



## UGANDA NATIONAL EXAMINATIONS BOARD

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### LIST OF CHEMICALS AND EQUIPMENT/APPARATUS A SECONDARY SCHOOL MUST HAVE

#### **CHEMICALS**

1. Aniline (Aminobenzene)
2. Acetic acid (Ethanoic acid) (**'O' level**)
3. Acetone (Propanone) (**'O' level**)
4. Acetaldehyde (Ethanal)
5. Acetamide (Ethanamide)
6. Albumen egg powder/crystals (**'O' level**)
7. Ascorbic acid (Tablets/powder) (**'O' level**)
8. Aluminum (Foil and Powder) (**'O' level**)
9. Aluminum oxide
10. Aluminum salts (nitrate, sulphate and chloride) (**'O' level**)
11. Aluminum potassium sulphate ('O' level)
12. Alizarin
13. Amines (All the classes i.e. 1°, 2° and 3°)
14. Ammonia solution (**'O' level**)
15. Ammonium ethanedioate (oxalate)
16. Ammonium acetate (ethanoate)
17. Ammonium salts (chloride, sulphate and carbonate) (**'O' level**)
18. Ammonium dihydrogen phosphate
19. Ammonium iron (II) sulphate (**'O' level**)
20. Ammonium iron (III) sulphate (**'O' level**)
21. Ammonium hydrogen carbonate (**'O' level**)
22. Ammonium thiocyanate

23. Alcohols (All the classes i.e. 1°, 2° and 3°)
24. Barium salts (chloride, nitrate and carbonate) (**'O' level**)
25. Barium chromate
26. Barium peroxide
27. Barium diphenylamine sulphonate
- 28. Benedict's solution (**'O' level**)**
29. Benzaldehyde
30. Benzene
31. Benzoic acid
- 32. Bicarbonate indicator (**'O' level**)**
33. Borax (di-sodium tetraborate (III) – 10 water and 5 water)
- 34. Bromine (**'O' level**)**
35. 1-Bromobutane
36. 1-Bromothymol blue (water solution)
37. Brady's Reagent (2,4-dinitrophenyl hydrazine)
38. Calcium metal (**'O' level**)
- 39. Calcium carbonate powder and marble chips (**'O' level**)**
40. Calcium salts (nitrate, chloride and sulphate) (**'O' level**)
- 41. Calcium oxide (**'O' level**)**
- 42. Calcium hydroxide (**'O' level**)**
- 43. Calcium hypochlorite (**'O' level**)**
- 44. Carbon rods (graphite) (**'O' level**)**
- 45. Carbon powder (**'O' level**)**
46. Carbon tetra chloride (tetra chloromethane) (**'O' level**)
47. Chloro acetic acid
48. Chloroform (Trichloromethane)
49. Chromium potassium sulphate (chrome alum)
50. Chromium trioxide
51. Cinnamic acid
- 52. Cobalt (II) chloride (crystals and paper) (**'O' level**)**

- 53.** Cooper (Foil powder and turning) (**'O' level**)
- 54.** Cooper (II) sulphate (anhydrous and hydrated) (**'O' level**)
- 55.** Copper (II) salts (chloride, nitrate and carbonate) (**'O' level**)
- 56.** Copper (II) oxide (**'O' level**)
- 57. Copper (I) chloride and oxide
- 58. Cyclohexane
- 59. D-Comphor (**'O' level**)
- 60.** 2, 6 Dichlorophenol – indophenols (DCP1P) (**'O' level**)
- 61. Dichloroacetic acid
- 62. Dimethylglyoxime
- 63.** Diethyl ether (Ethoxyethane) (**'O' level**)
- 64. Diphenylamine (redox indicator)
- 65. Devardas alloy
- 66. Di-potassium hydrogen phosphate
- 67. Di-sodium hydrogen phosphate
- 68.** Ethanol (**'O' level**)
- 69. Enzymes (diastase, lipase, trypsin, zymase, urease, sucrase and amylase) (**'O' level**)
- 70. Fehling's solutions (No. 1 and No. 2)
- 71. Formaldehyde (Methanal)
- 72.** Glass wool (**'O' level**)
- 73. Gelatin
- 74. Glycerol
- 75. Glycerin
- 76. Hexane
- 77.** Hydrochloric acid (concentrated) (**'O' level**)
- 78.** Hydrogen peroxide (20 vol. and 100 vol.) (**'O' level**)
- 79. Iron (nails and filings) (**'O' level**)
- 80.** Iron (II) salts (chloride, sulphate and carbonate) (**'O' level**)
- 81.** Iron (III) Chloride (anhydrous and hydrated) (**'O' level**)

- 82. Iron (III) sulphate, nitrate and oxide
- 83.** Iodine solution and resublimed (**'O' level**)
- 84. Ketones (Aromatic and aliphatic)
- 85. Lithium (carbonate and nitrate)
- 86.** Litmus indicator paper – red (**'O' level**)
- 87. Litmus indicator paper – blue (**'O' level**)
- 88.** Litmus (solution and solid) (**'O' level**)
- 89.** Litmus indicator – Neutral (**'O' level**)
- 90. Lead metal (foil and shots) (**'O' level**)
- 91. Lead (II) ethanoate (Acetate)
- 92.** Lead (II) salts (Nitrate, chloride, sulphate and carbonate) (**'O' level**)
- 93.** Lead (II) oxide (**'O' level**)
- 94.** Lead (IV) oxide (**'O' level**)
- 95. Lead (II) (IV) oxide (red lead oxide) (**'O' level**)
- 96. Lead (II) iodide
- 97. Magnesium (ribbon, powder and turnings) (**'O' level**)
- 98.** Magnesium salts (chloride, sulphate, nitrate and carbonate) (**'O' level**)
- 99.** Magnesium oxide (**'O' level**)
- 100. Manganese
- 101. Manganese (IV) oxide (**'O' level**)
- 102. Manganese (II) salts (chloride, sulphate and carbonate)
- 103. Mercury (II) chloride
- 104. Methanoic acid (Formic acid)
- 105.** Methanol (**'O' level**)
- 106.** Methylated spirit (**'O' level**)
- 107.** Methyl orange indicator (**'O' level**)
- 108.** Millions' reagent (**'O' level**)
- 109. Naphthalene (**'O' level**)
- 110. Nickel
- 111. Nickel Aluminum alloy powder

- 112. Nickel (II) salts (carbonate, sulphate, nitrate and chloride)
- 113. Nitric acid (concentrated) (**'O' level**)
- 114. Nitrobenzene
- 115. 4-Nitrophenol
- 116. Oil of turpentine
- 117. Orthophosphoric acid
- 118.** Paraffin wax (**'O' level**)
- 119.** Paraffin oil (**'O' level**)
- 120. PH buffers (tables/capsules)
- 121. Phenol detached crystals
- 122.** Phenolphthalein indicator solid (**'O' level**)
- 123. Phosphorus red sticks (**'O' level**)
- 124. Phosphorus pentachloride
- 125.** Platinum wire (**'O' level**)
- 126.** Potassium metal (**'O' level**)
- 127. Potassium bromide
- 128. Potassium salts (chloride, sulphate, nitrate and carbonate) (**'O' level**)
- 129. Potassium chlorate (**'O' level**)
- 130. Potassium chromate
- 131. Potassium dichromate
- 132.** Potassium ferricyanide (**'O' level**)
- 133.** Potassium ferrous cyanide (**'O' level**)
- 134. Potassium hydrogen sulphate
- 135. Potassium hydrogen phosphate
- 136.** Potassium hydroxide (**'O' level**)
- 137. Potassium iodate
- 138.** Potassium iodide (**'O' level**)
- 139. Potassium ethandioate (oxalate)
- 140.** Potassium manganate (VII) (permanganate) (**'O' level**)
- 141. Potassium persulphate

- 142. Potassium thiocyanate
- 143.** Pyrogallol (**'O' level**)
- 144. Sand (acid washed) (**'O' level**)
- 145. Schiff's reagent
- 146.** Silica gel (for chromatography) (**'O' level**)
- 147. Silver nitrate (**'O' level**)
- 148. Sodalime
- 149. Sodium metal (**'O' level**)
- 150. Sodium ethanoate (acetate)
- 151. Sodium benzoate
- 152. Sodium bismuthate
- 153.** Sodium salts (chloride, nitrate and sulphate) (**'O' level**)
- 154.** Sodium carbonate (anhydrous and hydrated) (**'O' level**)
- 155. Sodium dichromate
- 156. Sodium chromate
- 157.** Sodium hydrogen carbonate (sodium bicarbonate) (**'O' level**)
- 158. Sodium hydrogen sulphate (**'O' level**)
- 159. Sodium hydrogen sulphite
- 160. Sodium phosphate
- 161.** Sodium citrate (**'O' level**)
- 162.** Sodium hydroxide pellets (**'O' level**)
- 163. Sodium peroxide (**'O' level**)
- 164. Sodium sulphite
- 165.** Sodium thiosulphate (**'O' level**)
- 166. Sodium nitrite (**'O' level**)
- 167.** Starch (soluble) (**'O' level**)
- 168. Stains (Methylene blue, Leishmans stain, Eosin, and phloroglucinol.)
- 169. Succinic acid (Butanedioic acid)
- 170.** Sulphur (powder and rolls) (**'O' level**)
- 171.** Sulphuric acid (concentrated) (**'O' level**)

- 172. Sudan (III) (**'O' level**)
- 173. Sugars (sucrose, lactose, maltose, fructose and glucose) (**'O' level**)
- 174. Trichloro acetic acid
- 175. Universal indicator (solution and pH chart 1.0 - 14.0 and 4.5 – 7.5)  
(**'O' level**)
- 176. Urea
- 177. Vanadium pentoxide (**'O' level**)
- 178. Xylene
- 179.** Zinc (granulated and powder) (**'O' level**)
- 180. Zinc bromide
- 181.** Zinc chloride (anhydrous) (**'O' level**)
- 182.** Zinc salts (nitrate, sulphate and carbonate) (**'O' level**)
- 183.** Zinc oxide (**'O' level**)

**END**

**NB:** An 'O' level school can stock only those indicated (**'O' level**)

An 'A' level school must stock all the above chemicals

## **APPARATUS**

### **CHEMISTRY AND BIOLOGY**

1. Burettes (50 ml)
2. Stop clocks
3. Weighing balances ( $\pm 0.1$  dp)
4. Pipettes (10 ml, 20 ml, and 25 ml)
5. Filter funnels
6. Filter papers
7. Retort stands and clamps
8. Conical flasks (250 ml)
9. Glass Beakers (50 ml, 100 ml, 150 ml, 250 ml, 600 ml, and 1000 ml )
10. Plastic beakers (150 ml and 250 ml)
11. Test tubes and test tube racks
12. Heating apparatus (Bunsen burner, kerosene stove or gas stove)
13. Crucibles and lids
14. Boiling tubes
15. Corks (Assorted sizes)
16. Gas delivery tubes (Assorted sizes)
17. Thermometers ( $-10 - 110^{\circ}$  C)
18. Volumetric flasks (250 ml) ('A' level)
19. Spatulas
20. Glass rods
21. Measuring cylinders (5 ml, 10 ml, 25 ml, 50 ml, 100 ml and 250 ml)
22. Test tube holders
23. Weighing bottles
24. Evaporating basins
25. Mortars and pestles
26. Tripod stands



27. Round bottom flasks (250 ml and 500 ml)
28. Volumetric flasks (500 ml, 1000 ml, and 2000 ml) (for teachers' use)
29. Glass beakers (1000 ml) (for teachers' use)
30. Measuring cylinders (1000 ml) (for teachers' use)
31. Droppers
32. Separating funnels
33. Watch glasses
34. Wire gauze and pipe clay triangles
35. Asbestos mats
36. Reagent bottles
37. Dissecting kits
38. Microscopes
39. Microscope slides and cover slips
40. Hand lenses
41. White tiles
42. Visking tubings
43. Rubber bungs (assorted sizes)
44. Specimen bottles
45. Petri dishes

## PHYSICS

1. Mass hangers (5g, 10g,20g,50g and 100g)
2. Ammeter (0-1.0A) and (0 - 5.0A)
3. Bunsen burners/stoves
4. Diverging/concave lens (focal length 10, 15 and 20 cm)
5. Converging/concave mirrors (focal length 10, 15 and 20cm)
6. Connecting wires (0.5m each)
7. Constantan wires (SWG, 20, 22,24,26,28 and 30) at least 2 rolls @
8. Convex/converging lens (focal length 10, 15 and 20 cm)
9. Copper calorimeters (150 ml, 300 ml and 200 ml)
10. Crocodile clips
11. Convex/Diverging mirror (focal length 10, 15 and 20cm)
12. Galvanometers (centre zero) (**'A' level**)
13. Glass blocks (rectangular 11 x 6 x 2cm)
14. Half meter rules
15. Measuring cylinders (100 ml, 250 ml, and 1000 ml)
16. Metre bridges (**'A' level**)
17. Metre rules
18. Nichrome wires (SWG 22,24, 26 and 28) 2 rolls @
19. Optical pins (at least 2 boxes)
20. Pendulum bobs
21. Plane mirrors
22. Plasticine
23. Potentiometers (**'A' level**)
24. Prisms (60" x 60" Equilateral, 50 mm x 55 mm)
25. Right angled (50 x 50 mm)
26. Retort stands and clamps
27. Rheostats (0 – 50  $\Omega$ )
28. Slot masses (5g, 10g, 20g, 50 g, 100g and 200g)

29. Spiral spring (Nuffield type) spring constant 35 – 45  $\text{NM}^{-1}$ )
30. Spring balances (1N, 2.5N and 10N)
31. Standard resistors (1, 2, 3, 5 and  $10\Omega$ )
32. Stop clocks
33. Contact switches
34. Thermometers ( $-10^{\circ}$  –  $110^{\circ}\text{C}$ )
35. Tripod stands
36. Voltmeters (0 - 3.0V) and (0- 5.0V)
37. Wire gauzes
38. Soft boards
39. Bulb holders (single and double)
40. Touch bulbs (2.5 A, 3 v)
41. Thumb pins (2 boxes)
42. Thread (knitting, sewing & nylon) (2 rolls @)
43. Jockeys (**'A' level**)
44. Cell holders (Single and double)
45. Micrometer screw gauge (**'A' level**)
46. Vernier calipers ('A' level)
47. Glass beakers (100ml, 150ml, 250ml, 500ml and 600ml)
48. Wooden blocks (Various sizes)
49. Pulleys (single & double)
50. Wedges/knife edge (short & long)
51. Magnets & plotting compass
52. Keys (contact and tapping)
53. Copper wire (SWG 20, 28, 30) (2 rolls each)
54. Capillary tubes (diameter 0.5 - 4.0 mm)
55. Test tubes, test tube racks and test tube holders
56. Lead shots
57. Calorimeter jackets
58. Stirrers (Aluminium, copper and glass)

59. Wooden corks (various sizes)
60. Glass marbles (various sizes)
61. G-clamps
62. Dry cells(1.5 V, Size D)
63. Rubber bungs (various sizes)
64. White screens
65. Screens with a hole fitted with wire gauge
66. Lens/mirror holders
67. Plastic beaker/mugs (250ml)
68. Boiling tubes
69. Burettes (50ml)

## **AGRICULTURE**

**In addition to the chemicals and the apparatus used in Chemistry, Biology and Physics laboratories, Agriculture should stock the following:**

### **(A) CHEMICALS/ MATERIALS**

1. Feed stuffs (samples of energy feeds, supplements, concentrates and bulk feeds)
2. Common fertilizers (e.g. Ammonium sulphate, Super phosphates, Sulphate of Potash etc)
3. Common pesticides
4. Common herbicides
5. Samples of common animal drugs
6. Preserved specimens of pests and parasites (e.g. intestinal worms, flukes, ticks, mites, lice, beetles, weevils, caterpillars locusts, etc)
7. Tetrazolium salt.

### **(B) EQUIPMENT/ IMPLEMENTS**

1. Common farm tools and equipment (e.g. hoes, axes, matchet, slashers, shears, sickle, rake, shovel, spade, wheel barrow etc).
2. Common farm workshop tools (e.g. planes, saws, hammers, mallet, pincers, spanners, try squares, spirit levels, oil cans etc).
3. Common crop protection equipment (e.g. sprayers, watering cans, pumps etc).
4. Common livestock protection tools (e.g. syringes and needles, drenching guns/bottles, burdizzos, trocar and cannula, ropes, nose rings, milk cans, milk strainers, strip cups etc).
5. Access to farm engines (e.g. tractor engines, water pump engines, grinding mill engines, generator engines, mowing machine engines etc)
6. Access to tractor drawn implements (e.g. disc ploughs, harrows, seeders, weeders, harvesters etc).
7. Access to animal powered implements (e.g. mould board ploughs, milling machines, winnowers etc).