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100 'this version R Walton,
110 GOSUB 1880: 'instructions
120 DIM a(8,40),a$(40),k$(31),p$(40)
130 FOR tests=1 TO 8
140 FOR   subs=1 TO 40
150         READ a(tests,subs)
160     NEXT subs
170 NEXT tests
180 FOR subs=1 TO 40
190   READ p$(subs)
200 NEXT subs
210 GOTO 960
220 PRINT CHR$(7):LOCATE 5,25:PRINT"press <space-bar> to continue."
230 hold$=INKEY$:IF hold$=" " THEN 240 ELSE 230
240 MODE 2
250 WINDOW #2,2,36,3,22 : 'used for list of tests
260 WINDOW #1,40,79,2,21: 'used for test results
270 WINDOW #3,5,79,23,25: 'used for main questions
280 CLS
290 PRINT TAB(5) "CHEMICAL ANALYSIS."
300 GOSUB 1690
310 MOVE 4,380:DRAW 290,380
320 DRAW 290,80:DRAW 4,80
330 DRAW 4,380
340 MOVE 5,50:DRAW 635,50
350 MOVE 635,54:DRAW 5,54
360 CLS#3: PRINT #3,"Which chemical do you wish to test (1 - 40): ";:PRI
NT CHR$(7):INPUT #3, j$
370 l$=LEFT$(j$,2)
380 IF l$<"0" OR l$>"9" THEN 360
390 j=VAL(LEFT$(j$,2))
400 IF j<1 OR j>40 THEN 360
410 CLS#1:PRINT #1,"Results of tests on substance";j;":"
420 PRINT#1,a$(j)
430 CLS#3:INPUT #3, "which test (1 - 8): ",i$
440 IF UPPER$(i$)="STOP" THEN 620
450 IF UPPER$(i$)="GUESS" THEN 540
460 IF UPPER$(i$)="HELP" THEN 1980
470 l$=LEFT$(i$,1)
480 IF l$<"0" OR l$>"8" THEN 430
490 i=VAL(l$)
500 IF UPPER$(i$)="GUESS" THEN 540
510 ON i GOSUB 1800,1810,1820,1830,1840,1850,1860,1870
520 LOCATE #1,1,y+1:PRINT #1, i;" ";:PRINT #1,USING "&"; k$(a(i,j))
530 GOTO 430
540 CLS #3:PRINT#3,"What is your guess? "
550 INPUT #3,f$
560 f$=UPPER$(f$)
570 IF f$=p$(j) THEN 610
580 CLS#3:PRINT#3,"Sorry --- substance ";j;" is not ";f$
590 FOR delay=1 TO 3000:NEXT
600 GOTO 430
610 CLS#3:PRINT#3,"Well done!  Substance ";j;" is ";f$:GOTO 630
620 CLS#3:PRINT #3,"Substance ";j;" is ";p$(j)
630 INPUT #3,"Do you wish to try another (y/n)? ",a$
640 a$=UPPER$(LEFT$(a$,1))
650 IF a$="Y" THEN CLS#1:GOTO 360
660 IF a$="N" THEN CLS#3: LOCATE 1,25:END
670  DATA 1,2,3,4,5,6,6,1,2,3,4,5,6,6,1,2,3,4,5,6
680  DATA 6,1,2,3,4,5,6,6,1,2,3,4,5,6,2,3,4,6,3,4
690  DATA 10,7,7,7,9,8,7,10,7,7,7,8,7,9,10,7,7,11,7,9
700  DATA 8,10,7,7,7,7,7,7,10,7,7,7,7,7,11,11,7,7,8,8
710  DATA 16,12,12,12,13,14,15,16,12,12,12,13,14,15,16,12,12,12,13,14
720  DATA 15,16,12,12,12,13,14,15,16,12,12,12,13,14,12,12,12,15,12,12
730  DATA 17,17,17,17,17,17,17,17,18,17,17,17,17,17,18,17,17,17,17,17
740  DATA 17,17,17,17,17,17,17,17,17,17,18,17,17,17,17,17,18,17,19,19
750  DATA 21,22,22,20,20,20,21,22,20,21,22,20,22,20,20,21,22,20,22,20
760  DATA 20,22,20,20,22,21,21,22,20,22,20,21,22,22,20,20,20,22,20,20
770  DATA 24,25,26,23,23,23,24,26,23,24,25,23,25,23,23,24,25,23,25,23
780  DATA 23,25,23,23,26,24,24,25,23,26,23,24,26,26,23,23,23,26,23,23
790  DATA 27,27,27,28,27,28,27,27,29,27,27,28,27,27,29,27,27,27,27,27
800  DATA 28,27,28,28,27,27,27,27,28,27,29,27,27,27,27,27,29,27,27,27
810  DATA 30,30,30,30,31,30,30,30,30,30,30,30,30,31,30,30,30,31,30,31
820  DATA 30,30,30,30,30,30,30,30,30,30,30,30,30,30,31,31,30,30,30,30
830  DATA AMMONIUM CHLORIDE,LITHIUM BROMIDE,SODIUM IODIDE
840  DATA POTASSIUM SULPHATE,COPPER NITRATE,IRON (II) SULPHATE
850  DATA IRON (III) CHLORIDE,AMMONIUM IODIDE,LITHIUM CARBONATE
860  DATA SODIUM CHLORIDE,POTASSIUM BROMIDE,COPPER SULPHATE
870  DATA IRON (II) BROMIDE,IRON (III) NITRATE,AMMONIUM CARBONATE
880  DATA LITHIUM CHLORIDE,SODIUM BROMIDE,POTASSIUM NITRATE
890  DATA COPPER BROMIDE,IRON (II) NITRATE,IRON (III) SULPHATE
900  DATA AMMONIUM BROMIDE,LITHIUM SULPHATE,SODIUM SULPHATE
910  DATA POTASSIUM IODIDE,COPPER CHLORIDE,IRON (II) CHLORIDE
920  DATA IRON (III) BROMIDE,AMMONIUM SULPHATE,LITHIUM IODIDE
930  DATA SODIUM CARBONATE,POTASSIUM CHLORIDE,COPPER IODIDE
940  DATA IRON (II) IODIDE,LITHIUM NITRATE,SODIUM NITRATE
950  DATA POTASSIUM CARBONATE,IRON (III) IODIDE,SODIUM SULPHITE,POTASSIU
M SULPHITE
960 k$(1)="no definite colour"
970 k$(2)="crimson colour"
980 k$(3)="persistent yellow colour"
990 k$(4)="lilac colour"
1000 k$(5)="apple-green colour"
1010 k$(6)="yellow sparks produced"
1020 k$(7)="no apparent change"
1030 k$(8)="acidic gas evolved"
1040 k$(9)="brown gas evolved"
1050 k$(10)="white solid forms on cool sides of      test-tube"
1060 k$(11)="colourless gas evolved which            relights a glowing
splint"
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1070 k$(12)=k$(7)
1080 k$(13)="pale blue precipitate"
1090 k$(14)="dirty-green precipitate"
1100 k$(15)="reddish-brown precipitate"
1110 k$(16)="alkaline gas evolved on warming"
1120 k$(17)=k$(7)
1130 k$(18)="acidic gas evolved, turning              limewater chalky"

1140 k$(19)="acidic gas evolved on warming,       decolourising potassiu
m manganate (VII)"
1150 k$(20)=k$(7)
1160 k$(21)="white precipitate, turning grey"
1170 k$(22)="yellow precipitate"
1180 k$(23)=k$(7)
1190 k$(24)="precipitate dissolves in dilute ammonia"
1200 k$(25)="precipitate dissolves in                  concentrated ammoni
a"
1210 k$(26)="precipitate does not dissolve."
1220 k$(27)=k$(7)
1230 k$(28)="heavy white precipitate"
1240 k$(29)="light fluffy precipitate"
1250 k$(30)="no ammonia produced"
1260 k$(31)="ammonia produced"
1270 a$(0)=",soluble in water"
1280 a$(1)="white solid"+a$(0)
1290 a$(2)=a$(1)
1300 a$(3)="white crystalline solid"+a$(0)
1310 a$(4)=a$(3)
1320 a$(5)="blue crystalline solid"+a$(0)
1330 a$(6)="pale-green crystalline solid"+a$(0)
1340 a$(7)="yellow solid"+a$(0)
1350 a$(8)=a$(1)
1360 a$(9)=a$(1)
1370 a$(10)=a$(3)
1380 a$(11)=a$(3)
1390 a$(12)=a$(5)
1400 a$(13)="pale-green solid"+a$(0)
1410 a$(14)="pale-brown crystalline solid"+a$(0)
1420 a$(15)=a$(1)
1430 a$(16)=a$(1)
1440 a$(17)=a$(3)
1450 a$(18)=a$(3)
1460 a$(19)="light-fawn solid"
1470 a$(20)=a$(6)
1480 a$(21)=a$(14)
1490 a$(22)=a$(1)
1500 a$(23)=a$(1)
1510 a$(24)=a$(3)
1520 a$(25)=a$(3)
1530 a$(26)="blue-green solid"+a$(0)
1540 a$(27)=a$(13)
1550 a$(28)="pale-brown solid"+a$(0)
1560 a$(29)=a$(3)
1570 a$(30)=a$(1)
1580 a$(31)=a$(1)
1590 a$(32)=a$(1)
1600 a$(33)=a$(19)
1610 a$(34)=a$(13)
1620 a$(35)=a$(1)
1630 a$(36)=a$(1)
1640 a$(37)=a$(1)
1650 a$(38)=a$(28)
1660 a$(39)=a$(3)
1670 a$(40)=a$(3)
1680 GOTO 220
1690 PRINT#2,"The tests available are:":PRINT#2
1700 PRINT#2,"1. flame test
1710 PRINT#2,"2. action of heat on solid"
1720 PRINT#2,"3. action of NaOH on solution"
1730 PRINT#2,"4. action of dilute hydrochloric       acid on solution"

1740 PRINT#2,"5. action of dilute nitric acid and    silver nitrate on so
lution"
1750 PRINT#2,"6. action of ammonia solution          after test 5"
1760 PRINT#2,"7. action of dilute hydrochloric       acid and barium chlo
ride on        solution"
1770 PRINT#2,"8. heat with Devarda's alloy and        sodium hydroxide"
1780 PRINT#2:PRINT#2,"    (GUESS / STOP / HELP)"
1790 RETURN
1800 y=3:RETURN
1810 y=5:RETURN
1820 y=7:RETURN
1830 y=9:RETURN
1840 y=11:RETURN
1850 y=13:RETURN
1860 y=15:RETURN
1870 y=17:RETURN
1880 CLS:MODE 1:PRINT TAB(10)"CHEMICAL ANALYSIS."
1890 PRINT:PRINT"The object of this program is to try"
1900 PRINT:PRINT"to identify some salts by carrying"
1910 PRINT:PRINT"out simple tests on them."
1920 PRINT:PRINT:PRINT
1930 PRINT  "When you think you know the answer,"
1940 PRINT: PRINT  "type:       GUESS       as your choice."
1950 PRINT:PRINT:PRINT"If you want to quit the program,"
1960 PRINT:PRINT  "type:       STOP        as your choice."
1970 RETURN
1980 CLS #3
1990 INPUT #3,"HELP with which test (1 to 8) ",tests$
2000 tests=VAL(tests$):IF tests<1 OR tests>8 THEN 1980
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