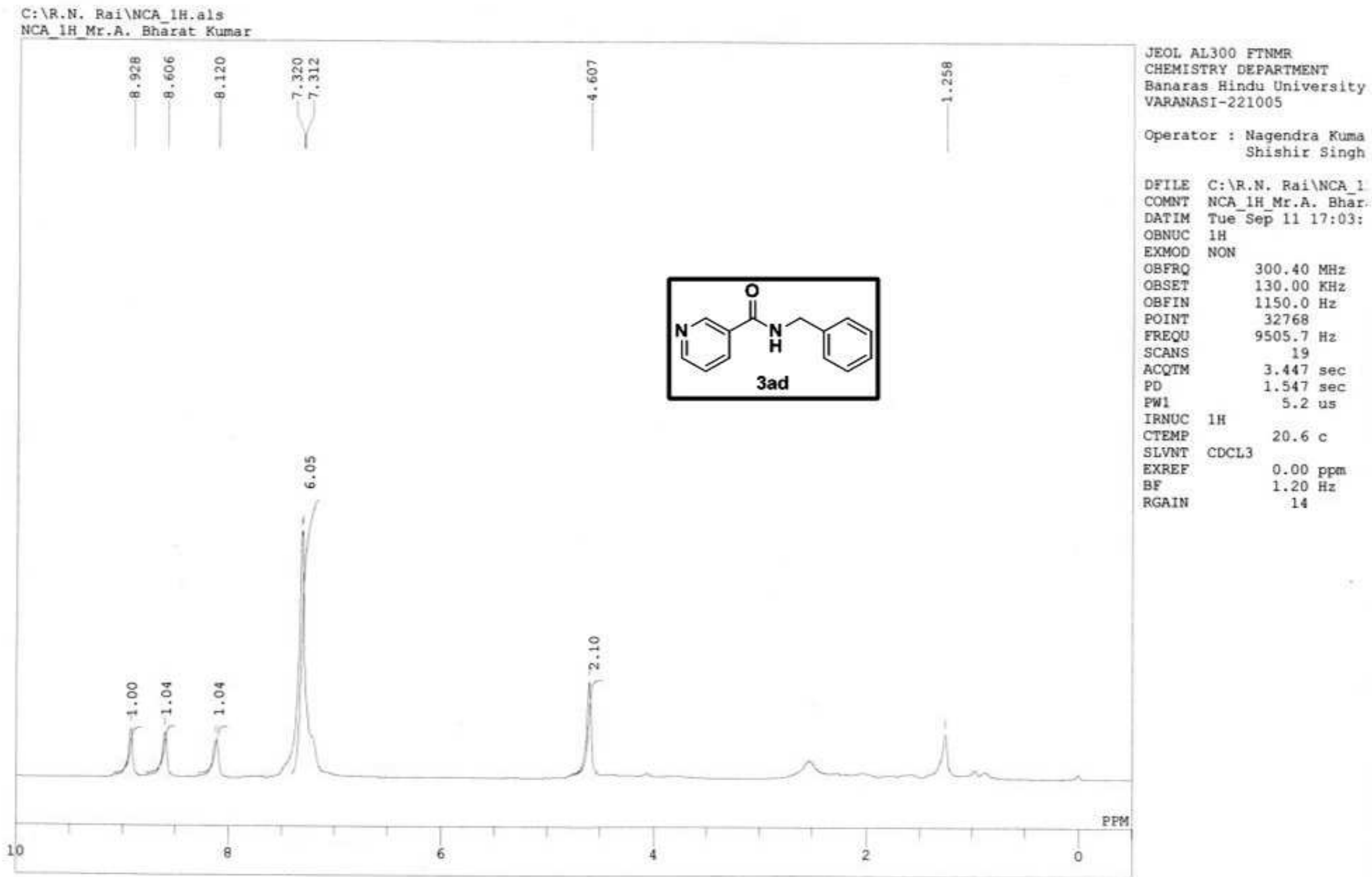
DFILE C:\K.N. Singh,,I.
COMNT BHA_1H_Mr. Rajesh
DATIM Thu Sep 13 12:13:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 18.9 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 12



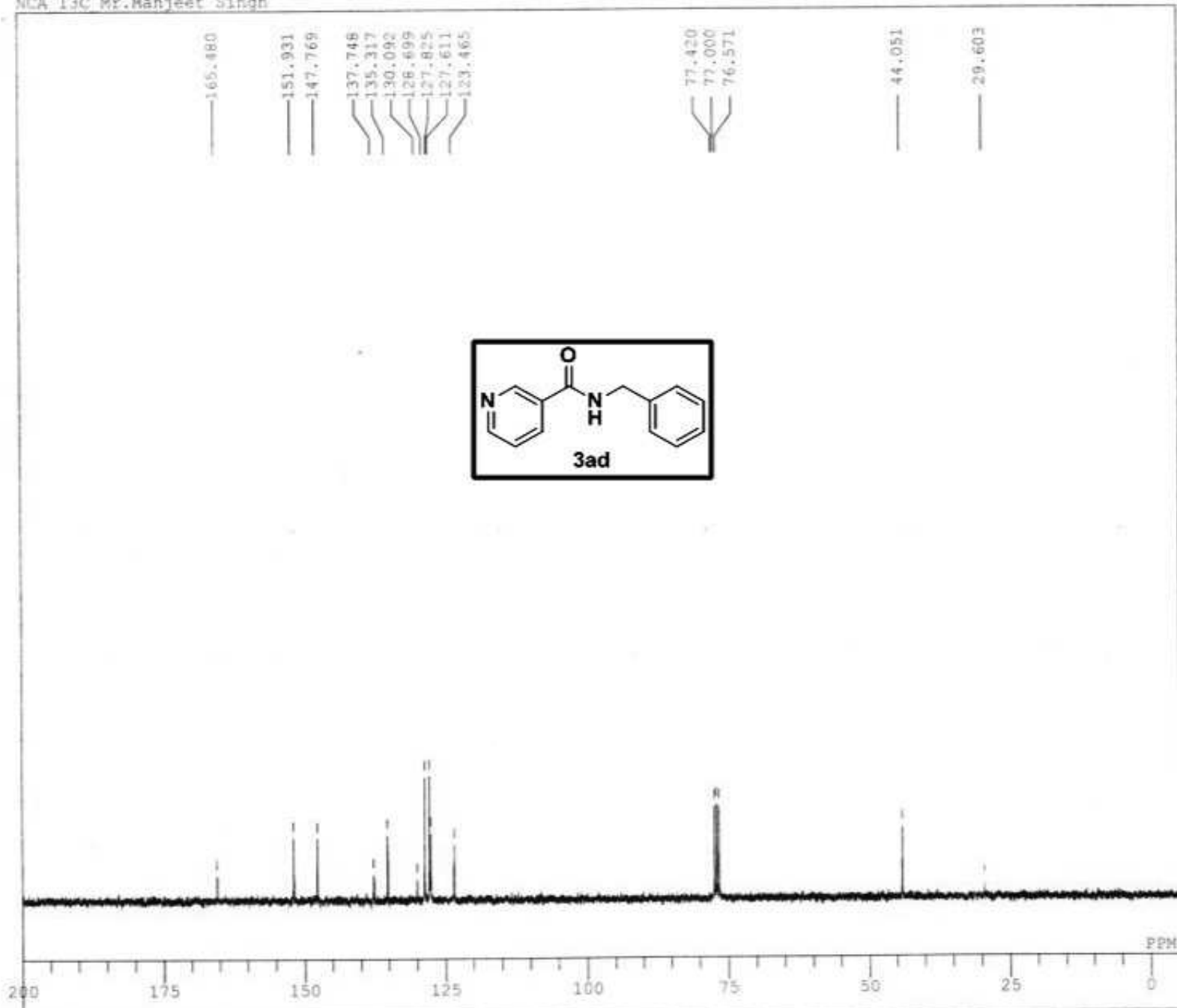
JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON_DEFAULT.
COMNT BHA_13C Mr. Rajeshwer
DATIM Thu Sep 13 12:23:53 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 120
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 22.4 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23



NCA 13C Mr.Manjeet Singh

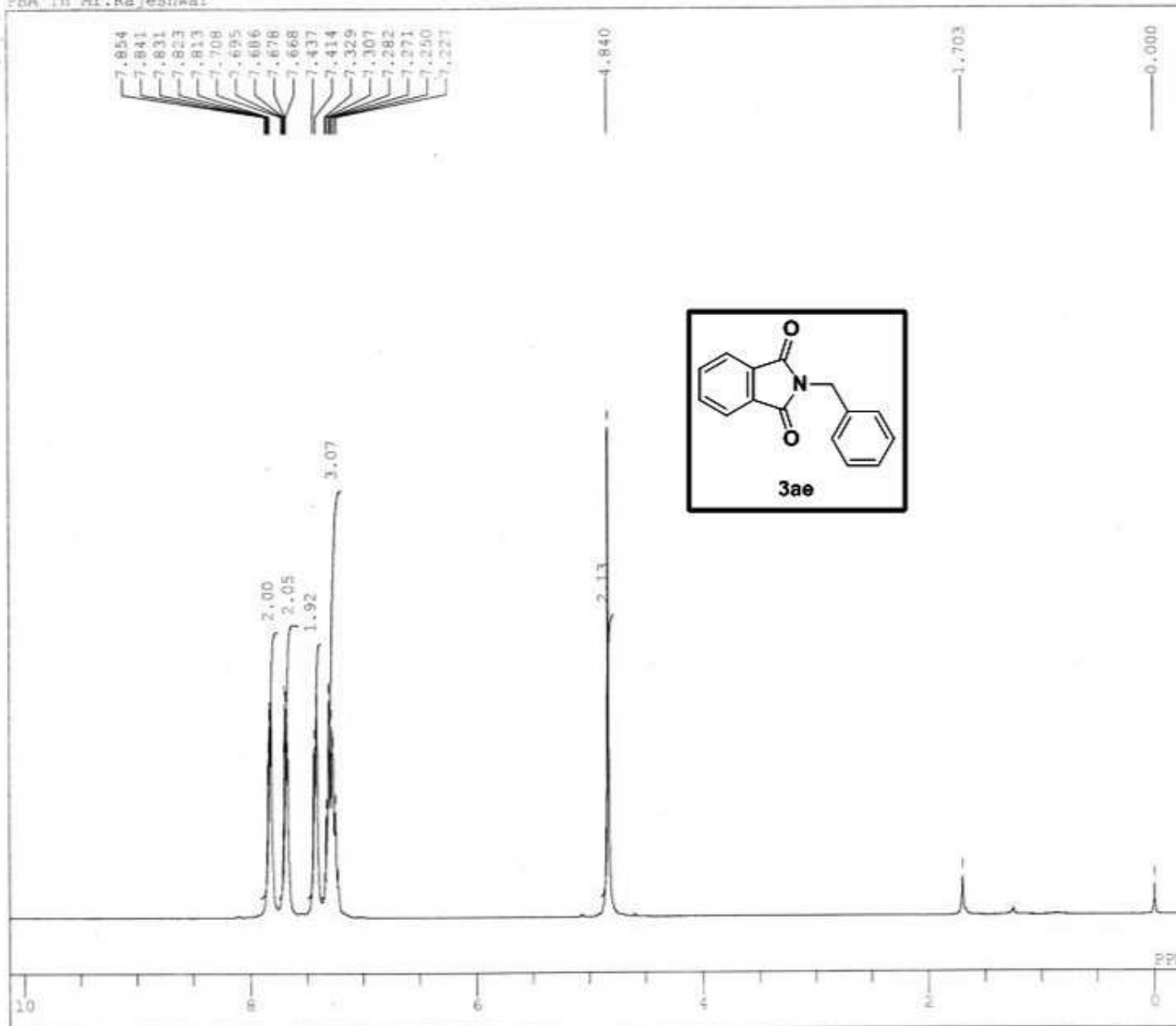


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON\DEFAULT.
COMNT NCA_13C_Mr.Manjeet_Singh
DATIM Tue Sep 11 17:12:31 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 117
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 22.8 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

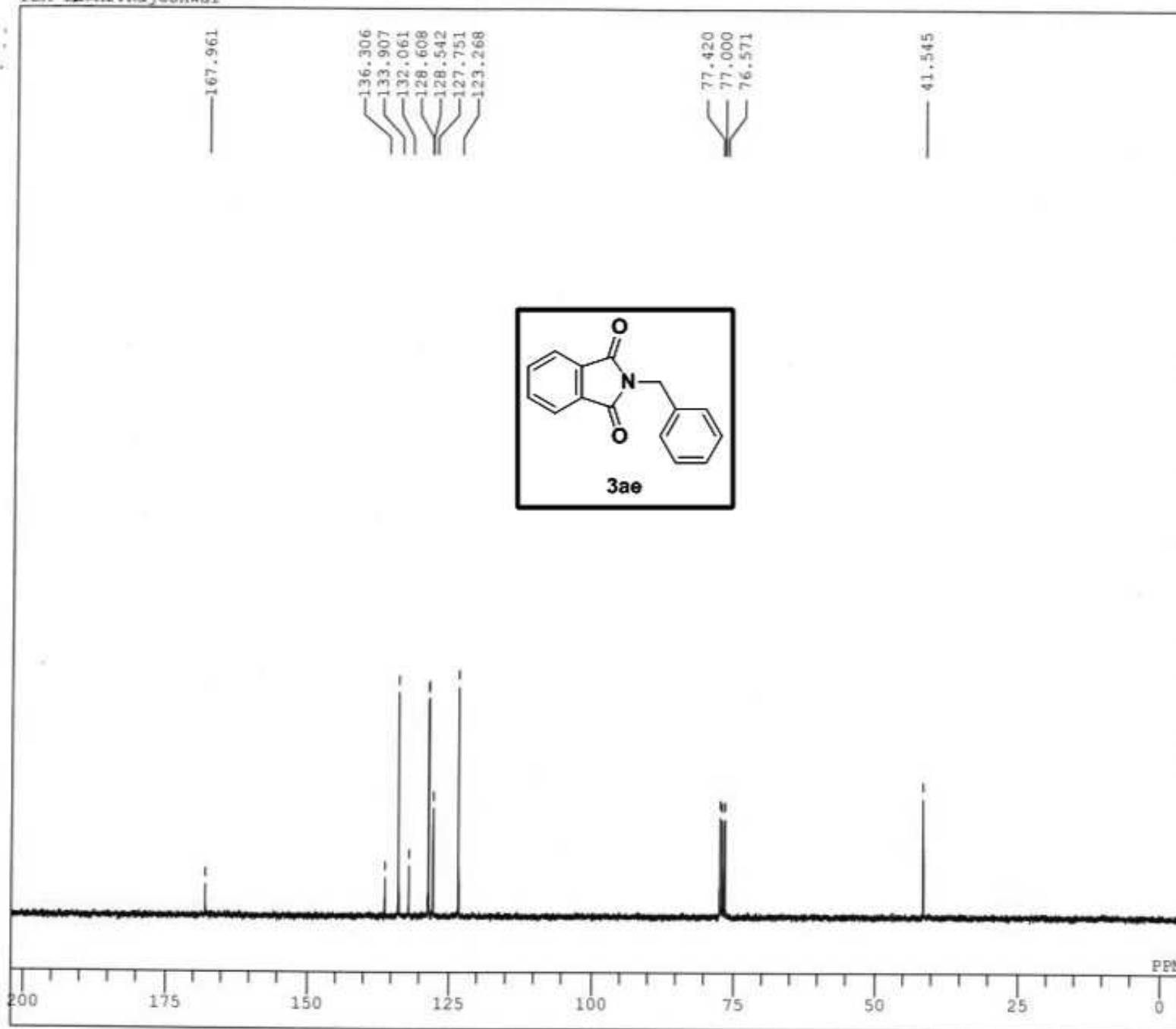
PBA_1H Mr.Rajeshwar



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\PBA_1H.a1
COMNT PBA_1H Mr.Rajeshwar
DATIM Thu Jul 05 14:40:30 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 32
ACQTM 5.446 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 21.8 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 14

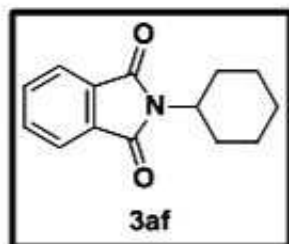
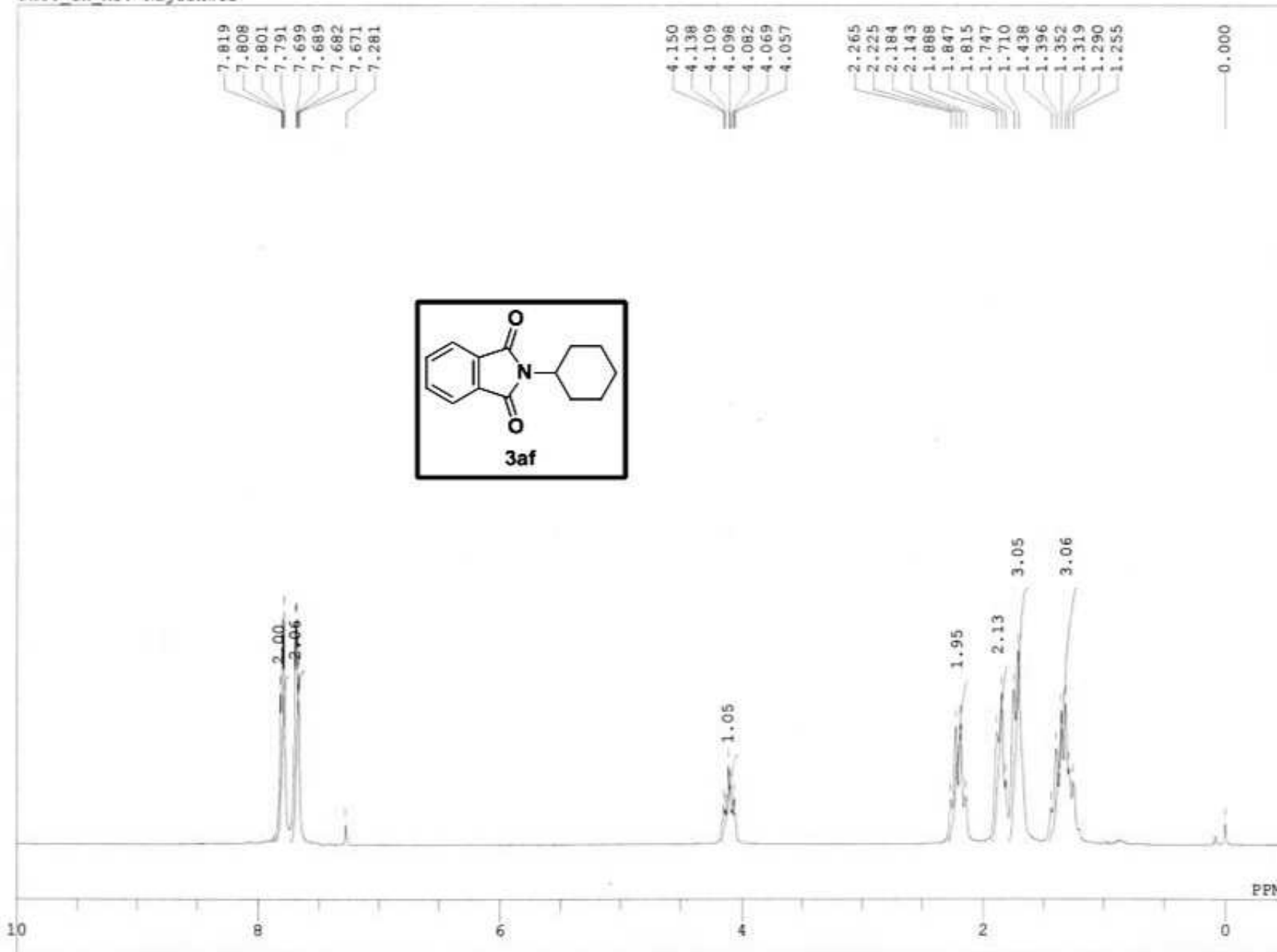


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\Data\PBA_1H2BCM_
COMNT PBA_1H Mr.Rajeshwar
DATIM Thu Jul 05 14:48:20 2012
OBNUC 13C
EXMOD BCM
OBFREQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 150
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 22.4 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23

C:\K.N. Singh,, I.T\PhCY_1H.als
PhCY_1H Mr. Rajeshwer

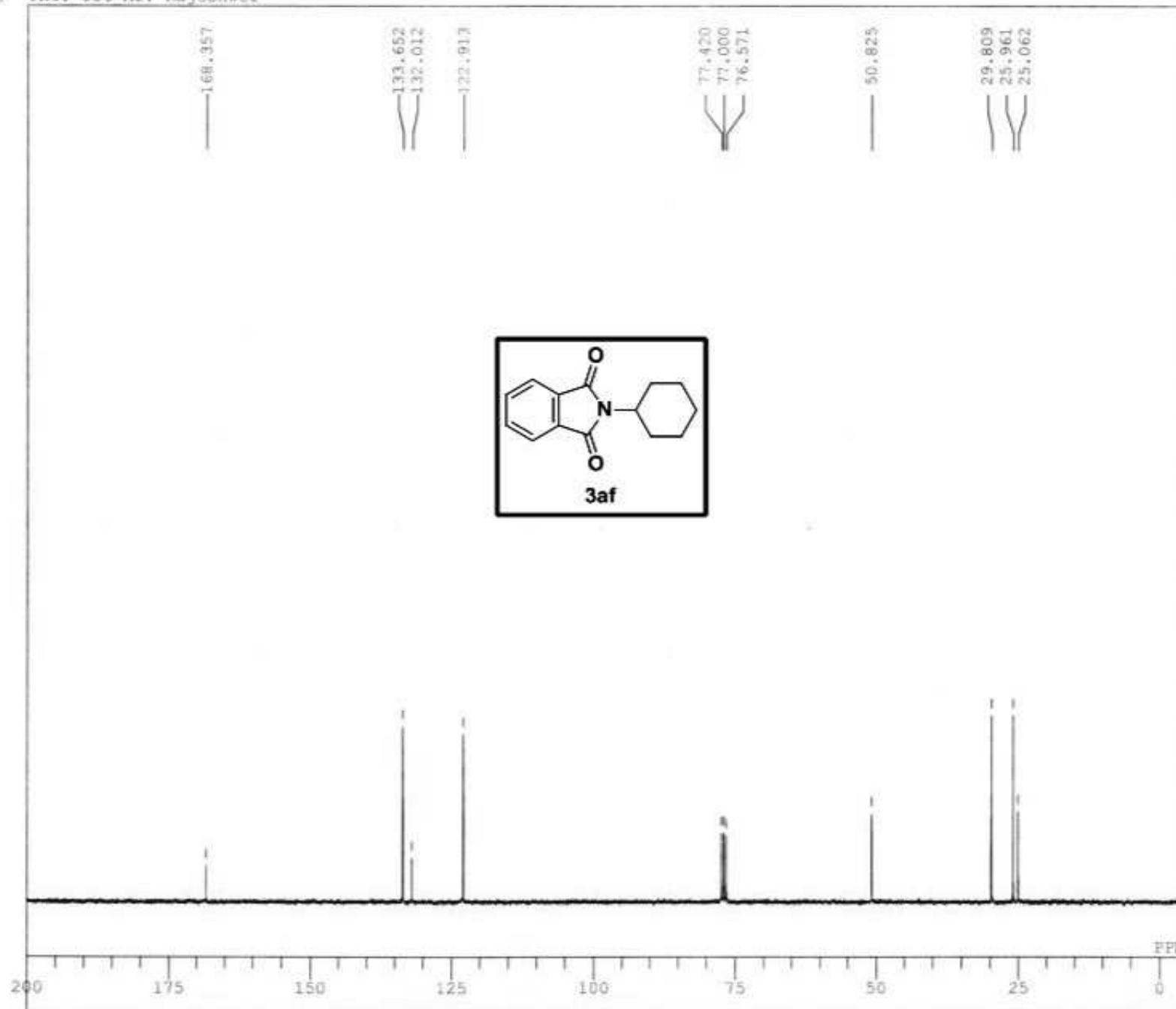


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\K.N. Singh,, I.
COMNT PhCY_1H Mr. Rajes
DATIM Mon Jul 30 15:34:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 21.9 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 11

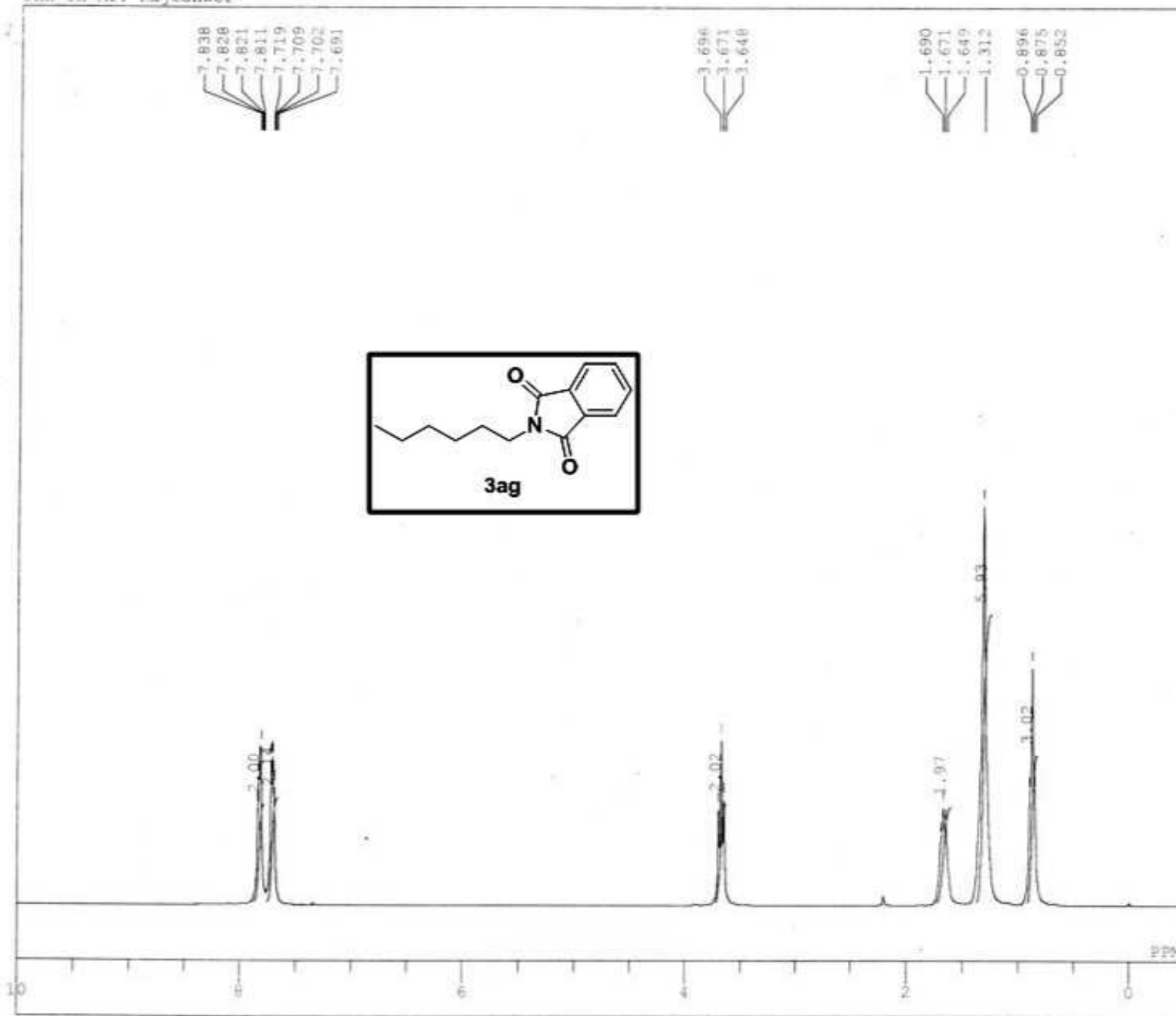
1 PhCY 13C Mr. Rajeshwer



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\PhCY 13C.
COMNT PhCY 13C Mr. Rajeshwer
DATIM Mon Jul 30 16:09:30 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 100
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 22.6 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 25

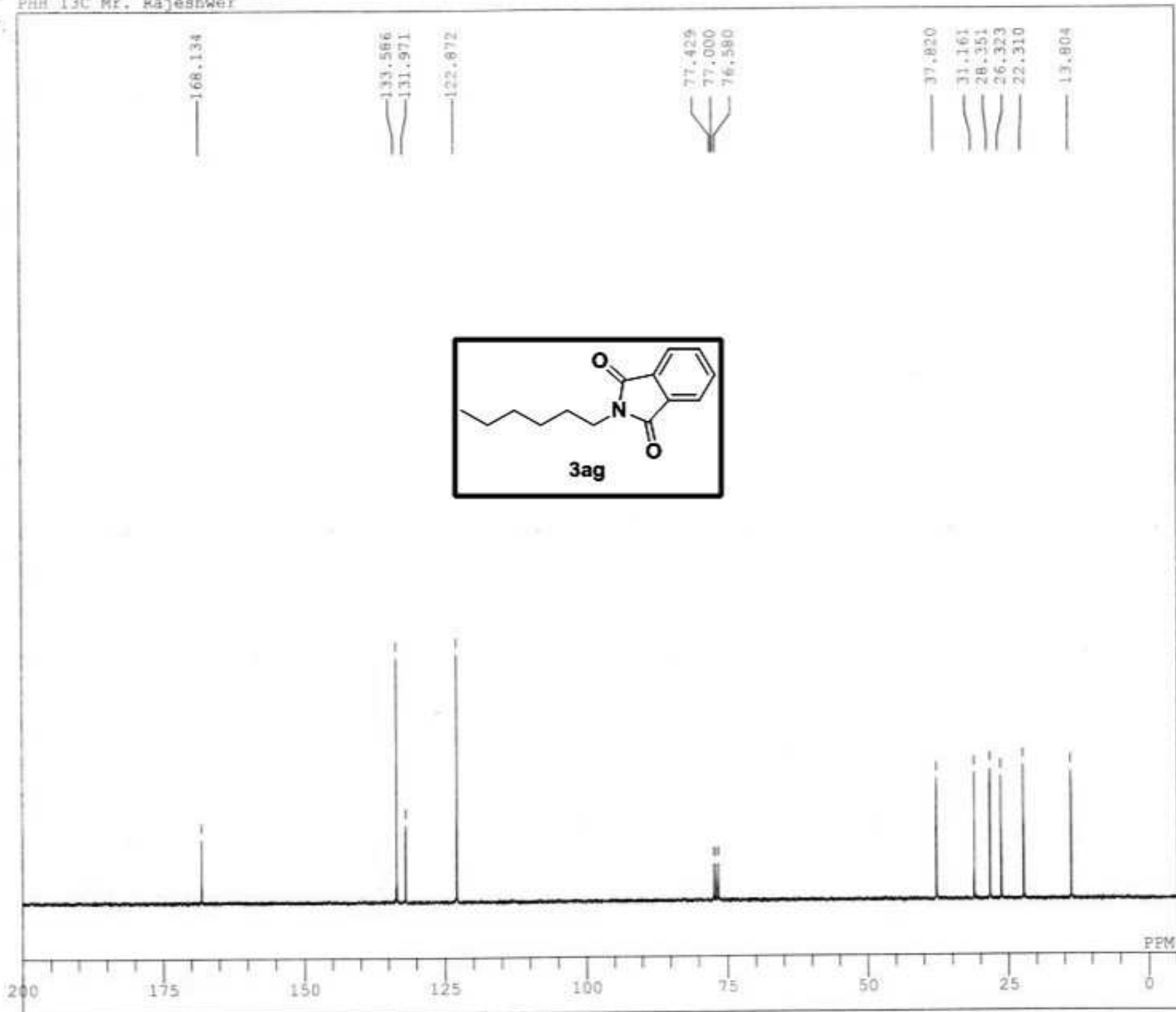


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\PHH_1H.a1
COMNT PHH_1H_Mr. Rajeshwer
DATIM Tue Sep 11 13:11:23 2012
OBNUC 1H
EXMOD NON
OBFRO 300.40 MHz
OBSET 130.00 MHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 16
ACQTM 3.447 sec
PD 1.547 sec
PWI 5.2 us
IRNUC 1H
CTEMP 20.0 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 7

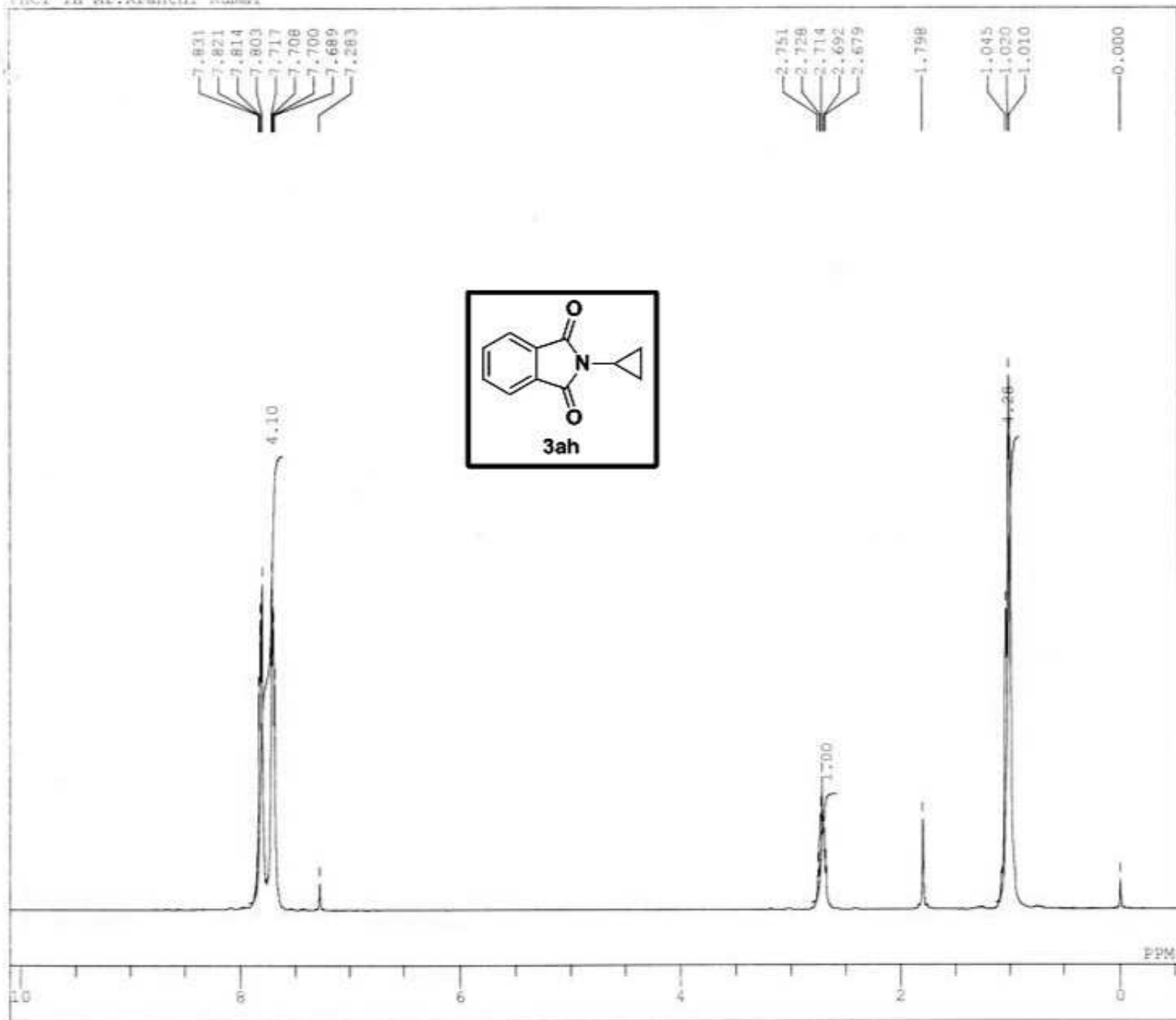
PHH 13C Mr. Rajeshwer



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

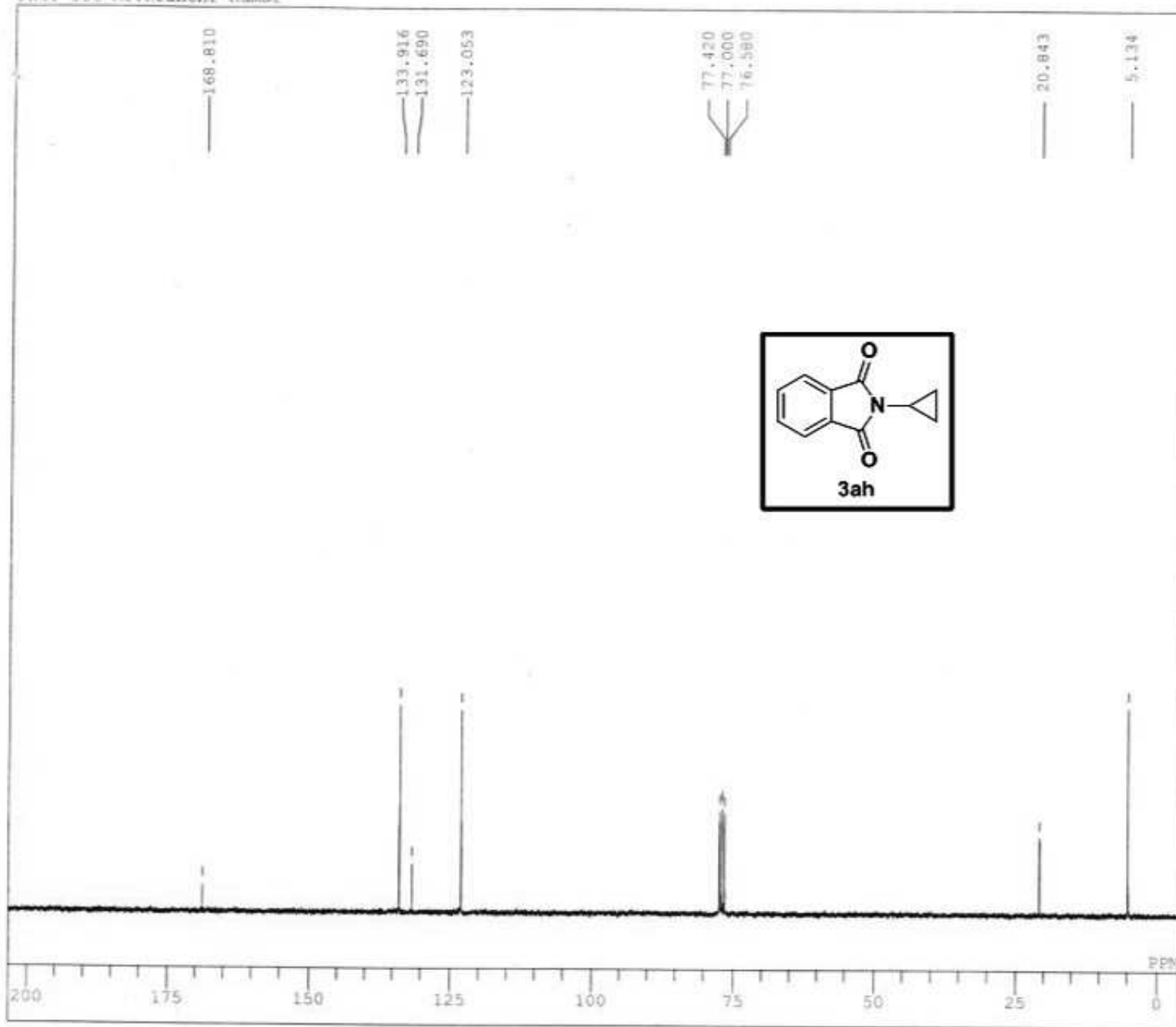
DFILE C:\WINNMR98\COMMON\DEFAULT.
COMNT PHH_13C_Mr. Rajeshwer
DATIM Tue Sep 11 13:16:24 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 32
ACQTM 1.606 sec
PD 1.394 sec
PWI 6.0 us
IRNUC 1H
CTEMP 23.5 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARAMASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\COMMON\DEFAULT.
COMNT PHCY_1H_Mr.Kranthi_Kumar
DATIM Fri Sep 07 12:13:48 2012
CHNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 12
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 19.0 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 14

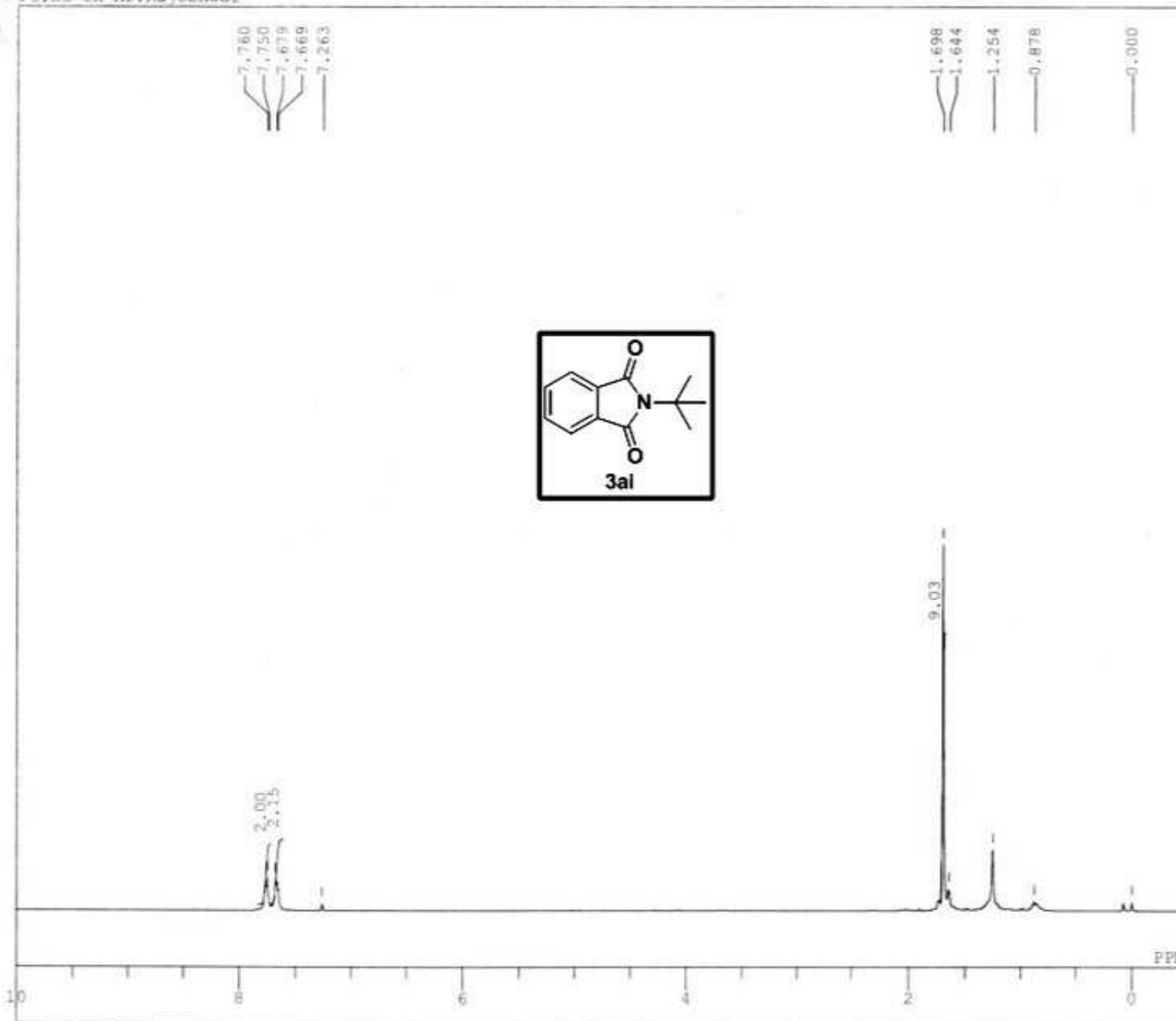


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

OFIL C:\Krantaz K. Tunagala\PHCY_13C
COMNT PHCY_13C_Mr.Kranthi Kumar
DATIM Fri Sep 07 12:22:13 2012
OBNUC 13C
EXMOD BCM
OBFREQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 102
ACQTM 1.606 sec
PD 1.394 sec
PW1 6.0 us
IRNUC 1H
CTEMP 22.5 c
SLVNT CDCL3
EXREP 77.00 ppm
BF 1.20 Hz
RGAIN 23

Pt.Bu 1H Mr.Rajeshwar

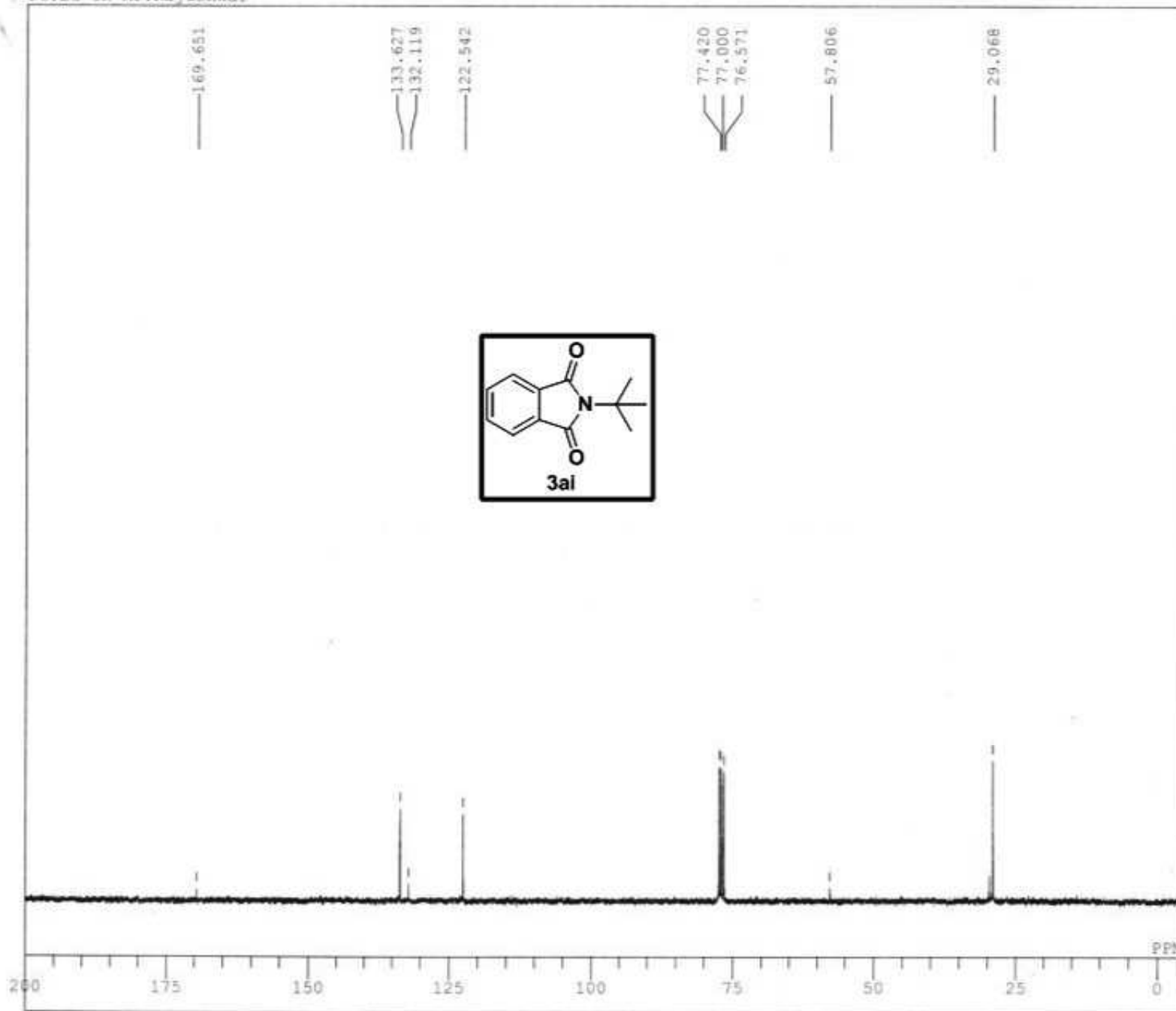


JEOL AL300 PTMNR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\Pt.Bu_1H.
COMNT Pt.Bu_1H Mr.Rajeshwar
DATIM Fri Sep 14 12:13:43 2012
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 9505.7 Hz
SCANS 44
ACQTM 3.447 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 19.1 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 15

Pt.Bu 1H Mr.Rajeshwar

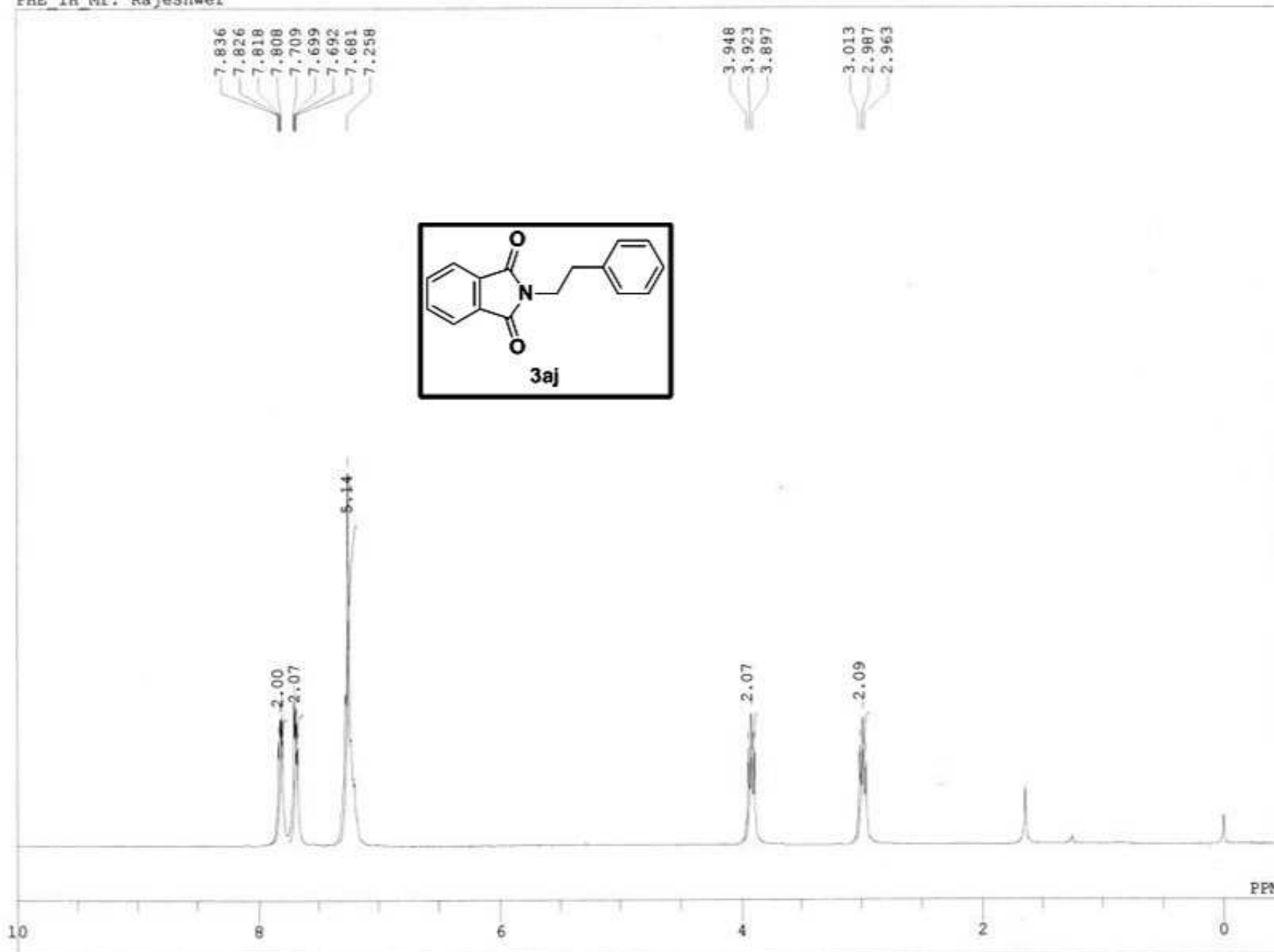


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\K.N. Singh,,I.T\Pt.Bu_13C
COMNT Pt.Bu 1H Mr.Rajeshwar
DATIM Fri Sep 14 12:06:26 2012
OBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 230
ACQTM 1.606 sec
PD 1.394 sec
FW1 6.0 us
IRNUC 1H
CTEMP 18.1 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 23

C:\K.N. Singh,,I.T\PHE_1H.als
PHE_1H Mr. Rajeshwer

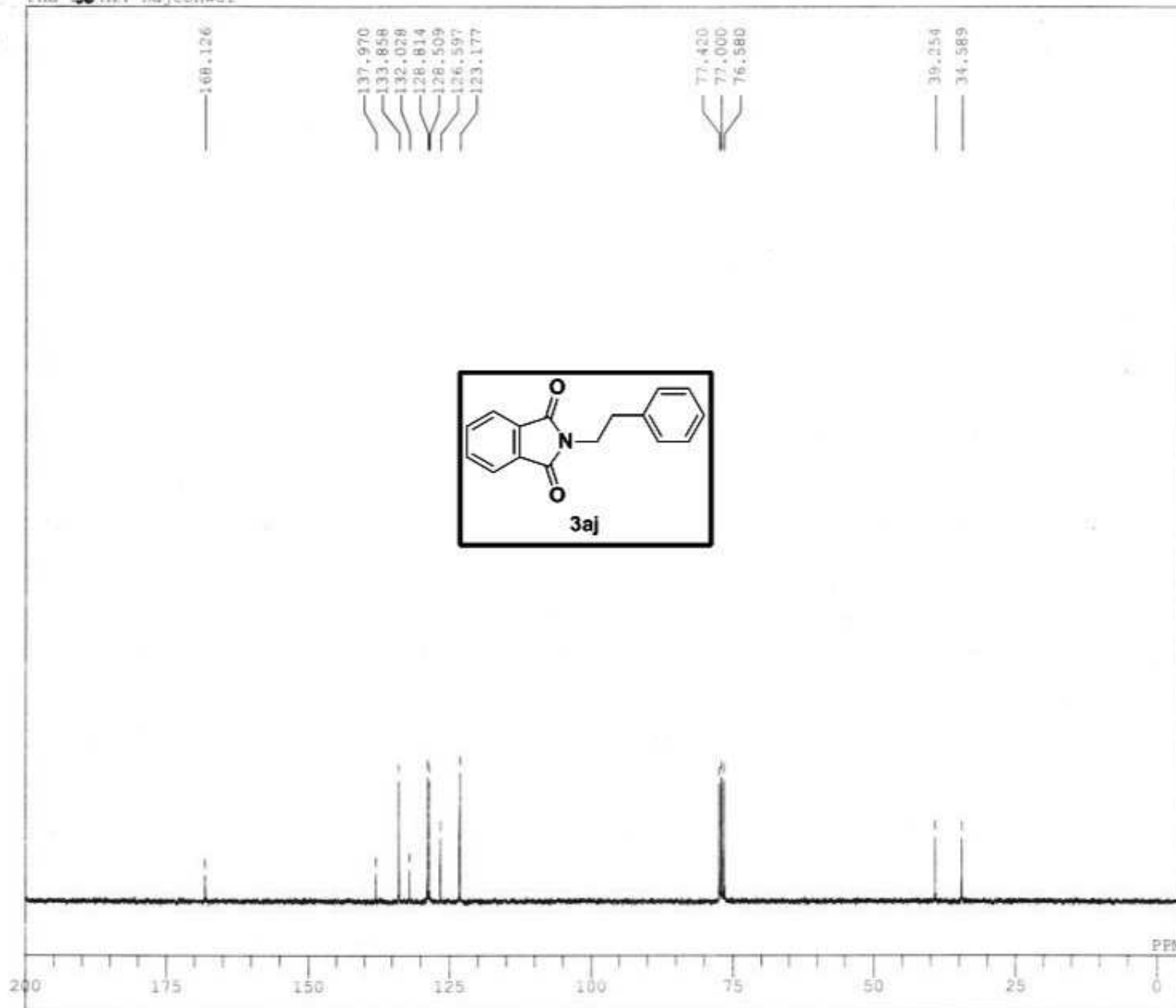


JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University
VARANASI-221005

Operator : Nagendra Kuma
Shishir Singh

DFILE C:\K.N. Singh,,I.T\
COMNT PHE_1H Mr. Rajesh
DATIM Mon Sep 10 15:04:
OBNUC 1H
EXMOD NON
OBFRQ 300.40 MHz
OBSET 130.00 KHz
OBFIN 1150.0 Hz
POINT 32768
FREQU 6016.8 Hz
SCANS 32
ACQTM 5.446 sec
PD 1.547 sec
PW1 5.2 us
IRNUC 1H
CTEMP 20.0 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 1.20 Hz
RGAIN 14

PHE 13C Mr. Rajeshwer



JEOL AL300 FTNMR
CHEMISTRY DEPARTMENT
Banaras Hindu University,
VARANASI-221005

Operator : Nagendra Kumar
Shishir Singh

DFILE C:\WINNMR98\Data\PHE_1H2BCM
COMNT PHE_1H_Mr. Rajeshwer
DATIM Mon Sep 10 15:19:25 2012
GBNUC 13C
EXMOD BCM
OBFRQ 75.45 MHz
OBSET 127.30 KHz
OBFIN 44.7 Hz
POINT 32768
FREQU 20408.1 Hz
SCANS 250
ACQTM 1.606 sec
PD 1.394 sec
PWL 6.0 us
IRNUC 1H
CTEMP 20.6 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24