APPENDIX 5. Tables of Selected Unknowns

All melting and boiling points are in °C.

ALDEHYDES

COMPOUNDS	BP	MP
Ethanal (Acetaldehyde)	21	
Propanal (Propionaldehyde)	48	
Propenal (Acrolein)	52	
2-Methylpropanal	64	
4-Hydroxybenzaldehyde		116
Butanal (Butyraldehyde)	75	
3-Methylbutanal (Isovaleraldehyde)	92	
Pentanal (Valeraldehyde)	102	
2-Butenal (Crotonaldehyde)	104	
2-Ethylbutanal	117	
Hexanal (Caproaldehyde)	130	
Heptanal (Heptaldehyde)	155	
2-Furaldehyde (Furfural)	162	
2-Ethylhexanal	163	
Octanal (Caprylaldehyde)	171	
Benzaldehyde	179	
5-Methylfurfural	187	
Phenylethanal	195	33
2-Hydroxybenzaldehyde	197	
4-Methylbenzaldehyde	204	
3,7-Dimethyl-6-octenal	207	
2-Chlorobenzaldehyde	213	11
4-Methoxybenzaldehyde	248	2.5
trans-Cinnamaldehyde	250 d.	
α–Naphthaldehyde	292	34
3,4-Methylenedioxybenzaldehyde	263	37
2-Methoxybenzaldehyde	245	38
4-Chlorobenzaldehyde	214	48
2, 3-Dimethoxybenzaldehyde	285	54
3-Nitrobenzaldehyde		58
4-Dimethylaminobenzaldehyde		74
Vanillin	285 d.	82
4-Nitrobenzaldehyde		106
4-Hydroxybenzaldehye		116

NOTE: d indicates decomposition

KETONES **Note: All temperatures in ^{o}C.**

COMPOUNDS	**BP**	**MP .**
2-Propanone (Acetone)	56	
2-Butanone	80	
3-Methyl-2-butanone	94	
2-Pentanone	l01	
3-Pentanone (Diethyl ketone)	l02	
3,3-dimethyl-2-butanone	106	
4-Methyl-2-pentanone	117	
2,4-Dimethyl-3-pentanone	124	
3-Hexanone	125	
2-Hexanone	128	
4-Methyl-3-penten-2-one	130	
Cyclopentanone	131	
2,3-Pentanedione	134	
2,4-Pentanedione	139	
4-Heptanone	144	
2-Heptanone	l 51	
Cyclohexanone	156	
2,6-Dimethyl-4-heptanone	168	
4-Octanone	170	
2-Octanone	173	
Cycloheptanone	181	
2,5-Hexanedione	194	
d-Fenchone	196	
Acetophenone	202	20
Isophorone	213	
Phenyl-2-propanone	216	27
Propiophenone	218	20
Pulegone	224	
2-Undecanone	228	12
d-Carvone	230	
4-Chloroacetophenone	232	12
4-Phenyl-2-butanone	235	
1-Acetylnaphthalene	302	34
4-Phenyl-3-buten-2-one	212	37
4-Methoxyacetophenone	258	38
1-Indanone	242	42
Benzophenone	305	48
4-Bromoacetophenone	225	5l
2-Acetanaphthalene	301	54
2-Indanone		58
Desoxybenzoin	320	60
3-Nitroacetophenone	202	81
9-Fluorenone	342	83
Benzil	347	95
d,2-Benzoin	344	l33
4-Hydroxypropiophenone		148
Camphor	205	179
Xanthone	350	174
DL Camphor		179

CARBOXYLIC ACIDS COMPOUNDS	bp (^{o}C)	mp (^{o}C)
Formic acid	101	8
Acetic acid	118	17
Acrylic acid	139	13
Propanoic acid	141	
2-Methylpropanoic acid	154	
Butanoic acid	162	
2-Methylpropenoic acid	163	16
Trimethylacetic acid	164	35
Pyruvic acid	165 d	14
3-Methylbutanoic acid	176	
Pentanoic acid	186	
Hexanoic acid	205	
2-Bromopropanoic acid	205	24
Octanoic acid	237	16
Nonanoic acid	254	12
Decanoic acid	268	32
3-Phenylpropanoic acid	279	48
Bromoacetic acid	208	50
Chloroacetic acid	189	63
Palmitic acid		63
Stearic acid		69
trans-2-Butenoic acid		72
Phenylacetic acid		77
l – Malic		100
2-Methoxybenzoic acid	200	101
2-Methylbenzoic acid		104
3-Methylbenzoic acid	263	110
Benzoic acid	249	122
Sebacic acid		133
Cinnamic acid	300	133
Maleic acid		137
2,2-dimethylsuccinic acid		139-42
2-Chlorobenzoic acid		140
3-Nitrobenzoic acid		140
2-Aminobenzoic acid		147 d.
2-Bromobenzoic acid		150
Benzilic acid		150
Adipic acid		154
3-Bromobenzoic acid		156
2-Hydroxybenzoic acid		158
3-Chlorobenzoic acid		158
2-Iodobenzoic acid		162
3,5-Dimethylbenzoic acid		166
d-Tartaric acid		169-71
4-Methylbenzoic acid		180
2-Naphthoic acid		184
4-Methoxybenzoic acid	280	184
Succinic acid		185
3-Iodobenzoic acid		187
Phthalic acid		200-6
3-Hydroxybenzoic acid		201

CARBOXYLIC ACIDS COMPOUNDS	bp (^{o}C)	mp (^{o}C)
d,*l*-Tartaric		206
4-Hydroxybenzoic acid		214
4-Nitrobenzoic acid		240
4-Chlorobenzoic acid		242

ALCOHOLS COMPOUNDS	bp	(mp ^{o}C)
Methanol	65	
Ethanol	78	
2-Propanol	82	
2-Methyl-2-propanol	83	26
2-Propen-1 -ol	97	
1 -Propanol	97	
2-Methyl-2-butanol	102	
2-Methyl-1-propanol	108	
3-Pentanol	115	
1 -Butanol	118	
2-Pentanol	119	
3-Methyl-3-pentanol	123	
2-Chloroethanol	129	
4-Methyl-2-pentanol	132	
1-Pentanol	138	
Cyclopentanol	140	
1-Hexanol	157	
Cyclohexanol	160	
1 -Heptanol	176	
2-Octanol	179	
Propylene glycol	187	
1-Octanol	195	
Benzyl alcohol	204	
1 -Phenylethanol	204	20
2-Phenylethanol	219	
3-Phenyl-2-propen-1 -ol	250	34
Menthol	212	41
Diphenylmethanol	288	68
Benzoin		133
Cholesterol		147
Borneol		208

PRIMARY AMINES COMPOUNDS	bp (°C)	mp (°C)
t-Butyl amine	46	
Propylamine	48	
sec-Butylamine	63	
Isobutylamine	69	
Butylamine	78	
Cyclohexylamine	135	
Benzylamine	184	
Aniline	184	
2-Methylaniline	200	144
3-Methylaniline	203	
2-Chloroaniline	2O8	
2,6-Dimethylaniline	216	11
2-Methoxyaniline	225	6
3-Chloroaniline	230	
4-Methylaniline	200	43
2-Ethylaniline	210	47
4-Methoxyaniline		58
4-Chloroaniline		70
2-Nitroaniline		72
Ethyl *p*-aminobenzoate		89
3-Nitroaniline		114
2-Aminobenzoic acid		147 decomposition.
4-Nitroaniline		148
2,4-Dinitroaniline		180

SECONDARY AMINES COMPOUNDS	bp (°C)	mp (°C)
Diethylamine	56	
Diisopropylamine	84	
Piperidine	106	
Dipropylamine	110	
Morpholine	129	
Diisobutylamine	139	
Dibutylamine	139	
Benzylmethylamine	184	
N-Methylaniline	196	
N-Ethylaniline	205	
N-Ethyl-m-toluidine	221	
Dicyclohexylamine	256	
N-Benzylaniline	298	37
Diphenylamine	302	52

TERTIARY AMINES (all T in ^{o}C)

COMPOUNDS	**bp**	**mp**
Triethylamine	89	
Pyridine	l l 6	
2-Methylpyridine (α-Picoline)	129	
3-Methylpyridine (β-Picoline)	143	
4-Methylpyridine (χ-Picoline)	143	
Tripropylamine	157	
N,N-Dimethylbenzylamine	183	
N,N-Dimethylaniline	193	
Tributylamine	216	
N,N-Diethylaniline	218	
Quinoline	239	
Acridine		107-110
Triphenylamine	348	124-8

ESTERS (all T in ^{o}C)

COMPOUNDS	**bp**
Methyl formate	32
Ethyl formate	54
Ethyl acetate	77
Methyl propionate	80
Methyl acrylate	80
Isopropyl acetate	89
Methyl isobutyrate	93
t-Butyl acetate	98
Ethyl acrylate	101
Methyl methacrylate	100
Propyl acetate	102
Methyl butyrate	102
2-Butyl acetate	111
Methyl 3-methylbutanoate	117
Ethyl butanoate	120
Butyl acetate	127
Methyl pentanoate	128
Ethyl 3-methylbutanoate	132
Pentyl acetate	142
3-Methylbutyl acetate	142
Ethyl lactate	154
Ethyl hexanoate	168
Methyl acetoacetate	170
Dimethyl malonate	180
Ethyl acetoacetate	181
Diethyl oxalate	185
Methyl benzoate	199
Diethyl malonate	199
Ethyl octanoate	207
Ethyl benzoate	212
Diethyl succinate	217
Diethyl fumarate	218
Methyl phenylacetate	220
Diethylmaleate	222

	bp	**mp**
Methyl salicylate	224	
Ethyl phenylacetate	228	
Ethyl salicylate	234	
Ethyl cinnamate	271	
Dimethyl phthalate	284	
Methyl cinnamate		36
Phenyl salicylate		42
Dibenzyl succinate		52
Ethyl p-nitrobenzoate		56
Phenyl benzoate		70
Methyl 3-nitrobenzoate		78
Methyl 4-bromobenzoate		81
Ethyl *p*-aminobenzoate		89
Benzoin acetate		83
Methyl 4-nitrobenzoate		96
Dimethyl fumarate		102

PHENOLS COMPOUNDS	ºC BP	ºC MP
Anisole	154	
2-Chlorophenol	176	7
3-Methylphenol (*m*-Cresol)	203	12
2-Methylphenol (*o*-Cresol)	191	32
2-Methoxyphenol (Guaiacol)	204	32
4-Methylphenol (*p*-Cresol)	202	34
Phenol	182	42
4-Chlorophenol	217	43
2,4-Dichlorophenol	210	45
4-Ethylphenol	219	45
2-Nitrophenol	216	45
4-Ethylphenol	219	47
2-Isopropyl-5-methylphenol	234	51
3,4-Dimethylphenol	225	64
4-Bromophenol	238	64
3,5-Dimethylphenol	220	68
2,5-Dimethylphenol	212	75
Vanillin (4-Hydroxy-3-methoxybenzaldehyde)	285	81-3
l-Naphthol (α-Naphthol)	280	94
1,2-Dihydroxybenzene (Catechol)	246	l05
1,3-Trihydroxybenzene (Resorcinol)	281	109
4-Nitrophenol		112
2-Naphthol (β-Naphthol)	286	121
1,2,3-Trihydroxybenzene	309	133
Salicylamide		139
4-Phenylphenol	305	164

HYDROCARBONS COMPOUNDS	ºC BP	ºC MP
2,2,4-Trimethylpentane	99	
p-Xylene	138	13
Phenylacetylene	142	
Camphene	160	51
Diphenylacetylene		59-61
tert-Butylbenzene	169	
Decane	173	
Indene	182	
n-Butylbenzene	182	
Mesitylene	164	
Hexamethylbenzene	264	164
Naphthalene	218	80
α-Methylnaphthalene	241	
Diphenyl	255	70
Dibenzyl	284	52
Anthracene	340	217
Diphenylmethane	262	25
Triphenylmethane	358	92
Adamantane		212

AMIDES COMPOUNDS	ºC BP	ºC MP
Propionamide		79
Acetamine		82
Acetanilide		114
n-Butyramide		115
Benzamide		129
p-Methoxyacetanilide		130
Salicylamide		139
p-Toluamide		159

NITRILES COMPOUNDS	ºC BP	ºC MP
Acetonitrile	82	
Benzonitrile	191	
p-Tolunitrile	218	
p-Chlorobenzonitrile	223	96
p-Nitrobenzinitrile		149

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University of Missouri-St. Louis

Solid Unknown
Chemistry 263 Preliminary Report Form

Name: _____

Date: _____

Unknown Number _____

Physical Properties
a) appearance:

b) melting point:

c) boiling point:

e) other properties you may have measured:

Solubility Tests (use +/- to indicate positive, negative tests)

H_2O: _____; 5%NaOH, _____; 5%$NaHCO_3$, _____; 5%HCl, _____ ; H_2SO_4,_____.

pH(aqueous solution): _____ .

Attach your IR Spectrum

Department of Chemistry
University of Missouri-St. Louis

Liquid Unknown
Chemistry 263 Preliminary Report Form

Name: _____

Date: _____

Unknown Number _____

Physical Properties

a) appearance:

b) melting point:

c) boiling point:

e) other properties you may have measured:

Solubility Tests (use +/- to indicate positive, negative tests)

H_2O: _____; 5%NaOH, _____; 5%$NaHCO_3$, _____; 5%HCl, _____ ; H_2SO_4,_____.

pH(aqueous solution): _____ .

Attach your IR Spectrum

Department of Chemistry
University of Missouri-St. Louis

Chemistry 263 Solid Unknown Final Report Form

Name: _____
Date: _____
Unknown Number _____
Compound Identification (give structure and proper name, including stereochemistry if appropriate)

Other Possible Compounds (compounds with very similar properties):

Physical Properties
a) appearance:
b) melting point:
c) boiling point:
e) other properties you may have measured:

Solubility Tests (use +/- to indicate positive, negative tests)

H_2O: _____; 5%NaOH, _____; 5%$NaHCO_3$, _____; 5%HCl, _____ ; H_2SO_4,_____.

pH(aqueous solution): _____ .

Functional Groups Present (based on IR or classification tests, attach IR spectra to this report)

Frequencies present Likely Functional Group

NMR Groups Present

Department of Chemistry
University of Missouri-St. Louis

Chemistry 263 Liquid Unknown Final Report Form

Name: _____
Date: _____
Unknown Number _____
Compound Identification (give structure and proper name, including stereochemistry if appropriate)

Other Possible Compounds (compounds with very similar properties):

Physical Properties
a) appearance:
b) melting point:
c) boiling point:
e) other properties you may have measured:

Solubility Tests (use +/- to indicate positive, negative tests)

H_2O: _____; 5%NaOH, _____; 5%$NaHCO_3$, _____; 5%HCl, _____ ; H_2SO_4,_____.

pH(aqueous solution): _____ .

Functional Groups Present (based on IR or classification tests, attach IR spectra to this report)

Frequencies present Likely Functional Group

NMR Groups Present