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**Colon Classification for Macro-Documents in Chemistry.**  
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(CC Ed 7 series. 3).

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[Enumerates the objectives and the methodology for the revision of Colon Classification (CC) schedule for the classification of subjects going with E Chemistry. A revised schedule of CC for classification of subjects going with the Primary Basic Subjects E Chemistry and its Secondary Basic Subjects are presented with scope notes and working rules. An index to schedule, one hundred and thirty six examples of subjects classified according to the scheme, and an alphabetical index to these subjects are given.]

**ABBREVIATIONS USED:**

(BS) = Basic Subject	(MM) = Matter Method Isolates
(CC) = Colon Classification	
(CN) = Class Number	(MP) = Matter Property Isolates
(E) = Energy isolate	(P) = Personality Isolate
(IN) = Isolate Number	(SpC) = Special Component

**0 Introduction**

This paper presents a schedule of Basic Subjects and the isolate ideas needed for classifying subjects going with the Primary Basic Subjects "E Chemistry". The schedule is a revised version of CC ed 6 (1960). This schedule is mainly intended for the classification of subjects embodied in the books. The basic structure of the design of this schedule was framed by the late S R Ranganathan. He was assisted by M A Gopinath, P Jayarajan, A Neelameghan and S Seetharama at different stages in the development of the schedule.

**1 Objectives of Revision**

The general objectives of the revision of the schedule are:

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1 To bring the sequence of isolates enumerated in line with a generally accepted view of a majority of specialists;

2 To enumerate in the schedule as many of the isolates as may be adequate for the classification of macro-documents. The requirements of a classification for micro-documents such as articles in periodicals, was not specifically taken into account;

21 In enumerating the special isolates, to provide means for the interpolation of new isolates that may come up in future, without considerable disturbance to the sequence of isolates now enumerated, and to the (IN) now assigned;

3 To respect, as far as possible, the Law of Parsimony (4) in the Notational plane, without prejudice to the implementation of the findings in the idea plane; and this is achieved

1 By respecting the integrity of Class Numbers wherever such a procedure will not do violence to the findings of the Idea Plane, the purpose being to keep to a minimum the change of Class Numbers already assigned to documents according to Ed 6 of CC; and

2 To restrict the number of digits in an (IN) generally to less than four.

## 2 Methods Adopted for Improving the Facet Structure

### 21 DETERMINATION OF FACET STRUCTURE

The work of improving the facet structure for the compound subjects going with Chemistry was done along the following lines:

1 With a view to modify the schedules, the literary warrant was checked, that is, an extensive study of current books was made. This pragmatic approach consisted in examining the kind of documents listed in the latest trade catalogues of publishers such as Academic Press, John Wiley & Sons, (Wiley-Interscience), McGraw-Hill Publishing Co, Prentice Hall Catalog, Holt, Rinehart, and Winston, the *British national bibliography*, the *Publishers' trade list annual*, and the *Cumulative book index*.

This investigation showed that several books could not be classified with the existing schedule, thereby confirming the view that the existing schedule was not sufficient for the purpose, and that it should be augmented by interpolating new isolates.

2 Utilisation of recent advances made in the General Theory of Library Classification—as for example, the clearer view of the concept of five fundamental categories, the application of the postulates and principles and the advances made in the development of versatile notational system especially the provision for interpolation and extrapolation of new Basic Subjects and isolates.

**22 DOCUMENTS USED**

The following were the documents used for information on the different concepts in the subject field Chemistry.

*General*

- 1 *Encyclopaedia Britannica*. 1965. 24V.
- 2 *McGraw-Hill encyclopaedia of science and technology*. 1971. 15V.

*Chemistry*

- 1 *International encyclopaedia of chemical science*. 1964. Princeton (New Jersey). D Van Nostrand Company, Inc.
- 2 IHDE (Aaron J). *Development of modern chemistry*. 1964.
- 3 ROSE (Arthur) and ROSE (Elizabeth). *Condensed chemical dictionary*. Ed 7. 1966.

**3 Chemistry and its Subdivisions****30 SCOPE OF CHEMISTRY**

Chemistry is a branch of natural sciences. It investigates the composition of all matter, and the transformations which the matter exhibits when subjected to energy change. To state it more specifically chemistry includes a study of the properties, composition, and structure of matter, the changes in structure and composition which matter undergoes, and the accompanying energy changes. Chemistry is one of the earliest disciplines to be recognised as Science. Chemical Engineering and Chemical Technology are subjects which are closely related to Chemistry. Physics, Biology, and Geology have interdisciplinary relationship with Chemistry.

**31 CC SCHEDULE FOR CHEMICAL SCIENCES**

In CC, the schedules for Chemistry and its allied subjects are represented as follows:

E*Z	Chemical sciences
E	Chemistry
EX	Chemical Engineering
F	Technology
FV	Foundry
FX	Welding

This paper presents schedules of isolate ideas for compound subjects going with Chemistry and its Secondary Basic Subjects. The schedules of isolates needed for classifying compound subjects going with EX Chemical Engineering and F Chemical Technology will be presented in later papers in this series.

## 32 CC SCHEDULE FOR CHEMISTRY

Chemistry is further subdivided as follows:

E	Chemistry
E-A	Systems in Chemistry
	<i>Note.— Division by (CD).</i>
	<i>(Illustrative)</i>
E-D	Alchemy
E1	General Chemistry
E2	Physical chemistry
E3	Analytical chemistry
E4	Synthetic chemistry

321 *General Chemistry*

'E1 General chemistry' covers a study of properties and energy changes in inorganic substances. Thus, General Chemistry covers topics in Inorganic Chemistry and Organic Chemistry. It also includes *in vitro* studies of biosubstances. The schedules presented in this paper are thoroughly revised in respect of enumeration of isolates. In the schedule for elements, there is provision for classifying collective treatment such as, Metals and Non-metals. The elements schedule is updated based on the latest developments in Chemistry. A list of special components for formation of compound isolates is given. Besides, the chemical symbol for each element, the atomic number, atomic weight and the class of material to which the particular element forms part of such as Transition Metals, Transuranium group, Non-metal, Metal, Actinium group are indicated. The schedule for Organic substance includes ring systems and their variations in details. Also provided is a list of special components. For representing this provides a facile device for constructing isolate numbers for organic compounds. The special component appears in the schedule with their indicator digit "=" (equals to) prefixed to each of them. The list of biosubstance is also enumerated in detail.

322 *Physical Chemistry*

'E2 Physical Chemistry' covers the energy and chemical changes of substances in different states of matter. A list of states of matter is given as (P) schedule for Physical Chemistry.

323 *Analytical Chemistry*

'E3 Analytical Chemistry' exclusively covers the study of various methods used in the Analysis of a Chemical Substance. The analysis of any specific substance is classified with the respective host subject. For example, the analysis of Gallium is placed in "General Chemistry, Gallium: Analysis". A list



of methods of analysis is enumerated as (P) isolates in the schedule for "E3 Analytical Chemistry".

#### 324 *Synthetic Chemistry*

'E4 Synthetic Chemistry' exclusively covers the study of various methods of synthesis. The synthesis of any specific substance is classified with the respective host subject. For example, 'Peptide Synthesis' is placed in "General Chemistry, Peptides: Synthesis". Methods of synthesis are deemed to be (P) isolates in the subjects going with "E4 Synthetic Chemistry".

#### 325 *Matter Property Isolates*

A list of matter property isolates needed for classifying subjects going with the secondary (BS) of 'E Chemistry' is presented in the schedule of (1P1) isolates. In addition to this, the schedule of common Matter Property isolates (I) can also be used in classifying compound subjects going with Chemistry.

#### 326 *Energy Isolates*

A list of Energy isolates needed for classifying subjects going with "E Chemistry" and Secondary (BS) is presented. In addition to this, the schedule of Common Energy isolates can also be used for classifying the compound subjects going with E Chemistry.

#### 327 *Method Isolates*

A list of Method isolates needed for classifying subjects going with the secondary (BS) of E Chemistry, are listed in the Schedule of (P) isolates of "E3 Analytical Chemistry". The same schedule can be used as Second Round Matter Method isolates for the Energy Isolate 3 Analysis'.

#### 328 *Consultation with Specialists*

Specialists from the Indian Institute of Science, Bangalore, and the Bangalore University, in the various disciplines in Chemistry and Chemical Sciences were consulted in demarcating the scope of the secondary (BS) of subjects. The schedules presented in this paper incorporates their suggestions.

### 4 Principles Used for Arrangement

The following principles for helpful sequence have been used in the determination of the sequence of secondary (BS) and the isolate ideas respectively.

Principle	Statement	Used in the Schedule of	Characteristics
Later in Development	If the subjects or ideas in a schedule have originated at different stages of development, they may be arranged in a parallel progressive development sequence except when any other overwhelming consideration rules it out.	Secondary (BS) of E Chemistry	Stages of development
Increasing Complexity	If the subjects or ideas in a schedule have different degrees of complexity they may be arranged parallel to the sequence of increasing complexity, except when any other overwhelming consideration rules it out.	Array of Order 1 Isolate ideas in (IPI) schedule of E1 General Chemistry  Array of Order 1 isolate ideas in (IPI) schedule of E2 Physical Chemistry	Degree of complexity  Degree of Complexity
Increasing Quantity	If the subjects or isolates in a schedule admit of quantitative distinction they may be arranged according to their increasing quantity, if it is helpful.	Elements in each group in (IPI) isolates in the schedule of E1 General Chemistry	Atomic Number

Principle of	Statement	Used in the Schedule of	Characteristics
		Ring Systems in (1P1) isolates in the Schedule of E1 General Chemistry	Number of members in a ring
Canonical Sequence	If the subjects or isolates in a schedule are traditionally referred to in a specific sequence, although no underlying principle is discoverable, it will be convenient to conform to this traditional sequence	(1P1) Methods isolates in E3 Analytical Chemistry  (1MP) Property isolates of E Chemistry (1E) Action isolates in E Chemistry.	
Alphabetical Sequence	When no other sequence of the isolates in a schedule is more helpful, they may be arranged alphabetically by their names current in international usage	9A Named Reactions in (1E) Schedule of E Chemistry	Name of Reaction

### 5 Notational System Used

The notational system of CC used for assigning numbers to the isolate ideas consists of a mixed base of

- 23 Roman small letters (a . . . z, excluding i, l, and o);
- 10 Indo-Arabic numerals (0 . . . 9);
- 26 Roman capital letters (A . . . Z);
- Bracketed numbers; and
- The indicator digits . : ; " - = + → in addition to the anteriorising digits \* " ←

The digits z, 9, and Z have been used as Empty Digits. The digit 0 (zero) has been used as a rich digit. As far as possible,

originally assigned numbers to isolates are retained. Newly added isolates were accommodated using Roman small letters and Roman capitals. Compound isolates can be formed using the enumerated ones whenever needed. The digit-group \*Z can be used whenever an agglomeration of enumerated isolates is needed.

## 6 Index to Schedule

*Note.*— 1 The terms enumerated in the schedules are listed in this index. However, terms denoting ideas the number for which are indicated to be derived by a device are not included.

2 The number from the schedule given against each index entry is preceded by an abbreviation for the name of the appropriate Fundamental category—for example, (1P1), (1MP1), (1 MM1), (1E) etc.

- Absorption E, (1MP1); 47  
 E3, (1P1), 55H  
 Chromatography E3, (1P1), 23  
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 Acetal E1, (1P1), 5 SpC 74  
 Acetic acid E1, (1P1), 83C  
 Acetylation E1, (1E):8221  
 Acetylene E1, (1P1), 551  
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 Achromatic E3, (1MM1); 05  
 Acid E1, (1P1), 3  
 Acidity E, (1MP1); 1A3  
 Acridine E1, (1P1), 7V213  
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 Actinium E1, (1P1), 13B  
 Acyclic hydrocarbon E1, (1P1), 68F  
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 and ketone E1, (1P1), 5 SpC 5Z  
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 Alloxazine E1, (1P1), 7TB  
 Alloy E1, (1P1), SpC B  
 Alpha alanine E1, (1P1), 8212  
 Aluminium E1, (1P1), 131  
 Amalgamatic E, (1MP1); 42  
 Anidine E1, (1P1), 5 SpC 150H  
 Amination and deamination E1, (1E): 828  
 Amino E1, (1P1), 5 SpC 1501  
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 Peptide, and protein E1, (1P1), 81Z  
 Aminopurine E1, (1P1), 7S15  
 Ammonia E1, (1P1), 113  
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 Analytical chemistry E3  
 Androgen E1, (1P1), 8612  
 Anhydride E1, (1P1), 5 SpC 7E  
 Animal  
 alkaloid E1, (1P1), 7VK  
 protein E1, (1P1), 85K  
 Anterior pituitary hormone (APH) E1 (1P1), 8641  
 Anthracene E1, (1P1), 625  
 Anthrocyamine *iri*  
 Six-membered ring E1, (1P1), 7C31  
 Anthrocyanide E1, (1P1), 7C31  
 Antibiotics E1, (1P1), 8L  
 Antimony E1, (1P1), 155  
 Antimony compound E1, (1P1), 7M4SB  
 Americium E1, (1P1), 16E  
 Apatite E1, (1P1), a715  
 Arginine E1, (1P1), 8275  
 Argon E1, (1P1), 102  
 Aromatic E1, (1P1), 7V86  
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- Astatine E1, (1P1), 17A  
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   absorption E3, (1P1), 5S7  
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   weight E, (1MP1); 11  
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 Azetidone E1, (1P1), 7323  
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 Azulene E1, (1P1), 623
- Barium E1, (1P1), 623  
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 Benzochromen E1, (1P1), 7C36  
 Benzene E1, (1P1), 611  
 Benzenoid E1, (1P1), 61  
 Benziminazole E1, (1P1), 7824  
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 Benzofuran E1, (1P1), 7621  
 Benzoid acid E1, (1P1), 834  
 Benzo indole E1, (1P1), 755  
 Benzoporphin E1, (1P1), 7L7  
 Benzothiazole E1, (1P1), 7875  
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   Substance E1, (1P1), aE6  
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   polymerisation E, (1E): 8B36  
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   E, (1MP1): 1875  
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 Esterification E, (1E): 824  
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<b>7</b>	<b>Schedule</b>	aE44	High
<b>E</b>	<b>Chemistry</b>	aE5	<i>By Melting point</i>
		aE52	Low
		aE54	High (Refractory material)
	<b>Secondary Basic Subjects</b>		
E1	General Chemistry		
E2	Physical Chemistry	aE6	<i>By Boiling point</i>
E3	Analytical Chemistry	aE62	Low
E4	Synthetic Chemistry	aE64	High
<b>E1</b>	<b>General Chemistry</b>	aG	<i>By Electric property</i>
	Schedule of (P) Isolates	aG1	<i>By Conductivity</i>
<b>a</b>	<i>By Substance</i>	aG12	Low
	(a to d may be used only for collective treatment)	aG14	High
		aG15	Semi-conductor
	<i>By State of matter</i>	aG2	Dielectric
a1	Solid	aG22	Low
a11	Liquid	aG24	High
a15	Thin film		
a152	Gas	aQ	Radioactive
a18		aS	Labelled compound
		aU	Ion
a3	<i>By Weight</i>	aV	Radical
a32	Light	aV2	Free radical
a34	Heavy	aX	Trace element
		aY	Coordination compound
a4	<i>By Strength</i>	aY3	Chelate
a42	Low	b	Metal
a44	High	b1	Transition metals
a46	Brittle	b2	Ferrous metals
		b22	Non-ferrous metals
a5	<i>By Plasticity</i>	b3	Noble
a51	Ductile	b4	Lanthanides
a52	Malleable	b5	Actinides
a55	Tough	b6	Transuranic
a56	Rigid	b7	Non-transuranic
		b8	Nuclear
a7	<i>By Hardness</i>	c	Metalloid
a71	Moh's scale for minerals	d	Non-metal
a711	Talc		
a712	Gypsum		
a713	Calc-spar		
a714	Fluorspar		
a715	Apatite		
a716	Feldspar		
a717	Quartz		
a718	Topaz		
a7191	Sapphire		
a7192	Diamond		
aE	<i>By Thermal property</i>		
aE1	<i>By Conductivity</i>		
aE12	Low		
aE14	High		
aE4	<i>By Specific heat</i>		
aE42	Low		
		<b>I</b>	<b>Inorganic Substance</b>
			<i>Note.</i> — Against the term denoting the element, the following items of information about the element are given in parenthesis:
		1	The chemical symbol
		2	The atomic number
		3	The atomic weight
		4	Nature of the element
			<i>Abbreviations used</i>
		A	= Actinoid
		L	= Lanthanoid
		M	= Metal
		M-A	= Actinoid Metal

	M-L = Lanthanoid Metal	13C	Promethium (Pm; 61; 145; M-L)
	M-N = Metalloid,		
	N = Non-metal	14	<i>Group 4</i>
10	<i>Group 0</i>	140	Carbon (C; 6; 12; N)
		141	Silicon (Si; 14; 28; M-N)
100	Helium (He; 2; 4; N)	142	Titanium (Ti; 22; 48; M)
101	Neon (Ne; 10; 20; N)	143	Germanium (Ge; 32; 73; M)
102	Argon (Ar; 18; 40; N)	144	Zirconium (Zr; 40; 91; M)
104	Krypton (Kr; 36; 84; N)	145	Tin (Sn; 50; 119; M)
106	Xenon (Xe; 54; 131; N)	146	Cerium (Ce; 58; 140; M-L)
107	Radon (Rn; 86; 222; N)	147	Praseodymium (Pr; 59; 141; M-L)
		148	Hafnium (Hf; 72; 179; M)
11	<i>Group 1</i>	14A	Lead (Pb; 82; 297; M)
110	Hydrogen (H; 1; 1; N)	14B	Thorium (Th; 90; 232; M-A)
111	Lithium (Li; 3; 7; M)		
112	Sodium (Na; 11; 23; M)	15	<i>Group 5</i>
113	Potassium (K; 19; 39; M)	150	Nitrogen (N; 7; 14; N)
114	<i>Ammonia</i> (NH <sub>3</sub> )	151	Phosphorus (P; 15; 31; N)
115	Copper (Cu; 29; 64; M)	152	Vanadium (V; 23; 51; M)
116	Rubidium (Rb; 37; 85; M)	153	Arsenic (As; 33; 75; M-N)
117	Silver (Ag; 47; 108; M)	154	Niobium (Nb; 41; 93; M)
118	Cesium (Cs; 55; 133; M)	155	Antimony (Sb; 51; 122; M-N)
11A	Dysprosium (Dy; 66; 163; M-L)	156	Neodymium (Nd; 60; 144; M-L)
11B	Holmium (Ho; 67; 165; M-L)	157	Tantalum (Ta; 73; 181; M)
11C	Gold (Au; 79; 197; M)	158	Bismuth (Bi; 83; 209; N)
11D	Francium (Fr; 87; 223; M)	15A	Protactinium (Pa; 91; 231; M-A)
		16	<i>Group 6</i>
12	<i>Group 2</i>	160	Oxygen (O; 8; 16; N)
120	Beryllium (Be; 4; 9; M)	161	Sulphur (S; 16; 32; N)
121	Magnesium (Mg; 12; 24; M)	162	Chromium (Cr; 24; 52; M)
122	Calcium (Ca; 20; 40; M)	163	Selenium (Se; 34; 79; N)
123	Zinc (Zn; 30; 65; M)	164	Molybdenum (Mo; 42; 96; M)
124	Strontium (Sr; 38; 88; M)	165	Tellurium (Te; 52; 128; M-N)
125	Cadmium (Cd; 48; 112; M)	166	Samarium (Sm; 62; 150; M-L)
126	Barium (Ba; 56; 137; M)	167	Europium (Eu; 63; 152; M-L)
127	Erbium (Er; 68; 167; M-L)	168	Tungsten (W; 74; 184; M)
128	Thulium (Tm; 69; 169; M-L)	16A	Polonium (Po; 84; 210; N)
12A	Mercury (Hg; 80; 201; M)	16B	Uranium (U; 92; 238; M-A)
12B	Radium (Ra; 88; 226; M)	16C	Neptunium (Np; 93; 237; M-A)
		16D	Plutonium (Pu; 94; 244; M-A)
13	<i>Group 3</i>	16E	Americium (Am; 95; 243; M-A)
130	Boron (B; 5; 11; M-N)	16F	Curium (Cm; 96; 248; M-A)
131	Aluminium (Al; 13; 27; M)	16G	Berkelium (Bk; 97; 247; M-A)
132	Scandium (Sc; 21; 45; M)		
133	Gallium (Ga; 31; 70; M)		
134	Yttrium (Y; 39; 89; M)		
135	Indium (In; 49; 115; M)		
136	Lanthanum (La; 57; 139; M)		
137	Ytterbium (Yb; 70; 173; M-L)		
138	Lutecium (Lu; 71; 175; M-L)		
13A	Thallium (Tl; 81; 204; M)		
13B	Actinium (Ac; 89; 227; M)		

16H	Californium (Cf; 98; 251; M-A)	27	<i>Binary</i>
16J	Einsteinium (Es; 99; 254; M-A)		Division by full element numbers (See Rules 0c and 1127) ( <i>Illustrative</i> )
16K	Fermium (Fm; 100; 253; M-A)		
16L	Mendelevium (Md; 101; 256; M-A)	27101-612	Hydrogen sulphide
16M	Nobelium (No; 102; 253; M-A)	3	<i>Acid</i>
16P	Kurchatovium (Ku; 104; 257; M-A)		Divisions by combining full element number (See Rules 0c and 113)  ( <i>Illustrative</i> )
17	<i>Group 7</i>		
170	Fluorine (F; 9; 19; N)		
171	Chlorine (Cl; 17; 35; N)	3614	Sulphurous acid
172	Manganese (Mn; 251; 55; M)	3616	Sulphuric acid
173	Bromine (Br; 35; 80; N)		
174	Technetium (Tc; 43; 99; M)	4	<i>Salt</i>
175	Iodine (I; 53; 127; N)		Divisions by combining full element number, basic component being the first component (See Rule 114)
176	Gadolinium (Gd; 64; 157; M-L)		( <i>Illustrative</i> )
177	Terbium (Tb; 65; 159; M-L)		
178	Rhenium (Re; 75; 186; M)		
17A	Astatine (At; 85; 210; N)		
18	<i>Group 8</i>	4232-616	Zinc sulphate
181	Steel	4232-618	Zinc sulphate
182	Iron (Fe; 26; 56; M)		
183	Nickel (Ni; 28; 59; M)	5	<i>Organic substance</i>
184	Cobalt (Co; 29; 59; M)	51	<i>Aliphatic compound (Acyclic)</i>
185	Ruthenium (Ru; 44; 101; M)	51Z	<i>Saturated hydrocarbon</i>
186	Rhodium (Rh; 54; 103; M)	52	<i>Paraffin (Alkane)</i>
187	Palladium (Pd; 46; 106; M)	521	Methane
188	Osmium (Os; 76; 190; M)	522	Ethane
18A	Iridium (Ir; 77; 192; M)	523	Propane
18B	Platinum (Pt; 78; 195; M)	524	Butane
		525	Pentane
		526	Hexane
	<i>Special Components</i>	527	nth homologue
	to form Compound		
	isolates with the		
	(IN) "a" to "18B"	52Z	<i>Unsaturated hydrocarbon</i>
=B	Alloy	53	Olefine (Alkene)
=D	Isotope	532	Ethylene
=E	Isolaar (Isobar)	533	Propylene
		534	Butylene. Butene
		538	nth homologue
2	<i>Basic Oxide</i>		
	Divisions by combining	54	<i>Di-olefine</i>
	full element number	541	Allene
	(See Rules 0c and 112)	544	Butadiene
	( <i>Illustrative</i> )	545	Isoprene
24A2	Lead oxide (Yellow)		
24A4	Lead dioxide	55	<i>Acetylene series (Alkyne)</i>
2823	Ferric oxide	551	Acetylene
2828	Ferrate oxide	558	nth homologue



56	Alicyclic (Monocyclic)	622	Naphthalene
560Z	Saturated	623	Azulene
563	Cyclopropane	625	Anthracene
564	Cyclobutane	628	Phenanthrene
568	nth homologue		
569Z	Unsaturated	63	Bridged hydrocarbon
56B	Cyclobutene	64	Spiro hydrocarbon
56C	Cyclobutadiene	65	Hydrocarbon ring assembly
56E	Cyclopentene	66	Cyclic hydrocarbon with side chain
56G	Cyclopentadiene		
58	<i>Carbohydrate</i>	68	<i>Terpene hydrocarbon</i>
581	<i>Monosaccharide</i>	680Z	By Isoprene structure
5812	Diose	681	Hemi
5813	Triose	682	Mono
5814	Tetrose	683	Sesquiterpene
5815	Pentose		
5816	Hexose	683Z	By Isoprene unit
58163	Glucose	684	Diterpene
58165	Sorbose	686	Triterpene
		688	Tetraterpene
581Z	<i>Oligosaccharide</i>	688Z	Polyterpene
582	<i>Disaccharide</i>	68AZ	By Number of rings
5821	Sucrose	68B	Monocyclic
5822	Maltose	68C	Bicyclic
5823	Lactose	68F	Acyclic
583	<i>Trisaccharide</i>	7	<i>Heterocyclic compound</i>
587	<i>Polysaccharide</i>	73	3-membered ring
5875	Pentosan	731	With one hetero atom
5876	Hexosan	7311	Oxiran
58761	Cellulose	7312	Thiiran
58762	Dextrin	7313	Aziridine
58768	Starch	732	With two hetero atoms
		7321	Oxetan
588	<i>Compound carbohydrates</i>	7322	Thietan
5881	Uronide	7323	Azetidino
5882	Gum		
5883	Hemicellulose	74	4-membered ring
5885	Pectin	741	Rings two O atoms
5888	Glycoside (Glycoside)	742	Rings two S atoms
		743	Rings two N atoms
6	<i>Aromatic compound</i>	744	Rings containing one N and one O atoms
61	Benzenoid		
610Z	Saturated side chain		
611	Benzene	75	<i>5-membered ring with N</i>
612	Toluene	751	Pyrroles and hydropyrrroles
614	Ethylbenzene	7511	Pyrrrole
		7512	Pyrroline
618Z	Unsaturated side chain	7513	Pyrrolidine
6191	Styrene	752	Indoles and hydroindoles
6195	Alkylbenzene	7521	Indole
619A	Polyphenyl	7522	Indoline
619H	Stilbene	7523	Indolinone
		7524	Tetrahydroindole
62	<i>Polynuclear</i>		
621	Indene	753	Iso-indoles and iso-indoline

755	Benzo indole	786	Iso-thiazole Group
756	Carbazole	7865	Benzisothiozole
76	<i>5-membered ring with O as hetero atom</i>	787 7871 7872	Thiozole group Thiozole Thiozoline
761	Monocyclic furans and hydrofurans	7873 7874	Thiozolidine Penicillin
7611	Furan	7875	Benzothiazole
7612	Dihydrofuran	7876	Selanzole
7614	Tetrahydrofuran	793	<i>5-membered ring with 3 hetero atoms</i>
762	Coumarone and Benzofuran		
7621	Benzofuran		
7623	Coumarane	7931	Triazole
763	Iso-benzofuran	7932	Oxadiazole
765	Dibenzofuran	7933	Thiadiazole
		7934	Dioxazole
77	<i>5-membered ring with S as hetero atom</i>	7936	Oxathiazole
		794	<i>5-membered ring with 4 hetero atoms</i>
771	Monocyclic thiophenes and hydrothiophenes		
7711	Thiophene	7941	Tetrazone
7712	Dihydrothiophene	7943	Thiazone
7714	Tetrahydrothiophene	7944	Dithiadiazole
772	Thionaphthene		
774	Dibenzothiophene	7B	<i>6-membered ring with N as hetero atoms</i>
776	Selenophene		
777	Tellurophene		
78	<i>5-membered ring with two hetero atoms</i>	7B1 7B11 7B12 7B14	Pyridine group Pyridine Dihydropyridine Tetrahydropyridine (Diperideine)
781	Pyrazole group	7B17	Hexahydropyridine
7811	Pyrazole	7B18	Dipiperidyls
7812	Pyrazoline	7B2	Quinolines and isoquinolines
7813	Pyrazolidine	7B21	Quinoline
7814	Imidazole	7B23	Isoquinoline
782	Iminazole group	7B4	Acridine
7821	Iminazole	7B5	Phenanthridine
7822	Iminazoline	7B6	Benzoquinoline and benzo- isoquinoline
7823	Iminazolidine		
7824	Benziminazole	7B81 7B85	Benacridine Benzophernanthridine
783	Dioxole group		
7831	Dioxole		
7835	Dithiole	7C	<i>6-membered ring with O as hetero atom</i>
784	Isoxazole group		
7841	Isoxazole	7C1	Pyran
7842	Isoxazoline	7C12	Pyronol
7843	Isoxazolidine	7C13	Pyrone
785	Oxazole group	7C14	Dihydropyran
7851	Oxazole	7C18	Tetrahydropyran
7852	Oxazoline		
7853	Oxazolidine	7C3	Chromen

7C31	Anthrocyamine and antho- cyanide	7K1	With N common to two rings
7C32	Coumarin	7K12	Quinuclidine
7C33	Chromones	7K2	Bicyclic system with a N bridge
7C35	Fluorene		
7C36	Benzochromen	7K25	Novtropolane
7C4	Chroman		
7C41	Tocopherol	7L	<i>Dyes and pigments</i>
7C43	Catechine and other tannins	7L1	Cyanine
7C44	Flavanone	7L12	Azacyanine
7C5	Isobenzopyran	7L13	Neocyanine
7C52	Isocoumarin	7L14	Merocyanine
7C53	Isochroman	7L16	Oxanol dye
7C6	Xanthen	7L17	Styryl dye
7D	<i>6-membered ring with S as hetero atom</i>	7L2	Indigo group
		7L3	Byrrole pigment
		7L4	Monocyclic pigment
7D1	Thiapyran	7L44	Porphin
7D2	Thiachroman	7L46	Haemoglobin
7D3	Dibenzothiapyran		
		7L5	Reduced pigment
7E	Brazilin and haematoxylin	7L51	Chlorophyll
7E1	Brazilin	7L52	Cyanocobalamin
7E2	Haematoxylin		
		7L5	Azaporphin
		7L7	Benzoporphin
7F	<i>Two fused 5 or 6-membered heterocyclic ring each of one hetero atoms</i>	7M	<i>Compounds with unusual hetero atoms</i>
		7M4	5-membered ring with one hetero atom
7F1	Two hetero rings fused to an aromatic system	7M47	Halogen compound
7F11	Pyranoquinoline	7M4P	Phosphorous compound
7F13	Phenanthroline	7M4SB	Antimony compound
7F15	Dipyridonaphthalene		
		7M5	5-membered ring with more than one hetero atom
7G	<i>Compounds with two hetero rings fused through adjacent carbon atom</i>		
		7M52	P and O or N
		7M53	As and O
		7M54	As and S
7G1	Furanoquinoline		
7G2	Pyranoquinoline	7M6	6-membered ring with more than one hetero atom
7G3	Pyrolopyridine		
7G5	Naphthopyridine	7M61	Si with O, S, or N compounds
7H	<i>Fused hetero system with a N atom common to two rings</i>	7M62	P with O, or N compounds
		7M64	Sb and O compounds
		7M7	7-membered and larger rings
		7M73	Si and Sn compounds
7H1	Pyrrocoline		
7H2	Puridocoline	7N	<i>6-membered ring with two hetero atoms</i>
7H3	Julolidine		
7H4	Lilolidine	7N1	Diazine
		7N2	Pyridazine
7K	<i>Bridged ring compounds</i>	7N23	Cinnoline

7N28	Phthalazine	7V14	Tropac
7N3	Pyrimidine	7V14A	Atropine
7N4	Pyrazine	7V14H	Hyoscyamine
7N44	Quinoxaline	7V14S	Scopolamine
7N45	Phenazine		
7N5	Oxazine	7V21	Quinoline
7N51	Monocyclic	7V211	Echinopsine
		7V212	Chincona
		7V213	Acridine
7N6	Thiazine		
7N61	Homocyclic	7V3	Isoquinoline
7N62	Benzothiazine	7V41	Lupinane
7N63	Phenothiazine	7V43	Cystisine
		7V46	Iminazole
7N7	Dioxane	7V47	Quinazoline
7P	<i>Dyes from phenazine etc and S dyes</i>	7V	Diterpene and steroid group
7P1	Phenazine dyes	7V51	Diterpene
7P3	Phenothiazine dyes	7V52	Steroid
7P6	Sulphur dyes		
		7V61	Morphine
		7V62	Codeine
7Q	<i>6-membered rings with more than 2 heteroatoms</i>	7V63	Neoprine
7Q1	Triazine	7V64	Thebain
7Q2	Dioxazines and Dithiazenes	7V66	Oripavine
7Q3	Trioxane and trithion	7V67	Sinomenine
7Q4	Tetrazine		
7Q5	Pentazine	7V68	Hasabenomine
7R3	7-membered ring	7V7	Indole
7R4	8-membered ring	7V8	Erythrina group
		7V82	Lactonic
		7V86	Aromatic
7S	<i>Purines and related ring system</i>		(For collective treatment only)
7S1	Purine	7VB	Polymer
7S12	Hydroxy purine	7VB5	High polymers
7S13	Halazonopurine	7VJ	Vegetable
7S14	Mercaptopurine	7VK	Animal
7S15	Amino purine		
7S2	Thiazolopyrimidine		
7S23	Pyrazolopyrimidine	8	<i>Bio substance</i>
		81Z	<i>Amino acid, Peptide and Protein</i>
7T1	Nucleoside	82	<i>Amino acid</i>
7T2	Nucleotide	821	Mono-carboxylic monoamino acid
7T3	Nucleic acid		
7TA	Pteridine	8211	Glycine
7TB	Alloxazine	8212	Alpha alamine
7TC	Vitamin B12	8214	Serine
7TD	Vitamin B1	8215	Valine
		8216	Thiocomine
7V	<i>Alkaloid</i>	8217	Cysteine
7V11	Pyrrrolidine	8218	Leucine
7V12	Puridine and Piperidinee	821C	Methiomine
7V13	Purrolizidine		

821E	Phenyl alanine	86	<i>Hormone</i>
821G	Tyrosine	861	Steroidal
821J	Tryptophan	8612	Androgen
822	Polyamino acid	8613	Corticoid
8271	Ornithine	8615	Estrogen
8273	Lycine	8616	Progesterone
8275	Arginine		
8277	Cystine	862	Non-steroidal
828	Heterocyclic amino acid	863	Phenol derivative
8281	Proline	8631	Epinephrine
8283	Hydroxy proline	8632	Norepinephrine
8285	Histilene	8635	Thyroxine
		8636	Tri-iodo thyronine
83	<i>Fatty acid</i>		
831	Tartaric acid	864	Protein hormone
833	Citric acid	8641	Anterior pituitary hormone (APH)
834	Malic acid		
835	Lactic acid	8643	Gonadotropin
83B	Formic acid	8645	Thyroglobulin
83C	Acetic	865	Peptide hormone
83E	Stearic	8653	Insulin
83F	Oleic	8655	ACTH
83H	Benzoic	8656	Vasopression
83K	Succinic	8657	Oxytocin
		8658	Secretin
84	<i>Peptide</i>		
842	Di-peptide	87	<i>Vitamin</i> (For collective treatment only)
843	Tripeptide		
848	Poly-peptide	88	<i>Lipid</i>
		8L	<i>Antibiotics</i> (For collective treatment only)
85	<i>Protein</i>		
851	Simple		<i>Special components</i> for compound isolates to go with '5' to '8' and their subdivisions
8512	Albumin		
8513	Globulin		
8517	Histone		
8518	Collagen		
853	Conjugated	=b	Metallic compound (Collective)
8531	Haemoglobin	=d	Non-metallic compound (Collective)
8533	Erythrochromin		
8535	Nucleo protein	=12A	Mercury compound
		=14A	Lead compound
855	Derived protein	=150	<i>Nitrogen compound</i>
8552	Denatured	=1501	Amino
8555	Hydrolytic	=15031	Azo
	(85J and 85K are for collective treatment only)	=1505	Diazo
85J	Vegetable protein	=1507	Nitro
85K	Animal protein	=15071	Nitroso
85M	<i>Enzyme</i>	=150A	Cyano group
85M1	Oxidising	=150B	Cyanide
85M2	Hydrolysing	=150C	Isonitrile (Isocyanide)
85M3	Phosphorylising	=150D	Urea
85M4	Transferring	=150F	Guanidine
85M5	Isomerising	=150H	Amidine
85M6	Splitting	=150J	Urethane

=150K	Carbonyl halide	31	Solute
=150P	Cyanamide	32	Non-solute
=150S	Nitride	4	Solvent
=151	Phosphorus compound	44	Non-aqueous solvent
=161	Sulphur compound	45	Aqueous solvent
=17	<i>Halogen derivative</i>	461	Non-ionizing solvent
=170	Fluoride	462	Ionizing solvent
=171	Chloride	5	Colloid
=173	Bromide	53	Dispersed phase
=175	Iodide	54	Dispersion phase
=177	Perchloryl Groups	61	Emulsion
=5	<i>Hydroxyl</i>	64	Molten salt
=51	Alcohol		
=512	Glycol	<b>E3</b>	<b>Analytical Chemistry</b>
=52	Ether		
=53	Epoxide		<i>Schedules of (IP1)</i>
=54	Peroxide		<i>Method isolates</i>
		<b>OZ</b>	<i>By Method</i>
=5Z	<i>Aldehyde and ketone</i>	1	Physical
=6A	Aldehyde	11	Centrifugal
=6B	Ketone	12	Counter current
=7B	Ester	15	Fluid method
=7C	Hydride	152	Static
=7E	Anhydride	153	Dynamic
=7G	Hemiacetal	17	Mass spectrometry
=7H	Acetal		
=7J	Cynohydrin	2	<i>Chromatography</i>
=7K	Ketene	23	Absorption
=7M	Oxime	231	Column
=7N	Hydroxylamine	232	Thin layer
=7P	Hydroxamate	25	Partition
=7Q	Hydrazone	251	Paper
=7S	Semi-carbazone	252	Gas
=7T	Hydrazine	253	Gas liquid
		27	Ion exchange
<b>E2</b>	<b>Physical Chemistry</b>		
	<i>Schedule of (P) state of matter isolates</i>	4	<i>Thermal</i>
		41	Thermometric
		44	Differential thermal analysis
<b>OZ</b>	<i>By state of matter</i>		
11	Solid	5	<i>Radiation</i>
14	Crystal	511	Microscopy
15	Liquid	5116	Electron microscopy
17	Film (surfaces)	514	Turbidimetry
18	Gas	5141	Nephelometry
2	Solution	52	Photometry
22	Unsaturated	525	Spectrophotometry
23	Saturated	526	Flame spectrophotometry
24	Supersaturated	527	Colorimetry
2A	Buffer solution		
2B	Hypotonic	53	Refractometry
2C	Isotonic	54	Polarimetry
2D	Hypertonic	55	Spectrometry
2E	Chemical	552	Ultraviolet spectrometry
2G	Normal	553	X-ray spectrometry
2J	Gas-liquid	554	Gamma-ray spectrometry

555	Raman spectrometry	01	Reagent
556	Infra-red spectrometry	011	Inorganic
		015	Organic
55E	Emission spectrometry	01Z	Indicator
55H	Absorption spectrometry	021	Internal
55M	Atomic absorption spectrometry	025	External
		03	Adsorption
		04	Neutralisation
56	Phosphorimetry	05	Achromatic
57	Fluorimetry	06	Fluorescent
		07	Precipitant
6	<i>Electrical method</i>	08	Complexing agent
61	Conductometry	0C	Test paper
62	Potentiometry		
63	Amperometry (Coulometry)	E4	<b>Synthetic Chemistry</b>
7	<i>Magnetic method</i>		Schedule of (1P1) isolates
71	Magnetic susceptibility		<i>Note.</i> — Isolates same as those enumerated in the Schedule of (1E) isolates.
73	Electron para magnetic resonance (EPR)		
77	Nuclear magnetic resonance (NMR)	8	( <i>Illustrative</i> )
B	<i>Radiometry</i>	811	Reaction
B1	Radioactivation	821	Oxidation
B4	Tracer	82P	Acylation
B5	Isotopic dilution	8F	Phosphorylation
B6	Neutron activation	9F	Chelation
		9G	Friedel-Crafts Reaction
			Grignard Reaction
E	<i>Chemical method</i>		
E2	Oxidation reduction (Redox)		Schedules Common for the Secondary (BS) of E Chemistry.
E21	Chlorometry		
E23	Bromometry		
E25	Iodometry		
E5	Complexation (Coordination)		<i>Schedule of (1MP1) Property isolates</i>
F	<i>Instrumental</i>	0Z	<i>By Property</i>
G	<i>Biological</i>	101	Additive property
G2	Microbiological	102	Constitutive property
G5	Bioassay	106	Colligative property
H	Non-destructive	11	Atomic weight
M	Volumetry	12	Molecular weight
M1	Direct	16	Atomic number
M2	Indirect		
N	Gravimetry	16Z	<i>Stereochemistry</i>
Q	Qualitative	17	Molecular structure
R	Quantitative	171	Rearrangement
S	Spot	173	Intermolecular force
T	Micro		
U	Semimicro	186Z	<i>Polymorphism</i>
V	Macro	187	Allotropy
		1871	Monotropic
		1873	Dynamic
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1885	Metamerism	4D	Chemical Thermodynamics
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18B	Electronic	51	Optical activity
18J	Polyhedral	54	Photosensitivity
18K	Condensed polyhedral	55	Luminescence
18L	Electron-deficient	551	Fluorescence
IA	<i>PH</i>	56	Phosphorescence
IA2	Alkalinity	6	Photoelectric
IA3	Acidity	61	<i>Electrochemical property</i>
IA7	Neutral	7	Electrolytic
21	<i>Chemical combination and action</i>		Magnetochemical property
211	Law of chemical combination		Schedule of (IE)
213	Chemical kinetics	OZ	<i>Action isolates</i>
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2133	Phase rule (Phase equilibrium)	5	Preparation
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214	Chemical affinity	81	<i>Reaction</i>
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222	Covalent bond	821	Acylation
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232	Viscosity	83	<i>Substitution</i>
2321	Viscoelasticity	833	Nucleophilic
24	Transport phenomenon	835	Electrophilic
25	Surface tension	838	Retrosynthetic
27	Osmosis	84	<i>Degradation</i>
31	Solubility	842	Decylation
33	Volatility	843	Ring contraction
34	Vapour pressure	844	Decarboxylation
36	Miscibility	845	Depolymerisation
42	Amalgamatic	85	<i>Condensation</i>
43	Adsorption	851	Carboxylation
47	Absorption	854	Cyclisation (Cycloaddition)
471	Occlusion	855	Ring expansion
474	Adhesion		



8B	<i>Polymerisation</i>	8E	Binding
8B11	Mass	8F	Chelation
8B15	Bulk	8H	Catalysis
8B2	Addition		
8B21	Simple	9A	<i>Named reactions</i>
8B22	Copolymerisation		<i>Division by (AD)</i>
		9F	Friedel-Crafts reaction
		9G	Grignard reaction
8B32	Solution		Schedule of (2MM1)
8B36	Emulsion		Isolates for the (IE) 3
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8B5	Condensation		
8B6	Aromatic		
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8C	Isomerisation		Divisions same as (IP)
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	Keto-enol isomerisation		( <i>Illustrative</i> )
8C5	Optical	2	Chromatography
8C6	Double-bound shift	44	Differential thermal analysis
8C8	Molecular rearrangement	555	Raman spectral analysis

### Rules

#### 0 Definition

##### 0b Element Number

The term 'Element Number' denotes the group of digits following the initial digit "1" in the (IPI) Substance Isolate Number for "E1 General Chemistry". For example,

- 41 Silicon
- 50 Nitrogen
- 6B Uranium

##### 0c Full Element Number

The term 'Full Element Number' denotes the Element Number followed by its Valency Number. The valency of some of the elements changes for compound to compound.

For example: The valency of iron, in Ferrous Oxide ( $\text{FeO}$ ), is 2; but in Ferric Oxide ( $\text{Fe}_2\text{O}_3$ ), it is 3.

##### 112 Basic Oxide, Hydroxyl

The number of a Basic Oxide or Hydroxyl should consist successively of the digits "2" and of the appropriate Full Element Number. For convenience in classification, the treatment for a Basic Oxide and its Corresponding Hydroxyl is made the same. So, the (CN) for a Basic Oxide and its Hydroxyl will be the same. For example,

2124 Sodium monoxide. Sodium hydroxide

##### 1125 Amphoteric Oxide

The Isolate Number for an Amphoteric Oxide should be constructed as for "2 Basic Oxide". For example,

- 2313 Aluminium hydroxide
- 2553 Antimony trioxide

##### 1127 Binary Compound

The (IN) "27" is used for a Binary, other than water, which is neither Hydroxyl nor Acid nor Salt. Water is regarded as the Hydroxyl of Hydrogen

in the construction of its substance number. The number of a binary should consist successively of the digit-pair "27", the appropriate Element Number for the first constituent element and of the appropriate Full Element Number for the second constituent Element. For example,  
271062 Hydrogen Sulphide

#### 113 *Acidic Oxide, Acid*

The number of an Acidic Oxide or Acid should consist successively of the digits "3" and of the appropriate Full Element Number. For convenience in classification, the treatment for an Acidic Oxide and its corresponding Acid is made the same. So the (CN) for an Acidic Oxide and its Acid will be the same. For example,  
3614 Sulphur dioxide. Sulphurous acid  
3616 Sulphur trioxide. Sulphuric acid

#### 1135 *Neutral Oxide*

The Isolate Number for a Neutral Oxide should be constructed as for "3 Acidic Oxide".

For example,

#### 114 *Salt*

The Number of a Salt should consist successively of the digits "4" the appropriate Element Number of the first constituent element, and of the appropriate Full Element Number of the second constituent Element. For example,

423616 Zinc Sulphite  
423618 Zinc Sulphate  
423711 Zinc Chloride

#### 11A *Special Component*

At the end of the Schedule of (IP1) "I Inorganic Substance", few Special Components are given.

#### 11B *Alloy*

The Special Component Number "B" can be divided by the Metal which forms the major Component in the Alloy of a particular Metal. The (IN) for the Alloy thus got can be further divided by the Metal which forms the next major Component. This should be connected to the major Component (IN) by a "Hyphen".

For example,

b=B Alloys (General)  
115=B Copper Alloy  
115=B123 Brass (Zinc alloy of copper)  
115=B145 Bronze (Tin alloy of copper)  
115=B165-131 Aluminium bronze

#### 11D *Isotope*

The Special Component Number "D" can be divided to get the (IN) for a Specific Isotope.

For example,

a=D Isotopes (General)  
184=D Isotopes of Cobalt  
184=D1 Cobalt 57  
184=D2 Cobalt 58  
184=D4 Cobalt 60

**E2 Physical Chemistry**

E2.1 The scope of physical chemistry confines to the matter and energy changes in general.

E2.2 Books dealing with the study of states of matter in general, or properties of substance in general are placed in "E2 Physical Chemistry".

For example,

E2.5 Physical chemistry; Optical activity

E2.2 Physical chemistry, Solution

E2.3 Books dealing with energy changes of a specific substance are placed along with other studies of the substance in E1 General Chemistry for example,

E1.58;16Z General chemistry, Carbohydrates; Stereochemistry

E1.61;4B General chemistry, Transition metal complexes; Thermochemistry

**E3 Analytical Chemistry**

E3.1 The scope of Analytical Chemistry confines to the study of methods of analysis in general.

E3.2 Books dealing with the study of methods of analysis in general are placed in "E3 Analytical Chemistry".

For example,

E3.81 Analytical chemistry, Radioactive analysis

E3.85 Analytical chemistry, Complexation

E3.3 Books dealing with the analysis of specific substances is placed along with other studies of the substance in "E1 General Chemistry". For example,

E1.120;3 General chemistry, Beryllium: Analysis

E1.130;3 General chemistry, Boron: Analysis

**E4 Synthetic Chemistry**

E4.1 The scope of synthetic chemistry confines to the study of methods of synthesis in general.

E4.2 Books dealing with the study of methods of synthesis in general are placed in "E4 Synthetic chemistry". For example,

E4.816 Synthetic chemistry, Hydration

E4.8H Synthetic chemistry, Catalysis

E4.3 Books dealing with the synthesis of specific substance is placed along with other studies of the substance in "E1 General Chemistry". For example

E1.d;9G General chemistry, Non-metals: Grignard reactions

E1.84;4 General chemistry, Peptides; Synthesis

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