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AUTHOR Gallardo, Julio; Delgado, Steven  
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ABSTRACT

This document provides computer programs, written in BASIC PLUS, for presenting fundamental or remedial college chemistry students with chemical problems in a computer assisted instructional program. Programs include instructions, a sample run, and 14 separate practice sessions covering: mathematical operations, using decimals, solving proportions, metric conversion, using metric, word problems, balancing chemical equations, stoichiometry, gas laws, and solutions.  
 (SL)

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\*COMMENTS\*  
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I - ALL PROGRAMS IN THIS PACKAGE ARE TO BE USED BY ANY STUDENT TAKING A FUNDAMENTALS OR REMEDIAL COURSE IN CHEMISTRY

II - ALL TERMINALS SHOULD BE SET WITH THE FOLLOWING CHARACTERISTICS USING THE 'TTYSET' COMMANDS:

- A - WIDTH 81
- B - LC OUTPUT

III - ALL PROBLEMS HAVE BEEN WRITTEN IN BASIC PLUS LANGUAGE. THESE PROGRAMS CANNOT BE RUN ON A COMPUTER THAT DOESN'T HAVE A BASIC PLUS COMPILER. IT SHOULD BE NOTED THAT IN ALMOST ALL CASES, ANY DATA GIVEN IS RANDOMIZED. THEREFORE NO TWO RUNS OF THE SAME PROGRAM WILL CONTAIN THE SAME DATA.

IV - EACH PROGRAM, WHEN RUN, WILL PRINT 'CODE #?'. THIS IS FOR THE INSTRUCTORS USE ONLY. THE POSSIBLE RESPONSES TO THIS ARE:

A - PRESS #1 FOLLOWED BY <CR>; THIS WILL CAUSE THE COMPUTER TO PRINT OUT JUST THE PROBLEMS CONTAINED WITHIN THE PROGRAM. THIS MEANS THAT THE COMPUTER WILL NOT WAIT FOR THE STUDENT'S ANSWER. FOLLOWING THE PROBLEMS THE CORRECT ANSWERS WILL BE PRINTED OUT. THIS IS INTENDED FOR THE INSTRUCTORS USE ONLY. OUR AIM WAS THAT THESE QUESTIONS COULD BE USED AS A TEST OR HOMEWORK ASSIGNMENTS.

B - WHEN ANY OTHER CHARACTER IS PRESSED FOLLOWED BY THE <CR> ALL PROGRAMS WILL FOLLOW THE SAME PATTERN. THAT IS, IT WILL ASK FOR THE STUDENT'S NAME AND ID# BEFORE PROCEEDING TO THE PROBLEMS THEMSELVES. THE PROGRAM WILL NOW BE IN A 'PRACTICE SESSION' MODE (SEE V).

V - PRACTICE SESSION MODE

A - WHEN THE PROGRAM IS RUN IN THIS MODE THE STUDENT WILL BE ASKED TO SOLVE A SET OF PROBLEMS.



- B - THERE IS NO SET TIME LIMIT FOR THE STUDENT TO COMPLETE THE SESSION OR TO SOLVE THE PROBLEMS. HOWEVER, THE STUDENTS ARE GIVEN TWO CHANCES TO ANSWER A QUESTION CORRECTLY. AFTER THE SECOND INCORRECT ANSWER THE COMPUTER WILL PRINT OUT THE CORRECT NUMERICAL ANSWER BUT WILL NOT SHOW THE STEPS USED TO ARRIVE AT THAT ANSWER
- C - THE COMPUTER WILL KEEP A RECORD OF ALL CORRECT ANSWERS BUT WILL NOT INDICATE IF THE CORRECT ANSWER WAS OBTAINED IN THE FIRST OR SECOND TRY.
- D - AT THE END OF A SESSION THE COMPUTER WILL PRINT OUT ALL OF THE CORRECT ANSWERS AND THE STUDENT ANSWERS.

VI - WHEN WE STARTED THIS TASK OF WRITING PROGRAMS TO BE USED AS PRACTICE SESSIONS BY THE STUDENTS IN SEPT. 1976, WE DID NOT HAVE ANY KNOWLEDGE OF COMPUTER PROGRAMMING.

THIS CAN BE SEEN IN THE PROGRAMS THEMSELVES, THAT HAVE A LOW DEGREE OF SOPHISTICATION. AS TIME PROGRESSED, AND WE LEARNED MORE TECHNIQUES IN PROGRAMMING, THE SOPHISTICATION OF THE PROGRAMS INCREASED, ALTHOUGH WE THOUGHT THAT THE STRUCTURE OF THE PROGRAMS SHOULD BE KEPT STRAIGHT FORWARD AND SIMPLE ENOUGH SO ANYBODY WITH SOME KNOWLEDGE OF BASIC PLUS LANGUAGE COULD FOLLOW WHAT WAS DONE. OUR AIM WAS TO LEARN ENOUGH COMPUTING KNOWLEDGE TO BE ABLE TO DEVELOPE PROGRAMS THAT STUDENTS COULD BENEFIT FROM

VII - FINAL COMMENTS:

THIS PACKAGE WAS DEVELOPED BY DR. JULIO GALLARDO AND MR. STEVEN DELGADO OF THE PHYSICAL SCIENCE DEPT. OF HOSTOS COMMUNITY COLLEGE OF C.U.N.Y.

IN OUR LAST EDITING WE HAVE TRIED TO ERASE ALL MISTAKES, BUT AS USUALLY HAPPENS, MANY OF THEM MAY HAVE ESCAPED OUR SCRUTINY.

ANY COMMENTS, SUGGESTIONS OR CORRECTIONS THAT YOU MAY HAVE ABOUT THIS PACKAGE MAY BE SENT TO:

DR. JULIO GALLARDO  
OR  
MR. STEVEN DELGADO  
PHYSICAL SCIENCE DEPT.  
HOSTOS COMMUNITY COLLEGE  
475 GRAND CONCOURSE  
BRONX, NEW YORK 10451

FINALLY WE WOULD LIKE TO THANK DR. A. MURIEL FOR GIVING US THE  
CHANCE TO BE PARTICIPANTS IN THIS PROJECT.

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FILE NAME  
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DESCRIPTION  
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INST \*\*\*\*\* INSTRUCTIONS FOR USING ALL PROGRAMS  
 IN THIS PACKAGE. FROM HERE A STUDENT  
 CAN CHOOSE ANY TOPIC HE WISHES TO DO.

CHE008 \*\*\*\*\* A PRACTICE SESSION USING INTERGERS  
 WITH VARIOUS MATHEMATICAL OPERATIONS  
 (ADD., SUB., MULT., AND DIV.). THIS  
 SESSION CONSISTS OF 12 PROBLEMS.

CHE108 \*\*\*\*\* A PRACTICE SESSION USING DECIMALS  
 WITH VARIOUS MATHEMATICAL OPERATIONS.  
 THIS SESSION HAS 15 PROBLEMS.

CHE208 \*\*\*\*\* A PRACTICE SESSION IN SOLVING PROPOR-  
 TIONS AND PERCENTAGE PROBLEMS. THIS  
 SESSION HAS 16 PROBLEMS.

CHE308 \*\*\*\*\* A PRACTICE SESSION IN CONVERTING FROM  
 THE METRIC SYSTEM TO THE ENGLISH SYS-  
 TEM AND VISA VERSA. THIS SESSION HAS  
 15 PROBLEMS.

CHE408 \*\*\*\*\* A PRACTICE SESSION USING THE METRIC  
 SYSTEM IN WORD PROBLEMS. THIS SESS-  
 ION HAS 10 QUESTIONS.

CHE508 \*\*\*\*\* A PRACTICE SESSION ON WORD PROBLEMS,  
 USING ALL OF THE ABOVE INFORMATION.  
 HERE A STUDENT CAN CHOOSE THE NUMBER  
 OF PROBLEMS HE WISHES TO DO. THIS  
 SESSION HAS 14 QUESTIONS.

CHE608 \*\*\*\*\* THESE ARE THE INSTRUCTIONS TO BE USED  
 BEFORE THE STUDENT ANSWERS THE QUEST-  
 IONS ON BALANCING CHEMICAL EQUATIONS.  
 THIS PROGRAM RANDOMLY CHAINS TO ANY  
 ONE OF 4 PROGRAMS ON BALANCING EQUAT-  
 IONS (EQUAT 2, 3, 4 OR 5).

EQUAT 2-5 \*\*\*\*\* THESE ARE THE PROGRAMS CHAINED TO CHE  
 608. THEY EACH HAVE 10 DIFFERENT EQUA-  
 TIONS. THEY CAN EACH RUN ON AN IN-  
 DIVIDUAL BASIS BUT ARE NOT CHAINED TO  
 THE 'INST' FILE.



FILE NAME  
\*\*\*\*\*

DESCRIPTION  
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CHE708 \*\*\*\*\* A PRACTICE SESSION ON STOICHIOMETRY, ASKING THE STUDENT TO ANSWER 5 QUESTIONS WHICH HAVE A LOW DEGREE OF DIFFICULTY. FROM HERE THE STUDENT CAN CHOOSE TO CONTINUE TO 10 MORE QUESTIONS (CHE718) WHICH ARE OF GREATER DIFFICULTY, OR END THE SESSION.

CHE718 \*\*\*\*\* THIS IS A CONTINUATION OF CHE708 BUT WITH HARDER PROBLEMS. THIS PROGRAM CAN RUN ON ITS OWN BUT IS NOT CHAINED TO THE 'INST' FILE.

CHE808 \*\*\*\*\* A PRACTICE SESSION ON THE GAS LAWS, CONTAINING 15 QUESTIONS OF MODERATE DIFFICULTY. THE STUDENT CAN CHOOSE TO DO 5, 10 OR ALL 15 PROBLEMS.

CHE908 \*\*\*\*\* A PRACTICE SESSION ON SOLUTIONS, CONSISTING OF 15 QUESTIONS DEALING WITH MOLALITY AND PERCENT SOLUTION. THE STUDENT CAN CHOOSE TO DO 5, 10 OR ALL 15 PROBLEMS.

CHE018 \*\*\*\*\* A PRACTICE SESSION ON SOLUTIONS (II), CONSISTING OF 15 QUESTIONS, DEALING WITH NORMALITY AND MOLARITY. THE STUDENT CAN CHOOSE 5, 10 OR ALL 15 QUESTIONS TO ANSWER.

CHE028 \*\*\*\*\* A PRACTICE SESSION ON THE GAS LAWS (II), CONSISTING OF 15 QUESTIONS OF GREATER DIFFICULTY THEN CHE808. A STUDENT CAN CHOOSE 5, 10 OR 15 QUESTIONS OR CAN GO ON TO AN ADDITIONAL 5, 10 OR 15 QUESTIONS IN CHE038.

CHE038 \*\*\*\*\* THIS IS A CONTINUATION OF CHE028. THIS PROGRAM IS CHAINED TO CHE028. EACH OF THESE PROGRAMS ARE GEARED TO THE GENERAL CHEMISTRY STUDENT, BUT MAY BE USED BY THE STUDENT TAKING A FUNDAMENTALS OF CHEMISTRY COURSE. THIS PROGRAM IS NOT CHAINED TO THE 'INST' FILE.

SAMPLE \*\*\*\*\* THIS IS A SAMPLE RUN OF CHE508. IT WILL SHOW HOW THE PROGRAM WILL RUN AND ALSO HOW IT CAN FUNCTION AS A SAMPLE TEST FOR THE INSTRUCTOR TO USE.



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INST 10:13 18-APR-77
5 REM - THIS PROGRAM SHOULD RUN WITH THE TERMINAL SET AT "WIDTH 81".
10 ! THIS PROGRAM PRINTS INSTRUCTIONS.
15 ! THIS PROGRAM HAS BEEN PREPARED BY DR. JULIO GALLARDO AND MR. STEVEN
16 ! DELGADO OF THE PHYSICAL SCIENCE DEPT. OF HOSTOS COMMUNITY COLLEGE, AND IS
17 ! BEING SUBSIDIZED BY A GRANT FROM THE NATIONAL SCIENCE FOUNDATION.*****
19 PRINT\PRINT\PRINT
50 PRINT "THE FOLLOWING PRACTICE SESSIONS HAVE BEEN PREPARED FOR YOUR USE. BE-"
51 PRINT "FORE YOU START, PLEASE READ ALL INSTRUCTIONS CAREFULLY. MAKE SURE"
52 PRINT "THAT YOU UNDERSTAND THEM COMPLETELY BEFORE YOU ATTEMPT TO SOLVE ANY"
53 PRINT "OF THE PROBLEMS THAT WILL BE PRESENTED. IF IN DOUBT, ASK THE INSTRUCC-"
54 PRINT "TOR FOR ASSISTANCE." \PRINT\PRINT
60 SLEEP 25
65 PRINT "THE COMPUTER WILL PRINT PROBLEMS OR QUESTIONS ONE AT A TIME, AND IT"
66 PRINT "WILL WAIT FOR YOUR ANSWER BEFORE PROCEEDING. YOU WILL BE ALLOWED TWO"
67 PRINT "CHANCES TO COME UP WITH THE CORRECT ANSWER. IF YOU GIVE AN INCORRECT"
68 PRINT "ANSWER, THE COMPUTER WILL TELL YOU SO, AND WILL PRINT THE SAME PROB-"
69 PRINT "LEM AGAIN. IF YOU ANSWER INCORRECTLY A SECOND TIME THE COMPUTER WILL"
70 PRINT "PRINT THE CORRECT ANSWER AND WILL PROCEED TO THE NEXT PROBLEM. OF"
71 PRINT "COURSE IF YOUR FIRST ANSWER IS CORRECT THEN THE COMPUTER WILL AUTO-"
72 PRINT "MATICALLY PROCEED TO THE NEXT PROBLEM." \PRINT
73 PRINT "*****IN CASE OF AN INCORRECT ANSWER WE SUGGEST THAT YOU CHECK YOUR"
74 PRINT "CALCULATIONS FOR MISTAKES IN YOUR OPERATIONS. ALSO CHECK THAT THE"
75 PRINT "NUMBERS YOU HAVE ARE THE SAME AS THOSE GIVEN BY THE COMPUTER."
76 PRINT\PRINT
85 PRINT "*****IT IS BELIEVED THAT THESE EXERCISES WILL HELP TO IMPROVE YOUR"
86 PRINT "SKILLS AND ALSO IMPROVE YOUR GRADES. REMEMBER THAT THESE ARE PRACTICE"
87 PRINT "SESSIONS AND ARE NOT EXAMS, THEREFORE, YOU WILL NOT RECEIVE ANY"
88 PRINT "GRADE. THEY WILL TELL YOU WHAT YOUR WEAK AREAS ARE AND WILL HELP YOU"
89 PRINT "TO IMPROVE THEM." \PRINT\PRINT
95 PRINT "*****YOU WILL NOT BE ALLOWED TO USE CALCULATORS DURING THESE PRACTICE"
96 PRINT "SESSIONS. PAPER WILL BE PROVIDED FOR YOU TO DO ALL NECESSARY CALCU-"
97 PRINT "LATIONS. THIS PAPER(S) SHOULD BE HANDED IN AT THE END OF THE SESSION"
98 PRINT "SO THAT YOUR INSTRUCTOR CAN CHECK ON YOUR PROGRESS OR IMPROVEMENT AND"
99 PRINT "MAKE POSSIBLE SUGGESTIONS AS TO THE NEXT STEPS YOU SHOULD FOLLOW."
100 PRINT\PRINT\PRINT
110 SLEEP 35
120 PRINT "HERE ARE SOME HELPFUL HINTS, THAT WILL ENABLE YOU TO OPERATE THE"
121 PRINT "COMPUTER WITH A MINIMUM OF DIFFICULTY." \PRINT\PRINT
122 PRINT "1-**DO NOT TYPE IN ANY INFORMATION THAT THE COMPUTER DOESN'T ASK FOR."
123 PRINT\PRINT
125 PRINT "2-**WHEN TYPING THE INFORMATION REQUESTED BY THE COMPUTER, DO IT"
126 PRINT "SLOWLY. IF YOU DO NOT KNOW HOW TO TYPE, JUST PRESS LIGHTLY ON THE"
127 PRINT "KEY(S) THAT YOU WANT, ONE BY ONE." \PRINT\PRINT
130 PRINT "3-**AFTER YOU TYPE IN THE INFORMATION REQUESTED OR YOUR ANSWERS TO"
131 PRINT "THE PROBLEMS, ALWAYS PRESS THE <RETURN> KEY. THIS WAY THE COMPUTER"
132 PRINT "KNOWS THAT YOU HAVE FINISHED ANSWERING." \PRINT\PRINT
134 PRINT "4-**ALWAYS ROUND OFF YOUR ANSWERS TO THE SECOND DECIMAL (EXCEPT IF"
135 PRINT "YOU ARE PRACTICING WITH INTEGERS, WHERE NO DECIMALS ARE REQUIRED)."
136 PRINT\PRINT
137 PRINT "***** EXAMPLE:" \PRINT
138 PRINT TAB(18)"IF YOUR ANSWER IS 15.4526 THEN TYPE 15.46 " \PRINT
139 PRINT TAB(18)"IF YOUR ANSWER IS 12.002 THEN TYPE 12.01 " \PRINT
140 PRINT TAB(18)"IF YOUR ANSWER IS 0.0001 THEN TYPE 0.00 " \PRINT
141 PRINT\PRINT
145 PRINT "THE FOLLOWING TOPICS ARE READY FOR YOUR USE:" \PRINT\PRINT
146 PRINT TAB (37)"TOPICS"
147 PRINT TAB(37)"*****"
149 PRINT\PRINT
150 PRINT TAB(0)"1- INTEGERS" TAB(40)"7- METRIC SYSTEM II" \PRINT
151 PRINT TAB(0)"2- DECIMALS" TAB(40)"8- STOICHIOMETRY" \PRINT
152 PRINT TAB(0)"3- PROPORTIONS & DECIMALS" TAB(40)"9- GAS LAWS I" \PRINT

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153 PRINT TAB(0)"4- WORD PROBLEMS";TAB(40)"10-SOLUTIONS I"\PRINT
154 PRINT TAB(0)"5- BALANCING EQUATIONS";TAB(40)"11- SOLUTIONS II"\PRINT
155 PRINT TAB(0)"6- METRIC SYSTEM I";TAB(40)"12- GAS LAWS II"\PRINT\PRINT\PRINT
160 PRINT "CHOOSE THE PRACTICE SESSION THAT YOU WANT BY TYPING THE TOPIC NUMBER"
161 PRINT "AFTER THE QUESTION MARK (?):*****"
162 PRINT
165 INPUT "WHICH TOPIC NUMBER WOULD YOU LIKE: "N
170 IF N=1 THEN CHAIN"CHE008" ELSE IF N=2 THEN CHAIN"CHE108" ELSE IF N=3 THEN CHA
IN"CHE208" ELSE IF N=4 THEN CHAIN"CHE508" ELSE IF N=5 THEN CHAIN"CHE608"
175 IF N=6 THEN CHAIN"CHE308" ELSE IF N=7 THEN CHAIN"CHE408" ELSE IF N=8 THEN CH
AIN"CHE708" ELSE IF N=9 THEN CHAIN "CHE808" ELSE IF N=10 THEN CHAIN"CHE908"
180 IF N=11 THEN CHAIN"CHE018" ELSE IF N=12 THEN CHAIN"CHE028"
200 END
```



1 REM - THIS IS A PROGRAM USED TO PRACTICE VARIOUS MATHEMATICAL OPERATIONS WITH I  
 NTEGERs.

2 THIS PROGRAM WAS DEVELOPED BY DR. JULIO GALLARDO, OF HOSTOS COMMUNITY COLLEGE  
 E, PHYSICAL SCIENCE DEPT., AND WAS SUBSIDIZED BY A GRANT FROM THE NATIONAL SCIENCE  
 E FOUNDATION.....

4 DIM A(15),B(15)

5 INPUT "CODE # "; M%

6 IF M% = 1 THEN 50

9 PRINTPRINT

10 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME. "; A1\$

11 PRINT

12 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER. "; A2\$

13 PRINT

14 PRINT " YOUR NAME IS, " A1\$ ", AND YOUR SOCIAL SECURITY NUMBER IS,

15 PRINT

16 PRINT A2\$ ". ARE THEY CORRECT? TYPE 'Y' FOR YES OR 'N' FOR NO. "

18 INPUT A3\$PRINT

19 IF A3\$ = "Y" THEN 50

20 IF A3\$ = "N" THEN 10 ELSE PRINT " USE 'Y' OR 'N' ONLY!!!!!"PRINT

21 GO TO 10

50 FOR Z = 1 TO 12

62 IF Y > Z1 THEN 3000

55 RANDOMIZE

56 R1=RND(Z)+1\R2=RND(Z)+1\R3=RND(Z)+1\R4=RND(Z)+1

57 X1=INT(R1\*125)\X2=INT(R2\*225)\X3=INT(R3\*175)\X4=INT(R4\*325)

58 X5=X1+X2\X6=X1+X2+X3\X7=X1+X2+X3+X4\X8=X1\*X2\X9=X1\*X2\*X3

59 Y1=X1\*X2\*X3\*X4\Y2=X5\*X6

60 M9%=0PRINTPRINT

61 M9%=M9%+1\FOR H%= 10% TO 25%\IF M9%>2% THEN 65 ELSE PRINT TAB(H%); "\*"NEXT H

62 PRINT TAB(25); "\*" \IF M9%=2 THEN 65 ELSE PRINT TAB(10%); "\*"TAB(14%); "FROBLEN";

PRINT Z;PRINT TAB(26%); "\*"GOTO 61

65 C1=0

65 C1=0PRINT

70 PRINT

100 IF Z=1 THEN PRINT X1+"X2"=" \A(1)=X1+X2

105 IF Z = 2 THEN PRINT X1+"X2"+"X3"=" \A(2)=X1+X2+X3

110 IF Z = 3 THEN PRINT X5+"X1"=" \A(3)=X5-X1

115 IF Z = 4 THEN PRINT X5+"X1"=" \A(4)=X5-X1

120 IF Z = 5 THEN PRINT X5+"X3"+"X1"+"X2"=" \A(5)=X5 +X6-X1-X2

125 IF Z = 6 THEN PRINT X8+"X5"+"X5"=" \A(6)=X6+X5+X6

130 IF Z = 7 THEN PRINT X1\*X"X2"=" \A(7)=X1X2

135 IF Z = 8 THEN PRINT X1\*X"X2"X"X3"=" \A(8)=X1X2X3

140 IF Z = 9 THEN PRINT X8/Y"X1"=" \A(9)=X8/Y1

145 IF Z = 10 THEN PRINT X8/Y"X2"=" \A(10)=X8/Y2

150 IF Z = 11 THEN PRINT "A" X1\*X1X2X3) "X9 \A(11)=(X1X2X3)/X9

155 IF Z = 12 THEN PRINT "A" X6(X12)/A(X1X2X3) " \A(12)=(X6Y2)/(X1X2X3)

PRINT

PRINT

PRINT " IS YOUR ANSWER 13 ----- "A(13)

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$

PRINT " CORRECT!! " A1\$







1 REM THIS IS A PRACTICE SESSION IN DECIMALS.  
2 THIS PROGRAM WAS DEVELOPED BY DR. JULIO GALLARDO OF HOSTOS COMMUNITY COLLEGE,  
AND WAS SUBSIDIZED BY A GRANT FROM THE NATIONAL SCIENCE FOUNDATION.

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3 DIM A(20),B(20)
4 INPUT "CODE # " ; N1% \PRINT \PRINT \PRINT
5 IF N1% = 1 THEN 49
6 PRINT
7 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME, " ; A1$
8 PRINT
9 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER, " ; A2$
10 PRINT
11 PRINT " YOUR NAME IS, " ; A1$ , " AND YOUR SOCIAL SECURITY NUMBER IS, " ; A2$
12 PRINT " ARE THEY CORRECT? TYPE 'Y' FOR YES AND 'N' FOR NO, " ;
13 INPUT A3$
14 IF A3$ = "N" THEN 9
15 IF A3$ <> "Y" THEN PRINT \PRINT " TYPE 'Y' OR 'N' ONLY!!!! " \PRINT \GOTO 20
16 PRINT
17 FOR Z = 1 TO 15
18 RANDOMIZE
19 R1=RND(Z)+1 \R2=RND(0)+1 \R3=RND(1)+1 \R4=RND(0)+1
20 X1=(INT(R1*1235))/10 \X2=(INT(R2*888))/10
21 X3=(INT(R3*125))/100 \X4=(INT(R4*225))/100
22 X5=(INT(R1*175))/1000 \X6=(INT(R2*455))/1000
23 X7=(INT(R3*7777))/1000000 \X8=(INT(R4*8545))/100000
24 Y1=X1+X2 \Y2=X1+X2+X3 \Y3=X3*X4 \Y4=X4*X5
25 Y5=X7*X8
26 M% = 0 \PRINT \PRINT
27 M% = M% + 1 \FOR H% = 15% TO 30% \IF M% > 2 THEN 75 ELSE PRINT TAB(H%) "X" \NEXT H%
28 PRINT TAB(31%) "X" \IF M% = 2% THEN 75 ELSE PRINT TAB(15%) "*" \TAB(19%) "PROBLEM"
29 PRINT Z% \PRINT TAB(31%) "X" \GOTO 71
30 PRINT
31 PRINT \PRINT
32 C1=0
33 IF Z=1 THEN PRINT X1+"X2"="\A(1)=Y1
34 IF Z=2 THEN PRINT X1+"X2"+"X3"="\A(2)=Y2
35 IF Z=3 THEN PRINT X1+"X3"+"X4"+"X5"="\A(3)=X1+X3+X4+X5
36 IF Z=4 THEN PRINT X1+"X3"*\X2"="\A(4)=Y2
37 IF Z=5 THEN PRINT Y1-"X1"="\A(5)=Y1-X1
38 IF Z=6 THEN PRINT X1*X7+X8-"X7"="\A(6)=X1+X7+X8-X7
39 IF Z=7 THEN PRINT Y2-"X3"="\A(7)=Y2-X3
40 IF Z=8 THEN PRINT X7+X8+X3+"X2"-"X3"-"X7"="\A(8)=X8+X2
41 IF Z=9 THEN PRINT X1*X*X2"="\A(9)=X1*X2
42 IF Z=10 THEN PRINT X1*X*X2"="\A(10)=X1*X2
43 IF Z=11 THEN PRINT X1*X*X3*X*X4"="\A(11)=X1*X3*X4
44 IF Z=12 THEN PRINT X3/"X3"="\A(12)=X3
45 IF Z=13 THEN PRINT X7*X*X8"="\A(13)=X7*X8
46 IF Z=14 THEN PRINT Y4/"X4"="\A(14)=Y4/X4
47 IF Z=15 THEN PRINT Y4/"X5"="\A(15)=Y4/X5
48 PRINT
49 IF N1% = 0 THEN 125
50 PRINT INPUT " YOUR ANSWER IS " ; B(Z)
51 IF ABS(ACC) <= 0.01 THEN 400 ELSE PRINT " CORRECT!!! " \PRINT
52 GOTO 2
53 IF Z=17 THEN 400
54 C1=C1+1 \PRINT \IF C1=1 THEN PRINT " YOU ARE INCORRECT, TRY AGAIN, " ELSE PRINT
55 " YOU ARE WRONG AGAIN! THE CORRECT ANSWER IS " ; A(Z)

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401 IF C1=1 THEN 120
402 PRINT USING " #####.## " A(Z) NGOTO 125
445 IF N1Z=1 THEN 490
450 PRINT " THE STUDENT " A1$ " , HAS COMPLETED THIS SESSION. \PRINT
452 PRINT A1$ " , HAS ANSWERED " S " QUESTIONS CORRECTLY. \PRINT
454 PRINT " HERE ARE THE CORRECT ANSWERS AND " A1$ " 'S ANSWERS: "
490 PRINT TAB(3)"PROBLEM";TAB(15)"CORRECT ANSWER";TAB(35)"STUDENT ANSWER"
491 PRINT TAB(3)"*****";TAB(15)"*****";TAB(35)"*****" \PRINT
500 FOR Z = 1 TO 15
501 IF Z<10 THEN PRINT TAB(5)'Z' ELSE PRINT TAB(4)'Z'
502 PRINT USING " #####.## " A(Z);
503 PRINT TAB(38)'B(Z)\NEXT Z
2000 END
```



```
330 PRINT
340 PRINT "HAS COMPLETED THIS SESSION." PRINT
350 PRINT "HAS ANSWERED " S " PROBLEMS CORRECTLY." PRINT
360 PRINT "HERE ARE THE CORRECT ANSWERS AND ALL " S " ANSWERS: "
370 PRINT
380 PRINT TAB(30) "PROBLEM" TAB(15) "CORRECT ANSWER" TAB(40) "STUDENT ANSWER"
390 PRINT TAB(1) "*****" TAB(25) "*****" TAB(40) "*****"
400 FOR Z = 1 TO 10 PRINT
410 IF A(Z) = 10 THEN PRINT TAB(5) "Z" ELSE PRINT TAB(4) "Z"
420 PRINT USING "###:##" A(Z)
430 PRINT TAB(45) "D(Z)" NEXT Z
440 END
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131 IF ABS(A(Z)-B(Z)) > .001 THEN 1000 ELSE PRINT "CORRECT!!!!"
132 S=S+1 IF Z= 15 THEN 499
100 NEXT Z
499 IF N1Z=1 THEN 514
500 PRINT "YOUR SESSION HAS ENDED. PLEASE CALL YOUR INSTRUCTOR." \PRINT
501 INPUT KZ
502 PRINT
503 PRINT " THE STUDENT " A1$ ", HAS COMPLETED THIS SESSION. \PRINT
504 PRINT A1$ ", HAS ANSWERED " S " QUESTIONS CORRECTLY. \PRINT
505 PRINT \PRINT \PRINT " HERE ARE THE CORRECT ANSWERS AND " A1$ " 'S ANSWER
5. " \PRINT
506 GOTO 515
514 PRINT \PRINT \PRINT \PRINT \PRINT \PRINT \PRINT \PRINT \PRINT \PRINT
515 PRINT TAB(5) "PROBLEM" ; TAB(18) "CORRECT ANSWERS" ; TAB(40) "STUDENT 'S
ANSWER"
516 PRINT TAB(5) "*****" ; TAB(18) "*****" ; TAB(40) "*****
***" \PRINT
517 FOR Z=1 TO 15, VIF Z<10 THEN PRINT TAB(6) " (Z) ELSE PRINT TAB(5) " (Z)
518 PRINT TAB(20) "A(Z)"
519 PRINT TAB(42) "B(Z)"
520 NEXT Z
521 GOTO 2000
1000 C1=C1+1
1001 IF C1=1 THEN PRINT " YOU ARE INCORRECT, TRY AGAIN." ELSE PRINT " YO
U ARE WRONG AGAIN. THE CORRECT ANSWER IS ----- "
1002 IF C1=2 THEN PRINT USING "#####.###", A(Z)
1005 IF C1=1 THEN 180 ELSE 200
2000 END
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READY



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QHE408 09:50 18-APR-77
5 REM- THIS IS A MORE DIFFICULT PRACTICE SESSION IN THE METRIC SYSTEM.
6 ! THIS PROGRAM WAS DEVELOPED BY DR. JULIO GALLARDO AND MR. STEVEN DELG
ADD OF HOSTOS COMMUNITY COLLEGE AND WAS SUBSIDIZED BY A GRANT FROM THE
NATIONAL SCIENCE FOUNDATION.*****
11 INPUT " CODE # "; N1% \PRINT \PRINT \PRINT
12 IF N1% # 1 THEN 50
15 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME. "; A1%
16 PRINT INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY N
UMBER. "; A2% \PRINT
20 PRINT " YOUR NAME IS, "; A1% ", AND YOUR SOCIAL SECURITY NUMBER "; \PRI
NT
21 PRINT " IS, "; A2% ". ARE THEY CORRECT? TYPE 'Y' FOR YES OR 'N' FOR NO
22 INPUT A3% \PRINT

```

```

25 IF A3% = "Y" THEN PRINT " TYPE 'Y' OR 'N' ONLY!!!! " \PRINT GOTO 20
50 FOR Z=1 TO 10
51 RANDOMIZE
53 X1=(INT((65*RND+30)*100))/100 \X2=(INT((19*RND+1)*100))/100
54 X3=(INT((19*RND+1)*100))/100 \X4=(INT((19*RND+1)*100))/100
55 X5=(INT((9*RND+1)*1000))/1000
56 X6=(INT(X1*X2*100))/100 \X7=(INT(X1*X2/10.9728))/100
57 PRINT
60 PRINT " PROBLEM " Z
61 PRINT " ***** ** " \PRINT
65 C1=0
100 IF Z=1 THEN PRINT " A CAR MOVES WITH A SPEED OF " X1 " KM/HR. EXPRESS
THIS SPEED IN M/SEC. " \A(1)= X1*1000/3600
101 IF Z=2 THEN PRINT " THE DENSITY OF AN OBJECT IS " X5 " G/ML. WHAT IS
ITS DENSITY IN LB/GAL.? " \A(2)=X5* 4000/(454*1.06)
103 IF Z=3 THEN PRINT " HOW MANY FT/SEC ARE THERE IN " X6 " M/HR? " \A(3)=
X7
104 IF Z=4 THEN PRINT " A BOX HAS THE DIMENSIONS " X2 " CM X " X3 " FT X " X4
" IN.
105 IF Z=4 THEN PRINT " CALCULATE ITS VOLUME IN CUBIC CENTIMETERS. " \A(4
)=X2*X3*X4*30.48*2.54
106 IF Z=5 THEN PRINT " A MAN WALKS " X6 " METERS, " 645*X7 " YARDS, " 875*
X1 " FEET, AND " X5 " CENTIMETERS. HOW MANY MILES DID HE WALK? "
107 IF Z=5 THEN A(5)=X6/1600 + X7*645/1760 + 875*X1/5280 + X5/130000
110 IF Z=6 THEN PRINT " YOU HAVE A " X1 " GALLON FISH TANK, AND YOU USE
A " X2 " LITER CONTAINER TO FILL IT. HOW MANY OF THESE CONTAINERS WILL IT
TAKE?
111 IF Z=6 THEN A(6) = (X1*3.77)/X2
113 IF Z=7 THEN PRINT " IF A LIQUID HAS A DENSITY OF " X5 " G/ML, AND YOU
HAVE " X1 " LB OF THE SAME LIQUID, HOW MANY GALLONS DO YOU HAVE? "
115 IF Z=7 THEN A(7) = X1*.12/X5
120 IF Z=8 THEN PRINT " IF CAR 1 IS TRAVELLING AT " 4*X2 " M/SEC, AND CAR
2 IS TRAVELLING AT " X1 " MI/HR, AND THEY ARE GOING A DISTANCE OF " X3 " K
M, WHICH WILL BE THE FIRST TO ARRIVE? "
123 IF Z=8 THEN IF 4*X2*X2/4 > X1 THEN A(8)=1% ELSE A(8)=2%
125 IF Z=9 THEN PRINT " HOW MANY SECONDS WILL IT TAKE A CAR TRAVELLING A
T " X1 " MPH, TO COVER A DISTANCE OF " X1 " KM? " \A(9)= (X1*2250)/X3
130 IF Z=10 THEN PRINT " YOU HAVE A LIQUID WITH A DENSITY OF " X5 " G/ML, A
ND A CONTAINER WITH A CAPACITY OF " X2 " CUBIC FEET.
131 IF Z=10 THEN PRINT " HOW MANY KILOGRAMS OF THIS LIQUID WILL FILL THE
CONTAINER? " \A(10)= X5*X2*28.3169
175 IF N1%=1 THEN 200
179 PRINT
180 PRINT INPUT " YOUR ANSWER " ; B(Z) \PRINT
181 IF ABS(A(Z)-B(Z)) < .01 THEN 1000 ELSE PRINT " CORRECT!!!! "
85 IF Z=10 THEN 500
X1 Z

```







```

171 PRINT "LIQUID WOULD BE USED IN AN EXPERIMENT THAT CALLS FOR " X4 " LITERS? "
172 A(8)=(INT(100*X8*X4/X5))/100
190 IF Z<>9 THEN 200 ELSE PRINT " A BAR, " X1 " METER LONG, WEIGHS " X2 "GRAMS. H
3W MANY GRAMS WOULD, A SIMILAR "
191 PRINT "BAR " X3 " METER LONG, WEIGH? "
192 A(9)=(INT(100*X2*X3/X1))/100
200 IF Z<>10 THEN 210 ELSE PRINT " A TRAIN MAKES A TRIP IN " X8 " HOURS TRAVELLIN
3 AT A SPEED OF " X7 " MPH. IF A "
201 PRINT "SECOND TRAIN, MAKES THE SAME TRIP IN " X4 " HOURS, HOW FAST DOES "
202 PRINT "IT MOVE?" \A(10)=(INT(100*X8*X4/X7))/100
210 IF Z<>11 THEN 215 ELSE PRINT " A SUBSTANCE IS COMPOSED OF " X2 " GRAMS OF HYD
ROGEN, "X3 " GRAMS OF SULFUR"
211 PRINT "AND "X5 " GRAMS OF OXYGEN. WHAT IS THE PERCENT OF OXYGEN FOUND IN THE
212 PRINT "SUBSTANCE?" \A(11)=(INT(100*(X5*100)/(X2+X3+X5)))/100
215 IF Z<>12 THEN 220 ELSE PRINT " IN THE FOLLOWING FORMULA, D= ATG, D HAS THE VA
LUE " X1 ", T HAS THE VALUE " X2 " AND "
216 PRINT "G HAS THE VALUE " X3 ". WHAT IS THE VALUE OF A? " \A(12)=X1/(X2*X3)
220 IF Z<>13 THEN 225 ELSE PRINT " A SUGAR SOLUTION IS PREPARED MIXING " X3 " MIL
LILITERS OF WATER AND " X4 " GRAMS OF SUGAR"
221 PRINT "HOW MANY GRAMS OF SUGAR SHOULD BE MIXED WITH " X2 " MILLILITERS OF WAT
ER, TO "
222 PRINT "OBTAIN A SIMILAR SOLUTION? " \A(13)=(X4*X2)/X3
225 IF Z<>14 THEN 230 ELSE PRINT " THE COST OF A 3 LBS BAG OF COFFEE WAS $ " X1 "
LAST MONTH. TODAY THE SAME BAG"
226 PRINT "COST $" X2 ". WHAT WAS THE PERCENT INCREASE PER LBS OF COFFEE? " \A(14)
=(X2-X1)*100/X1
230 IF MZ=1 THEN 297
231 PRINT\PRINT
250 INPUT " YOUR ANSWER -----> "; B(Z)
252 IF ABS(A(Z)-B(Z))>.02 THEN 498 ELSE PRINT\PRINT\PRINT " CORRECT!!! "
253 S1=S1+1
295 IF Z=N+BX+CZ+DZ THEN 2015
297 IFL=0 THEN 304 ELSE IF L=1 THEN 303 ELSE IF L=2 THEN 302 ELSE IF L=3 THEN 301
301 Z=Z+1\NEXT Z3
302 Z=Z+1\NEXT Z2
303 Z=Z+1\NEXT Z1
304 NEXT Z
497 GOTO 2015
498 PRINT
500 C1=C1+1\IF C1=1 THEN PRINT " YOU ARE INCORRECT. TRY AGAIN. " ELSE PRINT " YOU
ARE WRONG AGAIN. THE CORRECT ANSWER IS -----> ";
502 IF C1=1 THEN 230
503 PRINT USING F$, A(Z)
505 GOTO 297
1500 GOTO 2000
1990 IF MZ=1 THEN 1994 ELSE PRINT " THE STUDENT " A1$, " HAS ENDED THIS SESSION.
"\PRINT
1991 PRINT A1$, " HAS ANSWERED " S1 " , QUESTIONS CORRECTLY. "
1992 PRINT
1993 PRINT " HERE ARE " A1$ " 'S ANSWERS AND THE CORRECT ANSWERS. "
1994 PRINT\PRINT\PRINT\PRINT
2000 PRINT TAB(3) "PROBLEM";TAB(15) "CORRECT ANSWER";TAB(35) "STUDENT ANSWER"
2001 PRINT TAB(3) "*****";TAB(15) "*****";TAB(35) "*****"
2002 PRINT\PRINT
2005 FOR Z=1 TO N + BX + CZ + DZ
2007 PRINT TAB(6) "Z"
2009 PRINT TAB(18) "A(Z)"
2010 PRINT TAB(39) "B(Z)"
2014 NEXT Z
2015 L=L+1\PRINT\PRINT
2016 IF Q$ = "NO" THEN 3000
2017 INPUT " DO YOU WANT MORE PROBLEMS " Q$

```

```
2021 PRINT\PRINT
2030 IF Q#="YES" THEN 2031 ELSE 1990
2031 IF L=1 THEN Z=Z+1 ELSE IF L=3 THEN Z=Z-1
2032 IF L=1 THEN 2038 ELSE IF L=2 THEN 2040 ELSE IF L=3 THEN 2042 ELSE IF L=4 THE
N 3000
2038 INPUT "HOW MANY PROBLEMS " ; BZ\GOTO 52
2040 INPUT " HOW MANY PROBLEMS " ; CZ\GOTO 53
2042 INPUT " HOW MANY PROBLEMS " ; DZ\GOTO 54
2050 GOTO 55
3000 END
```

```

1  THIS IS A PRACTICE SESSION IN BALANCING CHEMICAL EQUATIONS. *****
*****
2  REM THIS PROGRAM WAS DEVELOPED BY DR. JULIO GALLARDO AND MR. STEVEN DELGADO, O
F HOSTOS COMMUNITY COLLEGE, AND WAS SUBSIDIZED BY A GRANT FROM THE NATIONAL SCIE
CE FOUNDATION.
3  PRINT PRINT PRINT
4  PRINT "      THE COMPUTER WILL PRINT AN UNBALANCED CHEMICAL EQUATION." PRINT
5  PRINT "YOU WILL TYPE IN YOUR ANSWER AFTER THE QUESTION MARK (?)." PRINT PRINT P
RINT
6  PRINT "      YOUR ANSWER SHOULD BE TYPED IN USING THE FORM 1,2,3,4, ETC. YOUR
ANSWER SHOULD INCLUDE ANY COEFFICIENTS THAT MAY BE EQUAL TO ONE."
7  PRINT "EVEN THOUGH THIS IS USUALLY NOT DONE. *****
*****
10 PRINT PRINT PRINT
11 FOR I = 1 TO 7 PRINT TAB(5+I) "*" NEXT I
12 PRINT PRINT TAB(6) "EXAMPLE"
13 FOR I = 1 TO 7 PRINT TAB(5+I) "*" NEXT I
14 PRINT PRINT PRINT
15 PRINT TAB(12) "HCl + NaOH ----> NaCl + H2O" PRINT TAB(43) "2" PRINT PRINT
16 PRINT "YOUR ANSWER WILL LOOK LIKE THIS:" PRINT
17 PRINT TAB(32) "-----> 1,1,1,1" PRINT PRINT PRINT
18 PRINT "----- IF YOU SHOULD ANSWER ANY QUESTION WRONG TWICE, THE COMPUTER WILL
19 PRINT "TYPE OUT THE CORRECT ANSWER AND ALSO THE BALANCED EQUATION. HOWEVER, "
20 PRINT "THE COMPUTER WILL PRINT THE BALANCED EQUATION ONLY WITH COEFFICIENTS"
21 PRINT "GREATER THAN 1"
22 PRINT PRINT PRINT
30 RANDOMIZE
40 RANDOMIZE
55 SZ= INT(3*RND+1)
65 PRINT SZ
100 IF SZ=1 THEN CHAIN "EQUAT2" ELSE IF SZ=2 THEN CHAIN "EQUAT3" ELSE IF SZ=3 THE
N CHAIN "EQUAT4" ELSE IF SZ=4 THEN CHAIN "EQUAT5"
1000 END

```

Reada

EQUAT2 12:09

18-APR-77

1 REM- THIS IS A PRACTICE SESSION IN BALANCING CHEMICAL EQUATIONS.  
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3 OF HOSTOS COMMUNITY COLLEGE, AND WAS SUBSIDIZED BY A GRANT FROM THE NATIONAL SCIENCE FOUNDATION.

3 PRINTPRINTPRINT

4 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME. " A1\$ PRINT

5 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER. " A2\$ PRINT

6 PRINT " YOUR NAME IS, " A1\$ " , AND YOUR SOCIAL SECURITY NUMBER " A2\$ PRINT

7 PRINT " IS, " A2\$ " . ARE THEY CORRECT? TYPE 'Y' FOR YES OR 'N' FOR NO. " A3\$ PRINT

8 INPUT A3\$ PRINT

9 IF A3\$ = "N" THEN 3

10 IF A3\$ = "Y" THEN PRINT " TYPE 'Y' OR 'N' ONLY!!!!" PRINT GOTO 6

59 DIM A\$(10,10) DIM B\$(10,10) DIM C\$(10,10)

65 D\$(1,1)=" 2,1,2 " D\$(2,1)=" 1,3,2 " D\$(3,1)=" 4,11,2,8 " D\$(4,1)=" 2,2,3 " D\$(5,1)=" 3,2,3,2,4 "

67 D\$(1,2)=" 2,1,1,2 " D\$(2,2)=" 1,4,1 " D\$(3,2)=" 1,1,1,4 " D\$(4,2)=" 2,2,2,1,4 " D\$(5,2)=" 2,15,10,12 "

99 A1\$ = " CORRECT!!! " B1\$ = " WHAT ARE THE CORRECT COEFFICIENTS "

100 A\$(1,1)=" H<sub>2</sub> + O<sub>2</sub> ----> H<sub>2</sub>O "

101 B\$(1,1)=" 2 2 2 "

102 A\$(2,1)=" N<sub>2</sub> + H<sub>2</sub> ----> NH<sub>3</sub> "

103 B\$(2,1)=" 2 2 3 "

104 A\$(3,1)=" FeS + O<sub>2</sub> ----> Fe<sub>2</sub>O<sub>3</sub> + SO<sub>2</sub> "

105 B\$(3,1)=" 2 2 2 3 2 "

106 A\$(4,1)=" KClO<sub>3</sub> ----> KCl + O<sub>2</sub> "

107 B\$(4,1)=" 2 2 "

108 A\$(5,1)=" H<sub>2</sub>S + HNO<sub>3</sub> ----> S + NO + H<sub>2</sub>O "

109 B\$(5,1)=" 2 3 2 "

115 A\$(1,2)=" NaCl + H<sub>2</sub>SO<sub>4</sub> ----> Na<sub>2</sub>SO<sub>4</sub> + HCl "

116 B\$(1,2)=" 2 4 2 4 "

117 A\$(2,2)=" Ni + CO ----> Ni(CO)<sub>4</sub> "

118 B\$(2,2)=" 1 4 "

119 A\$(3,2)=" (NH<sub>4</sub>)<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> ----> N<sub>2</sub> + Cr<sub>2</sub>O<sub>3</sub> + H<sub>2</sub>O "

120 B\$(3,2)=" 4 2 2 7 2 2 3 2 "

121 A\$(4,2)=" KrF<sub>4</sub> + H<sub>2</sub>O ----> Kr + O<sub>2</sub> + HF "

122 B\$(4,2)=" 2 2 2 "

123 A\$(5,2)=" C<sub>2</sub>H<sub>5</sub>OH + O<sub>2</sub> ----> CO<sub>2</sub> + H<sub>2</sub>O "

124 B\$(5,2)=" 5 11 2 2 2 "

300 C\$(1,1)=" 2H<sub>2</sub> + O<sub>2</sub> ----> 2H<sub>2</sub>O "

301 C\$(2,1)=" N<sub>2</sub> + 3H<sub>2</sub> ----> 2NH<sub>3</sub> "

302 C\$(3,1)=" 4FeS + 11O<sub>2</sub> ----> 2Fe<sub>2</sub>O<sub>3</sub> + 8SO<sub>2</sub> "

303 C\$(4,1)=" 2KClO<sub>3</sub> ----> 2KCl + 3O<sub>2</sub> "

304 C\$(5,1)=" 3H<sub>2</sub>S + 2HNO<sub>3</sub> ----> 3S + 2NO + 4H<sub>2</sub>O "

310 C\$(1,2)=" 2NaCl + H<sub>2</sub>SO<sub>4</sub> ----> Na<sub>2</sub>SO<sub>4</sub> + 2HCl "

311 C\$(2,2)=" Ni + 4CO ----> Ni(CO)<sub>4</sub> "

312 C\$(3,2)=" (NH<sub>4</sub>)<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> ----> N<sub>2</sub> + Cr<sub>2</sub>O<sub>3</sub> + 4H<sub>2</sub>O "

313 C\$(4,2)=" 2KrF<sub>4</sub> + 2H<sub>2</sub>O ----> 2Kr + O<sub>2</sub> + 4HF "

314 C\$(5,2)=" 2C<sub>2</sub>H<sub>5</sub>OH + 15O<sub>2</sub> ----> 10CO<sub>2</sub> + 12H<sub>2</sub>O "

400 RANDOMIZE I=(INT(4\*RND)+1.5) C1=0

401 IF Z1=1 THEN IF I=V% THEN 400

402 IF Z1=2 THEN IF I=V% THEN 400 ELSE IF V1%#I THEN 400

403 IF Z1=3 THEN IF I=V% THEN 400 ELSE IF V1%#I THEN 400 ELSE IF V2%#I THEN 400

404 IF Z1=4 THEN IF I=V% THEN 400 ELSE IF V1%#I THEN 400 ELSE IF I=V2% THEN 400 ELSE IF I=V3% THEN 400

405 IF Z1=5 THEN IF I=V% THEN 400 ELSE IF I=V1% THEN 400 ELSE IF I=V2% THEN 400 ELSE IF I=V3% THEN 400 ELSE IF I=V4% THEN 400

406 FOR J=1 TO 2:Q1=Q1+1:PRINTPRINT " PROBLEM " Q1:IF Q1<10 THEN PRINT " \*\*\*\*\* "

407 PRINTPRINT A\$(I,J):PRINT B\$(I,J):PRINTPRINT B1\$

408 IF KZ=1 THEN GOSUB 100

409 J=1 THEN IF I=3 THEN 470 ELSE IF I=5 THEN 480 ELSE 460

410 J=2 THEN IF I=2 THEN 460 ELSE IF I=4 THEN 480 ELSE 470

411 GOTO 400

412 END

413



```

460 INPUT ' ' ; NZ, MZ, PZ
461 GOTO 500
470 INPUT ' ' ; NZ, MZ, PZ, QZ
471 GOTO 510
480 INPUT ' ' ; NZ, MZ, PZ, QZ, RZ
481 GOTO 520
500 IF J=1 THEN IF I=1 THEN 503 ELSE IF I=2 THEN 505 ELSE IF I=4 THEN 507
501 IF J=2 THEN IF I=2 THEN 509
503 IF NZ<>2 THEN 800 ELSE IF MZ<>1 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE GOTO 900
505 IF NZ<>1 THEN 800 ELSE IF MZ<>3 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE 900
507 IF NZ<>2 THEN 800 ELSE IF MZ<>2 THEN 800 ELSE IF PZ<>3 THEN 800 ELSE 900
509 IF NZ<>1 THEN 800 ELSE IF MZ<>4 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE 900
510 IF J=1 THEN 518 ELSE IF I=1 THEN 512 ELSE IF I=3 THEN 514 ELSE IF I=5 THEN 516
512 IF NZ<>2 THEN 800 ELSE IF MZ<>1 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE IF QZ<>2 THEN 800 ELSE 900
514 IF NZ<>MZ THEN 800 ELSE IF MZ<>PZ THEN 800 ELSE IF NZ<>1 THEN 800 ELSE IF QZ<>4 THEN 800 ELSE 900
516 IF NZ<>2 THEN 800 ELSE IF MZ<>15 THEN 800 ELSE IF PZ<>10 THEN 800 ELSE IF QZ<>12 THEN 800 ELSE 900
518 IF NZ<>4 THEN 800 ELSE IF MZ<>11 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE IF QZ<>8 THEN 800 ELSE 900
520 IF J=1 THEN IF NZ<>3 THEN 800 ELSE IF MZ<>2 THEN 800 ELSE IF PZ<>3 THEN 800 ELSE IF QZ<>2 THEN 800 ELSE IF RZ<>4 THEN 800 ELSE 900
522 IF NZ<>2 THEN 800 ELSE IF MZ<>2 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE IF QZ<>1 THEN 800 ELSE IF RZ<>4 THEN 800 ELSE 900
600 FOR J=1 TO 2\FOR I=1 TO 5
602 PRINT " UNBALANCED ----- ";
604 PRINT TAB(27) " A$(I,J) \PRINT TAB(27) " B$(I,J) \PRINT
606 PRINT "***** BALANCED -----";
607 PRINT TAB(35) " C$(I,J) \PRINT TAB(35) " B$(I,J) \PRINT
608 NEXT I
610 NEXT J
611 GOTO 3000
800 PRINT C1=C1+1
801 IF C1=1 THEN PRINT " YOU ARE INCORRECT, TRY AGAIN. " ELSE PRINT " YOU ARE WRONG AGAIN. THE CORRECT ANSWER IS -----";
802 IF C1 = 1 THEN 408 ELSE PRINT D$(I,J) \PRINT \PRINT " THE BALANCED EQUATION IS AS FOLLOWS: -----"; \PRINT
803 PRINT TAB(25) " C$(I,J) \PRINT TAB(25) " B$(I,J)
804 C1=0 \NEXT J
805 Z1=Z1+1
806 PRINT \ IF Z1>4 THEN PRINT " YOUR SESSION HAS ENDED. " \PRINT \GOTO 600
807 IF Z1=1 THEN VZ=I ELSE IF Z1=2 THEN V1Z=I ELSE IF Z1=3 THEN V2Z=I ELSE IF Z1=4 THEN V3Z=I ELSE IF Z1=5 THEN V4Z=I
808 GOTO 400
900 PRINT A1$
901 GOTO 803
3000 END

```



```

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  IENCE FOUNDATION.
3 PRINT\PRINT\PRINT
4 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME. "A1$\PRINT
5 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER. "A2$\PR
  INT
6 PRINT " YOUR NAME IS, " A1$; ", AND YOUR SOCIAL SECURITY NUMBER "\PRINT
7 PRINT " IS, " A2$ ". ARE THEY CORRECT? TYPE 'Y' FOR YES OR 'N' FOR NO. "
8 INPUT A3$ \PRINT
9 IF A3$ = "N" THEN 3
10 IF A3$ <> "Y" THEN PRINT " TYPE 'Y' OR 'N' ONLY!!!!!" \PRINT \GOTO6
59 DIM A$(10,10)\DIM B$(10,10)\DIM C$(10,10)
65 B$(1,3)="1,1,1,2"\D$(2,3)="1,1,1,2"\D$(3,3)="2,3,1,6"\D$(4,3)="2,2,2,1"\D$(5,3
  )="3,1,1"
67 D$(1,4)="2,1,2"\D$(2,4)="1,3,2,3"\D$(3,4)="3,2,1,6"\D$(4,4)="1,2,1,1"\D$(5,4)=
  "6,1,4"
99 A1$ = " CORRECT!!! "\B1$ = " WHAT ARE THE CORRECT COEFFICIENTS "
130 A$(1,3)=" BaCl  + (NH ) CO ----> BaCO  + NH Cl"
131 B$(1,3)="      2      4 2 3      3      4 "
132 A$(2,3)=" Al(OH)  + NaOH ----> NaAlO  + H O"
133 B$(2,3)="      3      2      2"
134 A$(3,3)=" Fe(OH)  + H SO ----> Fe (SO )  + H O"
135 B$(3,3)="      3      2 4      2 4 3      2"
136 A$(4,3)=" Na  + H O ----> NaOH + H "
137 B$(4,3)="      2      2"
138 A$(5,3)=" Mg  + N ----> Mg N "
139 B$(5,3)="      2      3 2 "
145 A$(1,4)=" Mg  + O ----> MgO "
146 B$(1,4)="      2"
147 A$(2,4)=" C H O  + O ----> CO  + H O "
148 B$(2,4)="      2 6      2      2      2"
149 A$(3,4)=" FeCl  + Na PO ----> Fe (PO )  + NaCl "
150 B$(3,4)="      2      3 4      3 4 2 "
151 A$(4,4)=" CaC  + H O ----> C H  + Ca(OH) "
152 B$(4,4)="      2      2      2 2      2"
153 A$(5,4)=" Na O  + P O ----> Na PO "
154 B$(5,4)="      2      4 10      3 4"
320 C$(1,3)=" BaCl  + (NH ) CO ----> BaCO  + 2NH Cl "
321 C$(2,3)=" Al(OH)  + NaOH ----> NaAlO  + 2H O "
322 C$(3,3)=" 2Fe(OH)  + 3H SO ----> Fe (SO )  + 6H O "
323 C$(4,3)=" 2Na  + 2H O ----> 2NaOH + H "
324 C$(5,3)=" 3Mg  + N ----> Mg N "
330 C$(1,4)=" 2Mg  + O ----> 2MgO "
331 C$(2,4)=" C H O  + 3O ----> 2CO  + 3H O "
332 C$(3,4)=" 3FeCl  + 2Na PO ----> Fe (PO )  + 6NaCl "
333 C$(4,4)=" CaC  + 2H O ----> C H  + Ca(OH) "
334 C$(5,4)=" 6Na O  + P O ----> 4Na PO "
380 RANDOMIZE
381 I=(INT(4*RND +1.5))\C1=0
384 IF Z1=1 THEN IF I=V% THEN 380
386 IF Z1=2 THEN IF I=V% THEN 380 ELSE IF I=V1% THEN 380
388 IF Z1=3 THEN IF I=V% THEN 380 ELSE IF I=V1% THEN 380 ELSE IF I=V2% THEN 380
390 IF Z1=4 THEN IF I=V% THEN 380 ELSE IF I=V1% THEN 380 ELSE IF I= V2% THEN 380
  ELSE IF I=V3% THEN 380
400 FOR J=3 TO 4\Q1=Q1+1\PRINT\PRINT " PROBLEM " Q1\IF Q1<10 THEN PRINT " ***
  **** *"ELSE PRINT " ***** **"
405 PRINT\PRINT A$(I,J)\PRINT B$(I,J)\PRINT\PRINT B1$)

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410 IF J=3 THEN IF I=5 THEN 700 ELSE 720
415 IF J=4 THEN IF I=1 THEN 700 ELSE IF I=5 THEN 700 ELSE 720
500 IF J=3 THEN 504 ELSE 507
504 IF NZ<>3 THEN 800 ELSE IF MZ<>1 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE 900
507 IF I=1 THEN IF NZ<>2 THEN 800 ELSE IF MZ<>1 THEN 800 ELSE IF PZ<>2 THEN 800 E
LSE 900
508 IF NZ<>6 THEN 800 ELSE IF MZ<> 1 THEN 800 ELSE IF PZ<>4 THEN 800 ELSE 900
509 IF J=3 THEN 520 ELSE 530
515 IF J=3 THEN 520 ELSE 530
520 IF I<3 THEN 525
521 IF I=3 THEN 522 ELSE 523
522 IF NZ<>2 THEN 800 ELSE IF MZ<>3 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE IF QZ<>6
THEN 800 ELSE 900
523 IF NZ<>2 THEN 800 ELSE IF MZ<>2 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE IF QZ<>
1 THEN 800 ELSE 900
525 IF NZ<>1 THEN 800 ELSE IF MZ<>1 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE IF QZ<>2
THEN 800 ELSE 900
530 IF I=2 THEN 532 ELSE IF I=3 THEN 534 ELSE 536
532 IF NZ<>1 THEN 800 ELSE IF MZ<>3 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE IF QZ<>3
THEN 800 ELSE 900
534 IF NZ<>3 THEN 800 ELSE IF MZ<>2 THEN 800 ELSE IF PZ<> 1 THEN 800 ELSE IF QZ<>
6 THEN 800 ELSE 900
536 IF NZ<>1 THEN 800 ELSE IF MZ<>2 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE IF QZ<>1
THEN 800 ELSE 900
600 FOR J=3 TO 4\FOR I=1 TO 5
602 PRINT " UNBALANCED -----> ";
604 PRINT TAB(27) " A$(I,J)\PRINT TAB(27) " B$(I,J)\PRINT
606 PRINT "***** BALANCED ----->";
607 PRINT TAB(30) " C$(I,J)\PRINT TAB(30) " B$(I,J)\PRINT
608 NEXT I
610 NEXT J
611 GOTO 3000
700 INPUT "NZ,MZ,PZ";
710 GOTO 500
720 INPUT "NZ,MZ,PZ,QZ";
725 GOTO 515
800 PRINT\C1=C1+1
802 IF C1=1 THEN PRINT " YOU ARE INCORRECT. TRY AGAIN. " ELSE PRINT " YOU
ARE WRONG AGAIN. THE CORRECT ANSWER IS -----> ";
804 IF C1=1 THEN 410 ELSE PRINT D$(I,J)\PRINT\PRINT " THE BALANCED EQUAT
ION IS AS FOLLOWS "
806 PRINT TAB(25) " C$(I,J)\PRINT TAB(25) " B$(I,J)
808 C1=0\NEXT J
810 Z1=Z1+1
812 PRINT "\,IF Z1>4 THEN PRINT " YOUR SESSION HAS ENDED. PLEASE CALL THE INSTR
UCTOR. "\PRINT\GOTO 600
814 IF Z1=1 THEN V1%=I ELSE IF Z1=2 THEN V1%=I ELSE IF Z1=3 THEN V2%=I ELSE IF Z1
=4 THEN V3%=I
816 GOTO 360
900 PRINT A1$
902 GOTO 806
3000 END

```

1. REM- THIS IS A PRACTICE SESSION IN BALANCING CHEMICAL EQUATIONS.  
 2. ! THIS PROGRAM HAS BEEN DEVELOPED BY DR. JULIO GALLARDO, AND MR. STEVEN DELGADO  
 OF HOSTOS COMMUNITY COLLEGE, AND WAS SUBSIDIZED BY A GRANT FROM THE NATIONAL SC  
 IENCE FOUNDATION.

3 PRINT\PRINT\PRINT

4 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME. "A1\$\PRINT

5 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER. "A2\$\PR  
 INT

6 PRINT " YOUR NAME IS, " A1\$; ", AND YOUR SOCIAL SECURITY NUMBER "\PRINT

7 PRINT " IS, " A2\$ ". ARE THEY CORRECT? TYPE 'Y' FOR YES OR 'N' FOR NO. "

8 INPUT A3\$ \PRINT

9 IF A3\$ = "N" THEN 3

10 IF A3\$ <> "Y" THEN PRINT " TYPE 'Y' OR 'N' ONLY!!!!" \PRINT \GOTO6

59 DIM A\$(10,10)\DIM B\$(10,10)\DIM C\$(10,10)

60 D\$(1,5)="1,2,2,1"\D\$(2,5)="1,2,1,4"\D\$(3,5)="1,2,1,1"\D\$(4,5)="1,1,1"\D\$(5,5)  
 ="1,1,1"

63 D\$(1,6)="2,1,2"\D\$(2,6)="1,1,2,1"\D\$(3,6)="3,2,1,6"\D\$(4,6)="2,1,1,1,1"\D\$(5,6)  
 )="17,2,16,18"

99 A1\$ = " CORRECT!!! "\B1\$ = " WHAT ARE THE CORRECT COEFFICIENTS "

160 A\$(1,5)=" Sb O + NaOH ----> NaSbO + H O "

161 B\$(1,5)=" 2 3 2 2 "

162 A\$(2,5)=" TiCl + H O ----> TiO + HCl "

163 B\$(2,5)=" 4 2 2 "

164 A\$(3,5)=" Pb + HCl ----> PbCl<sub>2</sub> + H<sub>2</sub> "

165 B\$(3,5)=" 1 2 2 "

166 A\$(4,5)=" NH<sub>3</sub> + HCl ----> NH<sub>4</sub>Cl "

167 B\$(4,5)=" 3 4 "

168 A\$(5,5)=" MgO + SO<sub>2</sub> ----> MgSO<sub>4</sub> "

169 B\$(5,5)=" 3 4 "

175 A\$(1,6)=" Na + Cl ----> NaCl "

176 B\$(1,6)=" 2 "

177 A\$(2,6)=" CaBr<sub>2</sub> + H<sub>2</sub>SO<sub>4</sub> ----> HBr + CaSO<sub>4</sub> "

178 B\$(2,6)=" 2 2 4 4 "

179 A\$(3,6)=" Ca(OH)<sub>2</sub> + H<sub>3</sub>PO<sub>4</sub> ----> Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> + H<sub>2</sub>O "

180 B\$(3,6)=" 2 3 4 3 4 2 2 "

181 A\$(4,6)=" HCl + CaCO<sub>3</sub> ----> CO<sub>2</sub> + H<sub>2</sub>O + CaCl<sub>2</sub> "

182 B\$(4,6)=" 3 2 2 2 "

183 A\$(5,6)=" O<sub>2</sub> + C<sub>2</sub>H<sub>6</sub> ----> CO<sub>2</sub> + H<sub>2</sub>O "

184 B\$(5,6)=" 2 8 18 2 "

340 C\$(1,5)=" Sb O + 2NaOH ----> 2NaSbO + H O "

341 C\$(2,5)=" TiCl<sub>4</sub> + 2H O ----> TiO<sub>2</sub> + 4HCl "

342 C\$(3,5)=" Pb + 2HCl ----> PbCl<sub>2</sub> + H<sub>2</sub> "

343 C\$(4,5)=" NH<sub>3</sub> + HCl ----> NH<sub>4</sub>Cl "

344 C\$(5,5)=" MgO + SO<sub>2</sub> ----> MgSO<sub>4</sub> "

350 C\$(1,6)=" 2Na + Cl<sub>2</sub> ----> 2NaCl "

351 C\$(2,6)=" CaBr<sub>2</sub> + H<sub>2</sub>SO<sub>4</sub> ----> 2HBr + CaSO<sub>4</sub> "

352 C\$(3,6)=" 3Ca(OH)<sub>2</sub> + 2H<sub>3</sub>PO<sub>4</sub> ----> Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> + 6H<sub>2</sub>O "

353 C\$(4,6)=" 2HCl + CaCO<sub>3</sub> ----> CO<sub>2</sub> + H<sub>2</sub>O + CaCl<sub>2</sub> "

354 C\$(5,6)=" 17O<sub>2</sub> + 2C<sub>2</sub>H<sub>6</sub> ----> 16CO + 18H<sub>2</sub>O "

580 RANDOMIZE I=(INT(4\*RND +1.5))\C1=0

584 IF Z1=1 THEN IF VZ=I THEN 380

586 IF Z1=2 THEN IF I=V5 THEN 380 ELSE IF I=V1% THEN 380

588 IF Z1=3 THEN IF I=V% THEN 380 ELSE IF I=V1% THEN 380 ELSE IF I=V2% THEN 380

590 IF Z1=4 THEN IF I=V% THEN 380 ELSE IF I=V1% THEN 380 ELSE IF I= V2% THEN 380

ELSE IF I=V3% THEN 380

600 FOR J= 5 TO 6\Q1=Q1+1\PRINT\PRINT " PROBLEM " Q1\IF Q1<10 THEN PRINT

\*\*\*\*\* \*" ELSE PRINT " \*\*\*\*\* \*\*"

605 PRINT\PRINT A\$(I,J)\PRINT B\$(I,J)\PRINT\PRINT B1\$

610 IF J=5 THEN IF I<4 THEN 720 ELSE 700

615 IF J=6 THEN IF I=1 THEN 700 ELSE IF I=4 THEN 740 ELSE 720

700 IF J=5 THEN 504 ELSE 508

504 NX<>M% THEN 800 ELSE IF M%<>P% THEN 800 ELSE IF NX<>1 THEN 800 ELSE 900

508 NX<>2 THEN 800 ELSE IF M%<>1 THEN 800 ELSE IF P%<>2 THEN 800 ELSE 900

```

515 IF J=6 THEN 525 ELSE IF I=1 THEN 516 ELSE IF I=2 THEN 518 ELSE IF I=3 THEN 52
0
516 IF NX>1 THEN 800 ELSE IF MZ>2 THEN 800 ELSE IF FZ>2 THEN 800 ELSE IF QZ>1
THEN 800 ELSE 900
518 IF NX>1 THEN 800 ELSE IF MZ>2 THEN 800 ELSE IF FZ>1 THEN 800 ELSE IF QZ<
>4 THEN 800 ELSE 900
520 IF NX>1 THEN 800 ELSE IF MZ>2 THEN 800 ELSE IF FZ>1 THEN 800 ELSE IF QZ>1
THEN 800 ELSE 900
525 IF I=2 THEN 527 ELSE IF I=3 THEN 529 ELSE IF I=5 THEN 531
527 IF NX>1 THEN 800 ELSE IF MZ>1 THEN 800 ELSE IF FZ>2 THEN 800 ELSE IF QZ>
1 THEN 800 ELSE 900
529 IF NX>3 THEN 800 ELSE IF MZ>2 THEN 800 ELSE IF FZ>1 THEN 800 ELSE IF QZ>6
THEN 800 ELSE 900
531 IF NX>17 THEN 800 ELSE IF MZ>2 THEN 800 ELSE IF FZ>16 THEN 800 ELSE IF QZ<
>19 THEN 800 ELSE 900
540 IF NX>2 THEN 800 ELSE IF MZ>1 THEN 800 ELSE IF FZ>1 THEN 800 ELSE IF QZ>1
THEN 800 ELSE IF RZ>1 THEN 800 ELSE 900
600 FOR J= 5 TO 6\FOR I = 1 TO 5
602 PRINT " UNBALANCED -----> "
604 PRINT TAB(25) "A$(I,J)\PRINT TAB(25) "B$(I,J)\PRINT
606 PRINT "***** BALANCED -----> "
607 PRINT TAB(30) "C$(I,J)\PRINT TAB(30) "B$(I,J)\PRINT
608 NEXT I
610 NEXT J
611 GOTO 3000
700 INPUT "NZ,MZ,FZ
710 GOTO 500
720 INPUT "NZ,MZ,FZ,QZ
725 GOTO 515
740 INPUT "NZ,QZ,FZ,QZ,RZ
745 GOTO 540
800 PRINT C1=C1+1
802 IF C1=1 THEN PRINT " YOU ARE INCORRECT. TRY AGAIN. " ELSE PRINT "
YOU ARE WRONG AGAIN. THE CORRECT ANSWER IS -----> "
804 IF C1=1 THEN 410 ELSE PRINT D$(I,J)\PRINT\PRINT " THE BALANCED EQUAT
ION IS AS FOLLOWS: "
805 PRINT
806 PRINT TAB(25) "C$(I,J)\PRINT TAB(25) "B$(I,J)
808 C1=0\NEXT J
810 Z1=Z1+1\PRINT\IF Z1>4 THEN PRINT " YOUR SESSION HAS ENDED. PLEASE CA
LL THE INSTRUCTOR. "\PRINT\GOTO 600
814 IF Z1=1 THEN VZ=I ELSE IF Z1=2 THEN V1Z=I ELSE IF Z1=3 THEN V2Z=I ELSE IF Z1=
4 THEN V3Z=I
815 GOTO 380
900 PRINT\PRINT A14\GOTO 806
3000 END

```

EQUATS 09:31

19-APR-77

1 REM- THIS IS A PRACTICE SESSION IN BALANCING CHEMICAL EQUATIONS.  
2 ! THIS PROGRAM HAS BEEN DEVELOPED BY DR. JULIO GALLARDO, AND MR. STEVEN DELGADO  
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IENCE FOUNDATION.

3 PRINT\PRINT\PRINT

4 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME. " ;A1\$\PRINT

5 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER. " ;A2\$\PR  
INT

6 PRINT " YOUR NAME IS, " A1\$; ", AND YOUR SOCIAL SECURITY NUMBER " \PRINT

7 PRINT " IS, " A2\$ ". ARE THEY CORRECT? TYPE 'Y' FOR YES OR 'N' FOR NO. " ;

8 INPUT A3\$ \PRINT

9 IF A3\$ = "N" THEN 3

10 IF A3\$ <> "Y" THEN PRINT " TYPE 'Y' OR 'N' ONLY!!!!" \PRINT \GOTO6

59 DIM A\$(10,10)\DIM B\$(10,10)\DIM C\$(10,10)

60 D\$(1,7)="4,3,2,6"\D\$(2,7)="1,3,1,3"\D\$(3,7)="1,1,1,1"\D\$(4,7)="3,1,2,1"\D\$(5,7)  
>="1,1,1,5"

63 D\$(1,8)="6,6,1,6"\D\$(2,8)="1,5,3,4"\D\$(3,8)="2,3,2,2"\D\$(4,8)="2,1,2"\D\$(5,8)=  
"2,3,1,6"

99 A1\$ = " CORRECT!!! " \B1\$ = " WHAT ARE THE CORRECT COEFFICIENTS "

190 A\$(1,7)=" NH + 0 ----> N + H O "

191 B\$(1,7)=" 3 2 2 2 "

192 A\$(2,7)=" H PO + NaOH ----> Na PO + H O "

193 B\$(2,7)=" 3 4 2 "

194 A\$(3,7)=" NaCl + AgNO ----> NaNO + AgCl "

195 B\$(3,7)=" 3 3 "

196 A\$(4,7)=" NO + H O ----> HNO + NO "

197 B\$(4,7)=" 2 2 3 "

198 A\$(5,7)=" PCl + H O ----> H PO + HCl "

199 B\$(5,7)=" 5 2 3 4 "

205 A\$(1,8)=" H O + CO ----> C H O + O "

206 B\$(1,8)=" 2 2 6 12 6 2 "

207 A\$(2,8)=" C H + O ----> CO + H O "

208 B\$(2,8)=" 3 8 2 2 2 "

209 A\$(3,8)=" ZnS + O ----> ZnO + SO "

210 B\$(3,8)=" 2 2 2 "

211 A\$(4,8)=" Ca + O ----> CaO "

212 B\$(4,8)=" 2 "

213 A\$(5,8)=" Al(OH) + K SO ----> Al (SO ) + KOH "

314 B\$(5,8)=" 3 2 4 2 4 3 "

360 C\$(1,7)=" 4NH + 3O ----> 2N + 6H O "

361 C\$(2,7)=" H PO + 3NaOH ----> Na PO + 3H O "

362 C\$(3,7)=" NaCl + AgNO ----> NaNO + AgCl "

363 C\$(4,7)=" 3NO + H O ----> 2HNO + NO "

364 C\$(5,7)=" PCl + H O ----> H PO + 5HCl "

365 C\$(1,8)=" 6H O + 5CO ----> C H O + 6O "

366 C\$(2,8)=" C H + 5O ----> 3CO + 4H O "

367 C\$(3,8)=" 2ZnS + 3O ----> 2ZnO + 2SO "

368 C\$(4,8)=" 2Ca + O ----> 2CaO "

369 C\$(5,8)=" 2Al(OH) + 3K SO ----> Al (SO ) + 6KOH "

380 RANDOMIZE I=(INT(4\*RND +1.5))\C1=0

384 IF Z1=1 THEN IF VZ=I THEN 380

386 IF Z1=2 THEN IF I=VZ THEN 380 ELSE IF I=V1Z THEN 380

388 IF Z1=3 THEN IF I=VZ THEN 380 ELSE IF I=V1Z THEN 380 ELSE IF I=V2Z THEN 380

390 IF Z1=4 THEN IF I=VZ THEN 380 ELSE IF I=V1Z THEN 380 ELSE IF I=V2Z THEN 380

ELSE IF I=V3Z THEN 380

400 FOR J=7 TO 8\Q1Z=C Z+1Z\PRINT\PRINT

PROBLEM " Q1Z\IF Q1Z<10 THEN PRI

IT " \*\*\*\*\* ELSE PRINT \*\*\*\*\* \*\*"

405 PRINT\PRINT A\$(I, ) PRINT B\$(I, )\PRINT\PRINT B1\$;

410 IF J=7 THEN 700 ELSE IF J=8 THEN IF I= 4 THEN 720 ELSE 700

400 IF NZ<>2 THEN 800 ELSE IF MZ<>1 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE 900

410 J=7 THEN 512 ELSE 520



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512 IF I=1 THEN 514 ELSE IF I=2 THEN 515 ELSE IF I=3 THEN 516 ELSE IF I=4 THEN 51
513 IF NZ<>1 THEN 800 ELSE IF MZ<>1 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE IF QZ<>5
THEN 800 ELSE 900
514 IF NZ<>4 THEN 800 ELSE IF MZ<>3 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE IF QZ<>6
THEN 800 ELSE 900
515 IF NZ<>1 THEN 800 ELSE IF MZ<>3 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE IF QZ<>3
THEN 800 ELSE 900
516 IF NZ<>1 THEN 800 ELSE IF MZ<>1 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE IF QZ<>1
THEN 800 ELSE 900
517 IF NZ<>3 THEN 800 ELSE IF MZ<>1 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE IF QZ<>1
THEN 800 ELSE 900
520 IF I=1 THEN 522 ELSE IF I=2 THEN 523 ELSE IF I=3 THEN 524 ELSE IF I=5 THEN 52
522 IF NZ<>6 THEN 800 ELSE IF MZ<>6 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE IF QZ<>6
THEN 800 ELSE 900
523 IF NZ<>1 THEN 800 ELSE IF MZ<>5 THEN 800 ELSE IF PZ<>3 THEN 800 ELSE IF QZ<>4
THEN 800 ELSE 900
524 IF NZ<>2 THEN 800 ELSE IF MZ<>3 THEN 800 ELSE IF PZ<>2 THEN 800 ELSE IF QZ<>2
THEN 800 ELSE 900
525 IF NZ<>2 THEN 800 ELSE IF MZ<>3 THEN 800 ELSE IF PZ<>1 THEN 800 ELSE IF QZ<>6
THEN 800 ELSE 900
500 FOR J=7 TO 8
501 FOR I=1 TO 5
502 PRINT " UNBALANCED -----> ";
504 PRINT TAB(25) "A$(I,J)\PRINT TAB(25) "B$(I,J)\PRINT
506 PRINT "***** BALANCED -----> ";
507 PRINT TAB(30) "C$(I,J)\PRINT TAB(30) "B$(I,J)\PRINT
508 NEXT I
510 NEXT J
511 GOTO 3000
700 INPUT "NZ,MZ,PZ,QZ";
710 GOTO 510
720 INPUT "NZ,MZ,PZ";
722 GOTO 500
800 PRINT\C1=C1+1
801 IF C1=1 THEN PRINT " YOU ARE INCORRECT. TRY AGAIN. " ELSE PRINT "
YOU ARE WRONG AGAIN. THE CORRECT ANSWER IS -----> ";
802 IF C1=1 THEN 410 ELSE PRINT B$(I,J)\PRINT\PRINT " THE BALANCED EQUAT
ION IS AS FOLLOWS: "
806 PRINT TAB(25) "C$(I,J)\PRINT TAB(25) "B$(I,J)
808 C1=0\NEXT J
910 Z1=Z1+1\PRINT\IF Z1>4 THEN PRINT " YOUR SESSION HAS ENDED PLEASE CAL
THE INSTRUCTOR. "\PRINT\GOTO 500
912 IF Z1=1 THEN VZ=I ELSE IF Z1=2 THEN V1=I ELSE IF Z1=3 THEN V2=I ELSE IF Z1=
4 THEN V3=I\
916 GOTO 380
900 PRINT\PRINT A1$ \S=S+1
902 GOTO 806
3000 END

```



CHE708 11:30

22-APR-77

2 REM - THIS IS A PRACTICE SESSION ON STOICHIOMETRY.....  
3 ! THIS PROGRAM HAS BEEN DEVELOPED BY DR. JULIO GALLARDO AND MR. STEVEN DELGADO,  
OF HOSTOS COMMUNITY COLLEGE, AND WAS SUBSIDIZED BY A GRANT FROM THE NATIONAL SCI  
ENCE FOUNDATION.

5 PRINT\PRINT\PRINT

6 INPUT " CODE # ";N1%\PRINT

7 PRINT\PRINT\PRINT\IF N1%=1 THEN 98

10 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME. ";A1%\PRINT

11 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER. ";A2%\PR  
INT

15 PRINT " YOUR NAME IS, " ;A1\$;" , AND YOUR SOCIAL SECURITY NUMBER "\PRINT

16 PRINT " IS, "A2\$ ". ARE THEY CORRECT? TYPE 'Y' FOR YES OR 'N' FOR NO. ";

17 INPUT A4\$ \PRINT

18 IF A4\$ = "N" THEN10

19 IF A4\$<>"Y" THEN PRINT " TYPE 'Y' OR 'N' ONLY!!!"\PRINT\GOTO 15

20 Q\$ = A1\$ + " " + A2\$

21 R\$ = SYS(CHR\$(8%) + Q\$)

98 PRINT\PRINT\PRINT

100 A3\$ = " BASED ON THE FOLLOWING EQUATION: "\PRINT

131 B\$(1,3)=" 2 4 2 3 3 4 "

133 B\$(2,3)=" 3 2 2 4 3 2 "

135 B\$(3,3)=" 3 2 4 2 4 3 2 "

137 B\$(4,3)=" 2 2 "

139 B\$(5,3)=" 2 3 2 "

320 C\$(1,3)=" BaCl + (NH ) CO ----> BaCO + 2NH Cl "

321 C\$(2,3)=" Al(OH) + NaOH ----> NaAlO + 2H O "

322 C\$(3,3)=" 2Fe(OH) + 3H SO ----> Fe (SO ) + 6H "

323 C\$(4,3)=" 2Na + 2H O ----> 2NaOH + H "

324 C\$(5,3)=" 3Ms + N ----> Ms N "

325 T9\$(1)=" grams"\T9\$(2)=" moles"\T9\$(3)=" moles"\T9\$(4)=" liters"\T9\$(5)="  
liters"

329 FOR Z%=1 TO 5\PRINT\PRINT

330 RANDOMIZE

331 Y1=(INT(40500\*RND+30000)/100\Y2=(INT(24500\*RND +25454))/100

332 X1=(INT(800\*RND+85))/100 \X2=(INT(7800\*RND+9000)/100\X4=(INT(4256\*RND 1542))/100

336 K1=0

337 K1=K1+1\FOR L5=30 TO 41 PRINT TAB(L5) "

338 NEXT L5

339 PRINT " \*\*\* "\IF K1=1 THEN PRINT " T-B 30) " \*\* PROBLEM "Z%";\PRINT " \*\* "\GO  
TO 337

345 PRINT\PRINT

346 PRINT TAB(5) " " A3\$

347 PRINT\PRINT\PRINT TAB(15) " C\$(Z% 3)\PRINT TAB(15) " B\$(Z%,3)\PRINT

350 IF Z%<>1 THEN 365 ELSE PRINT " HOW MANY GRAMS OF BARIUM CHLORIDE ARE NEEDED TO  
PRODUCE " X1 " moles OF "

351 PRINT " BARIUM CARBONATE "

352 A(1%)=(INT(2070 \*X1)).

360 IF Z%<>2 THEN 365 ELSE PRINT " HOW MANY MOLES OF SODIUM HYDROXIDE REACT WITH  
ALUMINUM HYDROXIDE TO PRODUCE "

361 PRINT Y1 " grams OF WATER "

362 A(2%)=(INT(Y1/.36))/100

365 IF Z%<>3 THEN 370 ELSE PRINT X2 " moles OF SULFURIC ACID REACT WITH IRON HYDR  
OXIDE. HOW MANY MOLES OF "

366 PRINT " IRON SULFATE WILL BE PRODUCED? "

368 A(3%)=(INT(X2/.03))/100

370 IF Z%<>4 THEN 375 ELSE PRINT " IF " Y2 " grams OF SODIUM ARE MADE TO REACT WI  
TH WATER, HOW MANY LITERS "

371 PRINT " HYDROGEN WILL BE COLLECTED IF THE REACTION TAKES PLACE AT " X1 " atm  
AND "

372 PRINT X4 " DEGREES " T " ? "



```

074 A(4%) = (INT((273+X4)*Y2*.178372/X1))/100
075 IF ZX<5 THEN 379 ELSE PRINT " HOW MANY LITERS OF NITROGEN ARE REQUIRED TO RE
ACT WITH MAGNISIU, IF " Y1
076 PRINT " grams OF Mg N , HAVE TO BE PRODUCED AT STP?
077 PRINT "          3 2 "
078 A(5%) = (INT(Y1*22.4))/100
079 IF N1Z=1 THEN 385
080 PRINT\PRINT
081 INPUT "          YOUR ANSWER IS ----->" ;B(ZZ)\PRINT\PRINT
082 IF ABS(A(ZZ)-B(ZZ))>.03 THEN 500 ELSE 515
085 IF ZZ=5 THEN 799
086 NEXT ZZ
000 C1=C1+1\IF C1=1 THEN PRINT "          , YOU ARE INCORRECT. TRY AGAIN." ELSE PR
INT "          YOU ARE WRONG AGAIN. THE CORRECT ANSWER IS ----->" ;
001 IF C1=1 THEN 380 ELSE PRINT A(ZZ);T9$(ZZ)
002 C1=0
003 GOTO 385
015 S=S+1\Z$ = "          CORRECT!!!!!! "
016 PRINT\PRINT\PRINT Z$
017 GOTO 502
099 IF N1Z=1 THEN 810
000 PRINT\PRINT\PRINT "          THIS SESSION HAS ENDED. IF YOU WISH TO CONTINUE
TO MORE DIFFICULT "
001 PRINT "          PROBLEMS, TYPE THE LETTER 'D', AND THEN PRESS THE 'RETURN KEY.' ;
002 INPUT " " ;H$
003 IF H$="D" THEN CHAIN "CHE718"25
005 PRINT\PRINT\PRINT
006 PRINT " " A1$ " , HAS ENDED THIS SESSION AT " TIME$(O) " . "
007 PRINT\PRINT " " A1$ " , HAS ANSWERED " S " QUESTION CORRECTLY.\PRINT
008 PRINT "          THE FOLLOWING IS A LISTING OF " A1$ 'S ANSWERS AND THE "
009 PRINT " CORRECT ANSWER FOR EACH PROBLEM
010 PRINT\PRINT\PRINT\PRINT
015 PRINT TAB(5) "PROBLEM";TAB(25) "CORRECT ANSWER";
016 PRINT TAB(50) "A1$;\PRINT " S ANSWER"
017 PRINT\PRINT
019 FOR IZ=1% TO 5%
020 PRINT TAB(8) " IZ;TAB(30) " A(IZ);TAB(52) " B(IZ)
022 NEXT IZ
0000 END

```

ready

3HE718 11:34

22-APR-77

2 REM - THIS IS A PRACTICE SESSION ON STOICHIOMETRY.....  
3 ! THIS PROGRAM HAS BEEN DEVELOPED BY DR. JULIO GALLARDO AND MR. STEVEN DELGADO,  
OF HOSTOS COMMUNITY COLLEGE, AND WAS SUBSIDIZED BY A GRANT FROM THE NATIONAL SCIENCE FOUNDATION.

5 PRINT\PRINT\PRINT  
6 INPUT " CODE # ";N1%\PRINT

7 IF N1% = 1 THEN 98  
10 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME. ";A1%\PRINT  
11 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER. ";A2%\PRINT

15 PRINT " YOUR NAME IS, ";A1%;", AND YOUR SOCIAL SECURITY NUMBER "\PRINT  
16 PRINT " IS, "A2\$ ". ARE THEY CORRECT? TYPE 'Y' FOR YES OR 'N' FOR NO. ";

17 INPUT A4\$ \ PRINT  
18 IF A4\$ = "N" THEN 10  
19 IF A4\$ <> "Y" THEN PRINT " TYPE 'Y' OR 'N' ONLY!!! "\PRINT\GOTO 15  
20 GOTO 98

25 PRINT\PRINT\PRINT  
26 R\$ =SYS(CHR\$(7%))  
29 W=LEN(R\$)\A1\$=MID(R\$,1,W-9)  
30 H1=LEN (A1\$)  
31 A2\$=MID(R\$,H1+1,9)  
32 GOTO 15

98 DIM A(10), B(10)  
99 DIM B\$(10,10)\DIM C\$(10,10).

100 A3\$ = " BASED ON THE FOLLOWING EQUATION: "\PRINT

101 B\$(1,1)=" 2 2 2 "  
103 B\$(2,1)=" 2 2 3 "  
105 B\$(3,1)=" 2 2 2 3 "  
107 B\$(4,1)=" 3 2 "  
109 B\$(5,1)=" 2 3 "  
116 B\$(1,2)=" 2 4 2 4 "  
118 B\$(2,2)=" 4 "  
120 B\$(3,2)=" 4 2 2 7 2 2 3 2 "  
122 B\$(4,2)=" 2 2 2 "  
124 B\$(5,2)=" 5 11 2 2 2 "

300 C\$(1,1)="2H + 0 ----> 2H O "  
301 C\$(2,1)=" N + 3H ----> 2NH "  
302 C\$(3,1)="4FeS + 11O ----> 2Fe O + 8S "  
303 C\$(4,1)="2KClO ----> 2KCl + 3O "  
304 C\$(5,1)="3H S - 2HNO ----> 3S + 2NO + 4H O "  
310 C\$(1,2)="2NaCl + H SO ----> Na SO + 2HCl "  
311 C\$(2,2)=" Ni + 4CO ----> Ni(CO) "  
312 C\$(3,2)=" (NH ) Cr O ----> N + Cr O + 4H "  
313 C\$(4,2)="2KrF + 2H O ----> 2Kr + 4HF "  
314 C\$(5,2)="2C H OH + 15O ----> 10CO - 12H O "

350 FOR Z% = 1 TO 10  
355 RANDOMIZE

35 PRINT\PRINT  
361 PRINT " PROBLEM " Z%  
362 IF Z%<10% THEN PRINT " \*\*\*\*\* \* ELSE PRINT " \*\*\*\*\* \*  
\*"

363 PRINT\PRINT  
370 V1=(INT(700\*RND+100))/100\V2=(INT(710\*RND+90))/100  
371 V1 AND V2 ARE VOLUMES WITH VALUES BETWEEN 1 AND 8 WITH 2 DECIMAL PLACES  
375 M1=(INT(4985\*RND+15))/1000\M2=(INT(4987\*RND+13))/1000  
376 M1 AND M2 ARE MOLES BETWEEN THE VALUES .05 AND .05 WITH 3 DECIMAL PLACES

380 M3=(INT(4000\*RND+1000))/100\M4=(INT(4000\*RND+995))/100  
381 ! M3 AND M4 ARE MASS UNITS IN GRAMS BETWEEN 10 AND 10 WITH 2 DECIMALS  
385 M5=(INT(900\*RND+1.5))/100\M6=(INT(905\*RND+1.5))/100  
386 M5 AND M6 ARE MASS UNITS BETWEEN THE VALUE OF .05 AND 10 WITH 2 DECIMAL PLACES  
390 M7=(INT(29500\*RND+10500))/100\M8=(INT(30000\*RND+10000))/100



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391 ! M7 AND M8 ARE MASS UNITS BETWEEN THE VALUE S OF 100 AND 400 WITH 2 DECIMAL
PLACES.
395 M9=(INT(700*RND+100))/100\M0=(INT(750*RND+50))/100
396 ! M9 AND M0 ARE MASS UNITS BETWEEN THE VALUE OF 1 AND 8 TO BE USED WITH KILOG
RAMS AND HAS 2 DECIMAL PLACES.
400 IF Z%<>1 THEN 410 ELSE PRINT A3%\PRINT
401 PRINT TAB(15)''C$(1,1)\PRINT TAB(15)''B$(1,1)\PRINT
402 PRINT " CALCULATE THE NUMBER OF LITERS OF O (AT STP) NEEDED TO FORM" M1 "MOL
ES"
403 PRINT TAB(36)"2"\PRINT
404 A(1) = (INT(M1*1120))/100
410 IF Z%<>2 THEN 420 ELSE PRINT A3%\PRINT
411 PRINT TAB(15)''C$(4,1)\PRINT TAB(15)''B$(4,1)\PRINT
412 PRINT " CALCULATE THE NUMBER OF MOLES OF O PRODUCED BY HEATING" M3 "g OF"
413 PRINT TAB(35)"2"
414 PRINT " POTASSIUM CHLORATE (KClO )."
415 PRINT TAB(25)"3"\PRINT
416 A(2)=(INT(300*M3/228.9))/100
420 IF Z%<>3 THEN 430 ELSE PRINT A3%\PRINT
421 PRINT TAB(15)''C$(1,2)\PRINT TAB(15)''B$(1,2)\PRINT
422 PRINT " IF" M3 "g OF NaCl ARE REACTED WITH" M4 "g OF SULFURIC ACID"\PRINT
423 PRINT " (H SO ). HOW MANY MOLES OF Na SO ARE PRODUCED?"
424 PRINT TAB(3)"2";TAB(4)"4";TAB(31)"2";TAB(34)"4"\PRINT
425 A(3) = (INT(M3*100/116.9))/100
430 IF Z%<>4 THEN 440 ELSE PRINT A3%\PRINT
431 PRINT TAB(15)''C$(5,1)\PRINT TAB(15)''B$(5,1)\PRINT
432 PRINT " IF" M2 "MOLES OF HYDROGEN SULFIDE GAS REACTS WITH AN EXCESS OF NITRIC
ACID, HOW"\PRINT
433 PRINT " MANY GRAMS OF NITROUS OXIDE ARE PRODUCED? "\PRINT
435 A(4) = (INT(6000*M2/3))/100
440 IF Z%<>5 THEN 450 ELSE PRINT A3%\PRINT
441 PRINT TAB(15)''C$(2,1)\PRINT TAB(15)''B$(2,1)\PRINT
442 PRINT " HOW MANY LITERS OF NITROGEN GAS WOULD DISAPPEAR IN THE PRODUCTION OF"
V1 "L OF"\PRINT
443 PRINT " GASEOUS AMMONIA, BOTH GASES BEING MEASURED AT THE SAME TEMPERATURE AN
D PRESSURE? "\PRINT
445 A(5) = (INT(V1*50))/100
450 IF Z%<>6 THEN 460 ELSE PRINT A3%\PRINT
451 PRINT TAB(15)''C$(3,1)\PRINT TAB(15)''B$(3,1)\PRINT
452 PRINT " HOW MANY KILOGRAMS OF FERRIC OXIDE (Fe O ) CAN BE OBTAINED BY ROASTIN
G" M9
453 PRINT TAB(39)"2";TAB(41)"3"
454 PRINT " kg OF FERROUS SULFIDE (FeS )? "
455 PRINT TAB(27)"2"\PRINT
456 A(6) = (INT(M9*4800/32))/100
460 IF Z%<>7 THEN 470 ELSE PRINT A3%\PRINT
461 PRINT TAB(15)''C$(2,2)\PRINT TAB(15)''B$(2,2)\PRINT
462 PRINT " A" M4 "g SAMPLE OF NICKEL IS ALLOWED TO REACT WITH CARBON MONOXIDE (C
O)".\PRINT
463 PRINT " CALCULATE THE NUMBER OF MOLES OF CO NEEDED TO PRODUCE THE REACTION."
PRINT
465 A(7) = (INT(M4*6.78))/100
470 IF Z%<>8 THEN 480 ELSE PRINT A3%\PRINT
471 PRINT TAB(15)''C$(3,2)\PRINT TAB(15)''B$(3,2)\PRINT
472 PRINT " CALCULATE THE NUMBER OF GRAMS OF AMMONIUM DICROMATE NECESSARY TO PRO
DUCE"\PRINT
473 PRINT V2 "LITERS OF NITROGEN AT STP."\PRINT
475 A(8) = (INT(27600*V2/22.4))/100
480 IF Z%<>9 THEN 490 ELSE PRINT A3%\PRINT
481 PRINT TAB(15)''C$(4,2)\PRINT TAB(15)''B$(4,2)\PRINT
482 PRINT " HOW MANY MOLES OF HYDROGEN FLUORIDE COULD BE PRODUCED BY THE REACTION
PRINT
483 PRINT M2 "MOLES OF KRYPTON (Kr) DIFLUORIDE AND WATER? "\PRINT
485 A(9) = (INT(M2*200))/100

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190 IF Z% < 10 THEN 600 ELSE PRINT A3$ \PRINT
191 PRINT TAB(15) 'C$(5,2) \PRINT TAB(15) 'B$(5,2) \PRINT
192 PRINT ' CALCULATE THE NUMBER OF GRAMS OF OXYGEN REQUIRED TO BURN' M8 'g' \PRIN
193 PRINT ' OF C H OH TO CARBON DIOXIDE (CO2) AND WATER.
194 PRINT TAB(5)'5';TAB(7)'11';TAB(33)'2' \PRINT \PRINT
195 A(10) = (INT(272.73*M8))/100
600 IF N1% = 1 THEN 699 ELSE 750
699 C1 = 0 \IF Z% = 10 THEN 800
700 NEXT Z%
750 PRINT \PRINT \INPUT ' YOUR ANSWER -----> ' ; B(Z%)
752 PRINT \IF (ABS(A(Z%) - B(Z%))) > .01 THEN 780 ELSE PRINT ' CORRECT !!!!! '
753 S = S + 1 \PRINT \GOTO 699
780 C1 = C1 + 1 \IF C1 = 1 THEN PRINT ' YOU ARE INCORRECT, TRY AGAIN. ' ELSE PRINT
' YOU ARE WRONG AGAIN, THE CORRECT ANSWER IS -----> ' A(Z%);
781 IF C1 = 1 THEN 750
782 IF Z% = 5 THEN PRINT 'liters' ELSE IF Z% = 8 THEN PRINT 'grams' ELSE IF Z% = 2 THEN
PRINT 'moles' ELSE IF Z% = 3 THEN PRINT 'moles' ELSE IF Z% = 7 THEN PRINT 'moles' EL
SE IF Z% = 9 THEN PRINT 'moles'
784 IF Z% = 1 THEN PRINT 'liters' ELSE IF Z% = 6 THEN PRINT 'kg' ELSE IF Z% = 4 THEN PR
INT 'grams' ELSE IF Z% = 10 THEN PRINT 'grams' \GOTO 699
785 GOTO 699
800 PRINT \PRINT \PRINT ' A1$ ' HAS ENDED THIS SESSION AT 'TIME$(0)' . \PRINT
801 PRINT ' A1$ ' HAS ANSWERED ' S ' QUESTIONS CORRECTLY. \PRINT
802 PRINT 'HERE ARE THE CORRECT ANSWERS AND ' A1$ ' 'S ANSWERS.'
803 PRINT \PRINT
806 PRINT TAB(8) 'PROBLEM'; TAB(28) 'CORRECT ANSWER'; TAB(58) 'STUDENT'S ANSWER'
807 PRINT TAB(8) '*****'; TAB(28) '*****'; TAB(58) '*****' \PRINT
\PRINT
810 FOR JZ = 1 TO 10
811 IF JZ < 10 THEN PRINT TAB(10) 'JZ'; ELSE PRINT TAB(9) 'JZ';
812 PRINT TAB(32) 'A(JZ); TAB(63) 'B(JZ)
815 NEXT JZ
3000 END

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Ready







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126 PRINT "WHAT WOULD BE THE VOLUME OF THE SAME GAS IF THE PRESSURE IS CHANGED TO
0"
127 PRINT P2 "A4$ "? "
128 A(5)=(INT(100*P1*V1/P2))/100
130 IF Z<6 THEN 140 ELSE PRINT "THE PRESSURE OF A GAS IS P5 A5$ WHEN THE TEMP
ERATURE IS T1"
131 PRINT "A8$ A2$, WHAT WOULD THE PRESSURE BE IF THE TEMPERATURE
132 PRINT "CHANGES TO T2 A8$ A2$ "?
135 A(6)=(INT(100*P5*(FNC(T2)+273)/(FNC(T1)+273)))/100
140 IF Z<7 THEN 150 ELSE PRINT "WHAT WOULD THE TEMPERATURE OF V1 A6$ OF A GAS
BE,"
141 PRINT "IF V2 A6$ OF THE SAME GAS HAVE A TEMPERATURE OF T1
142 PRINT "A8$ A2$ "?
145 A(7)=(INT(100*(FNC(T1)+273)*V1/V2))/100
150 IF Z<8 THEN 155 ELSE PRINT "WHAT WOULD THE VOLUME OF A GAS BE WHEN THE TEMP
ERATURE IS T1"
151 PRINT "A8$ A1$, IF THE VOLUME AT STP IS V1 A6$ AND THE
152 PRINT "PRESSURE REMAINS UNCHANGED? "
153 A(8)=(INT(100*V1*(T1+273)/273))/100
155 IF Z<9 THEN 160 ELSE PRINT "A GAS MEASURES V1 A6$ AT P4 A5$, CALCULATE
ITS VOLUME"
156 PRINT "AT P5 A5$ "
157 A(9)=(INT(100*P4*V1/P5))/100
160 IF Z<10 THEN 165 ELSE PRINT "A SAMPLE OF GAS HAS A VOLUME OF V1 A6$ WHEN
MEASURED"
161 PRINT "AT T1 A8$ A1$ AND P1 A4$, WHAT VOLUME WILL IT
162 PRINT "OCCUPY AT THE SAME TEMPERATURE AND P2 A4$ "?
164 A(10)=(INT(100*V1*P1/P2))/100
165 IF Z<11 THEN 170 ELSE PRINT "A SAMPLE OF GAS OCCUPIES V1 A6$ AT T1 A8$
A1$
166 PRINT "AND P1 A4$, WHAT VOLUME WILL IT HAVE AT T2 A8$ A1$
167 A(11)=(INT(100*V1*(T2+273)/(T1+273)))/100
170 IF Z<12 THEN 175 ELSE PRINT "A SAMPLE OF GAS OCCUPIES V3 A7$ AT T1 A8$
A2$ "
171 PRINT "CALCULATE ITS VOLUME WHEN THE TEMPERATURE IS T2 A8$ A2$ "
173 A(12)=(INT((V1*(FNC(T2)+273)*100)/(FNC(T1)+273)))/100
175 IF Z<13 THEN 185 ELSE PRINT "A SAMPLE OF GAS OCCUPIES V3 A7$ AT P1 A4$
AND T1
176 PRINT "A8$ A1$, AT WHAT TEMPERATURE IN A8$ A1$ WOULD THE
177 PRINT "PRESSURE BE P2 A4$ , IF THE VOLUME REMAINS CONSTANT? "
179 A(13)=(INT(100*P2*(FNC(T1)+273)/P1))/100 -273
185 IF Z<14 THEN 195 ELSE PRINT "A CERTAIN GAS OCCUPIES A VOLUME OF V1 A6$ AT
T1 A8$
186 PRINT "A1$ AND P1 A4$, WHAT VOLUME WILL IT OCCUPY AT STP? "
188 A(14)=(INT(100*(P1*V1*(T2+273)/((T1+273)*P2)))/100
195 IF Z<15 THEN 500 ELSE PRINT "A GAS MEASURES V1 A6$ AT STP, CALCULATE ITS
PRESSURE IN A5$
196 PRINT "IF ITS VOLUME IS CHANGED TO V3 A7$ AND THE TEMPERATURE TO T1
197 PRINT "A8$ A1$ "
198 A(15)=(INT((V1*100*(T1+273))/(273*V2)))/100
499 PRINT\PRINT
500 IF NZ=1 THEN 1999
501PRINT
502 INPUT "YOUR ANSWER ---->" B(Z)
503 PRINT
505 IF (ABS(A(Z)-B(Z)))>.01 THEN 600 ELSE PRINT A9$\SL=S1+1
506 GOTO 1999
507 ! S1 COUNTS CORRECT ANSWERS
500 C1=C1+1\IF C1=1 THEN PRINT B2$ ELSE PRINT B3$
505 IF C1=1 THEN 501 ELSE PRINT A(Z);
506 IF Z=1 THEN PRINT "A8$ ELSE IF Z=2 THEN PRINT "A5$ ELSE IF Z=3 THEN PRINT "
A4$ ELSE IF Z=4 THEN PRINT "A6$ ELSE IF Z=5 THEN PRINT "A6$ ELSE IF Z=6 THEN PRIN
" ELSE GOTO 607

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207 IF Z=7 THEN PRINT 'A8$' 'A3$ ELSE IF Z=8 THEN PRINT 'A6$ ELSE IF Z=9 THEN PRINT
'A6$ ELSE IF Z=10 THEN PRINT 'A6$ ELSE IF Z=11 THEN PRINT A6$ ELSE GOTO 608
608 IF Z=12 THEN PRINT 'A7$ ELSE IF Z=13 THEN PRINT 'A8$' 'A1$ ELSE IF Z=14 THEN
PRINT 'A6$ ELSE IF Z=15 THEN PRINT 'A5$ \GOTO 1999
1999 Z1=Z1+1 \PRINT \IF Z1=6 THEN 2019 ELSE IF Z1=11 THEN 2019
2014 IF Z>14 THEN 2400
2015 C1=0 \NEXT Z
2019 PRINT
2020 PRINT ' IF YOU WISH TO CONTINUE TYPE 'YES', OTHERWISE TYPE 'NO'.' ;
2021 INPUT S5$
2022 PRINT \PRINT \PRINT
2025 IF S5$="NO" THEN 2400 ELSE 2015
2400 PRINT ' THE STUDENT ' N1$ ' HAS ENDED THIS SESSION. 'N1$
2401 PRINT \PRINT ' HAS ANSWERED ' S1 ' QUESTIONS CORRECTLY. ' \PRINT
2405 PRINT ' HERE ARE THE CORRECT ANSWERS AND 'N1$ ' 'S ANSWERS: '
2499 PRINT \PRINT \PRINT
2500 PRINT TAB(5) "PROBLEM"; TAB(18) " CORRECT ANSWER"; TAB(40) "STUDENT'S ANSWER"
2502 PRINT TAB(5) "*****"; TAB(18) " *****"; TAB(40) "*****"
2505 PRINT \PRINT
2510 FOR Z=1 TO Z1-1
2512 PRINT TAB(8) 'Z; TAB(25) 'A(Z); TAB(46) 'B(Z)
2520 NEXT Z
3000 END

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163 PRINT " ARE NECESSARY TO YIELD " X5 " GRAMS OF SILVER NITRATE? "
165 A(7)= (INT(10000*X5/Y1))/100
170 IF Z<>8 THEN 180 ELSE PRINT " CALCULATE THE WEIGHT OF ANHYDROUS HCl IN " X5 "
  ml OF CONCENTRATED "
171 PRINT " HYDROCHLORIC ACID OF DENSITY 1.19g/ml AND CONTAINING "Y1"% HCl"
172 PRINT " BY WEIGHT. "
175 A(8)= (INT(X5*1.19*Y1))/100
180 IF Z<>9 THEN 200 ELSE PRINT " WHAT IS THE MOLALITY OF A SOLUTION WHICH CONTAI
NS "X6 "g OF CANE"
181 PRINT " SUGAR, C H O , DISSOLVED IN " X1 " GRAMS OF WATER? "
182 PRINT "          12 22 11 "
185 A(9)= (INT(1000*X6/(342*X1)))/1000
200 IF Z<>10 THEN 210 ELSE PRINT " CALCULATE THE VOLUME OF CONCENTRATED SULFURIC
ACID, OF DENSITY 1.84g/ml"
201 PRINT " AND CONTAINING "Y2"% OF SULFURIC ACID BY WEIGHT, THAT WOULD CONTAIN "
202 PRINT X5 " GRAMS OF PURE SULFURIC ACID. "
205 A(10)= (INT(10000*X5/(Y1*1.84)))/100
210 IF Z<>11 THEN 220 ELSE PRINT " CALCULATE THE PERCENT OF THE SOLUTE IN A SOLUT
ION THAT CONTAINS "Y1"%"
211 PRINT " OF POTASSIUM CARBONATE IN "X2"%" OF WATER. "
215 A(11)= (INT(10000*Y1/X2))/100
220 IF Z<>12 THEN 230 ELSE PRINT " CALCULATE THE GRAMS OF WATER THAT MUST BE ADDE
D TO " X5 " GRAMS OF "
221 PRINT " POTASSIUM IODIDE IN THE PREPARATION OF A " Y1 " PERCENT POTASSIUM "
222 PRINT " IODIDE SOLUTION. "
225 A(12)= (INT(X5*100*(100-Y1)/Y1))/100
230 IF Z<>13 THEN 240 ELSE PRINT " CALCULATE THE MOLALITY OF A SOLUTION CONTAININ
G "X5"%" OF SULFURIC"
231 PRINT " ACID IN " X1 "%" OF WATER. "
235 A(13)= (INT(100000*X5/(98*X1)))/100
240 IF Z<>14 THEN 250 ELSE PRINT " HOW MANY GRAMS OF SOLUTE ARE NEEDED TO PREPARE
" X2 "%" OF A "
241 PRINT Y1/100 " MOLAL SOLUTION OF ETHYLENE GLYCOL (C H O )? "
242 PRINT "          2 6 2 "
245 A(14)= (INT(62*Y1*X2/(1000+62*Y1)))/100
250 IF Z<>15 THEN 260 ELSE PRINT " CALCULATE THE NUMBER OF GRAMS OF WATER THAT M
UST BE ADDED TO "Y1/25"
251 PRINT " MOLES OF PRESTONE (C H O ) IN THE PREPARATION OF A " Y2"m SOLUTION. "
252 PRINT "          2 6 2 "
255 A(15)= (INT(100000*Y1/(25*Y2)))/100
260 PRINT\IF NZ=1 THEN 1999
261 INPUT " YOUR ANSWER -----> " ;B(Z)
265 IF ABS(A(Z)-B(Z))>.1 THEN 399 ELSE 499
399 PRINT
400 C1=C1+1\IF C1=1 THEN PRINT " YOU ARE INCORRECT. TRY AGAIN. " ELSE PRINT " Y
OU ARE WRONG AGAIN. THE CORRECT ANSWER IS -----> " A(Z);
401 IF C1=1 THEN 260
402 IF Z=2 THEN PRINT "%" ELSE IF Z=4 THEN PRINT "MOLAL" ELSE IF Z=9 THEN PRINT "MO
LAL" ELSE IF Z=10 THEN PRINT "m1" ELSE IF Z=13 THEN PRINT "MOLAL" ELSE IF Z=11 TH
EN PRINT "%" ELSE PRINT "GRAMS"
403 PRINT
405 IF C1=1 THEN 100 ELSE 1999
499 PRINT
500 PRINT " CORRECT !!!!! " ;S1Z=S1Z+1Z
1999 C1=0\IF Z=5 THEN 2010 ELSE IF Z=10 THEN 2010
2000 NEXT Z
2009 IF Z = 15 THEN 2480
2010 PRINT\PRINT\PRINT " IF YOU WISH TO STOP HERE, TYPE 'N', OTHERWISE, PRESS 'RE
TURN'. ";
2012 INPUT Q$
2014 IF Q$="N" THEN 2480 ELSE 2000
2015 PRINT\PRINT\PRINT
2016 PRINT " A5$ " HAS ENDED THIS SESSION. "A5$ " HAS ANSWERED "S1Z" QUESTI
ON INCORRECTLY. "

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2485 PRINT\PRINT\PRINT " HERE ARE " A5# "'S ANSWERS AND THE CORRECT ANSWERS. "  
2486 PRINT\PRINT  
2500 PRINT TAB(8) "PROBLEM";TAB(28) "CORRECT ANSWER";TAB(58) "STUDENT'S ANSWER"  
2501 PRINT TAB(8) "*****";TAB(28) "***** *****";TAB(58) "***** *****"\F  
RINT\PRINT  
2505 FOR Z=1 TO 15  
2506 IF Z<10 THEN PRINT TAB (11)''Z;  
2507 IF Z>9 THEN PRINT TAB(10)''Z;  
2510 PRINT TAB(31)''A(Z);TAB(65)''B(Z)  
2511 NEXT Z  
3000 END
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141 PRINT " BARIUM HYDROXIDE (Ba(OH) )?"
142 PRINT TAB(25)*2"
145 A(5%)=(INT(N1*V1*100))/100
150 IF Z% > 6 THEN 160 ELSE PRINT " WHAT IS THE EQUIVALENT WEIGHT OF ALUMINUM HYD
ROXIDE (Al(OH) ), WHERE "
151 PRINT TAB(60)*3"
152 PRINT " ONLY ONE OF THE HYDROXIDE IONS REACT? "
155 A(6%)=78
160 IF Z% > 7 THEN 170 ELSE PRINT " CALCULATE THE MOLARITY OF A P1 " % CALCIUM NIT
RATE (Ca(NO) ) SOLUTION"
161 PRINT TAB(57)*3";TAB (59)*2"
162 PRINT " WITH A DENSITY OF" N1 " g/ml."
165 A(7%)=(INT(100*P1*N1/164))/100
170 IF Z% > 8 THEN 180 ELSE PRINT " CALCULATE THE NORMALITY OF A SOLUTION CONTAIN
ING" M2 " G OF SODIUM"
171 PRINT " HYDROXIDE (NaOH) IN" V2 " ml OF SOLUTION."
175 A(8%)=(INT(M2*100000/V2))/100
180 IF Z% > 9 THEN 190 ELSE PRINT " CALCULATE THE MOLARITY OF A SULFURIC ACID SOL
UTION OF SPECIFIC GRAVITY"
181 PRINT N2 " g/ml CONTAINING" P1 " % H SO BY WEIGHT."
182 PRINT TAB(30)*2";TAB(33)*4"
185 A(9%)=(INT(1000*N2*P1/98))/100
190 IF Z% > 10 THEN 200 ELSE PRINT " HOW MANY EQUIVALENTS OF SOLUTE ARE CONTAINED
IN" V4 " ml OF A" N3 " M"
191 PRINT " SOLUTION"
195 A(10%)=(INT(100*N3*V4))/100
200 IF Z% > 11 THEN 210 ELSE PRINT " HOW MANY MILLILITERS OF CONCENTRATED SULFUR
IC ACID (H SO ), OF SPECIFIC"
201 PRINT TAB(54)*2";TAB(57)*4"
202 PRINT " GRAVITY " 34 CONTAINING " 8% SULFURIC ACID BY WEIGHT SHOULD BE "
203 PRINT " TO MAKE " V1 " ml OF " " M SOLUTION?"
205 A(11%)=(INT(N1*V1/36.8))/100
210 IF Z% > 12 THEN 220 ELSE PRINT " CALCULATE THE NORMALITY OF A" N2 " M PHOSPHOR
IC ACID (H PO ) SOLUTION "
211 PRINT TAB(56)*3";TAB(59)*4"
212 PRINT " IN A REACTION THAT ONLY REPLACES TWO HYDROGEN IONS. "
215 A(12%)=(INT(N2*300/2))/100
220 IF Z% > 13 THEN 230 ELSE PRINT " CALCULATE THE NUMBER OF GRAMS OF SOLUTE NECES
SARY TO PREPARE" V2 " ml "
221 PRINT " OF A" N2 " M SODIUM SULFATE (Na SO ) SOLUTION. "
222 PRINT TAB(33)*2";TAB(36)*4"
225 A(13%)=(INT(N2*V2*142/10))/100
230 IF Z% > 14 THEN 240 ELSE PRINT " CALCULATE THE NUMBER OF ml OF SOLUTION REQUIR
ED TO PROVIDE" M4 " g OF"
231 PRINT " SULFURIC ACID (H SO ) FROM A" N3 " M SOLUTION IN A REACTION THAT REPL
ACES"
232 PRINT TAB(17)*2";TAB(20)*4"
233 PRINT " ONLY ONE HYDROGEN ION."
235 A(14%)=(INT(M4*100000/(98*N3)))/100
240 IF Z% > 15 THEN 250 ELSE PRINT " A HYDROCHLORIC ACID SOLUTION IS APPROXIMATELY
" P1 " % HYDROCHLORIC ACID (HCl)"
241 PRINT " AND ITS DENSITY IS" N1 " g/ml. CALCULATE THE NORMALITY OF THE HYDROCH
LORIC "
242 PRINT " ACID."
245 A(15%)=(INT(1000*P1*N1/36.45))/100
250 IF Q%=1 THEN 1999
300 PRINT\INPUT " YOUR ANSWER -----> " ;B(Z%)
305 PRINT\IF ABS(A(Z%)-B(Z%))>.1 THEN 399 ELSE 499
399 PRINT
400 C1=C1+1\IF C1=1 THEN PRINT " YOU ARE INCORRECT. TRY AGAIN. " ELSE PRINT "
YOU ARE WRONG AGAIN. THE CORRECT ANSWER IS -----> " A(Z%);
401 IF C1=1 THEN 300

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002 IF ZZ=1 THEN PRINT " M" ELSE IF ZZ=2 THEN PRINT " N" ELSE IF ZZ=3 THEN PRINT "
-EQUIV." ELSE IF ZZ=4 THEN PRINT " S" ELSE IF ZZ=5 THEN PRINT " m-EQUIV." ELSE 4
003 IF ZZ=6 THEN PRINT " 's" ELSE IF ZZ=7 THEN PRINT " M" ELSE IF ZZ=8 THEN PRINT
" N" ELSE IF ZZ=9 THEN PRINT " M" ELSE IF ZZ=10 THEN PRINT " EQUIV." ELSE IF ZZ=1
THEN PRINT " m1" ELSE 404
004 IF ZZ=12 THEN PRINT " N" ELSE IF ZZ=13 THEN PRINT " S" ELSE IF ZZ=14 THEN PRI
IT " m1" ELSE IF ZZ=15 THEN PRINT " N"
005 PRINT\PRINT\GOTO 1999
009 PRINT
010 PRINT " CORRECT !!!" \S1Z=S1Z+1Z
0099 C1=0\IF ZZ=5 THEN 2010 ELSE IF ZZ=10 THEN 2010 ELSE IF ZZ=15 THEN 2010 ELSE
IF ZZ=20 THEN 2010
0000 NEXT ZZ
0009 IF ZZ=15 THEN 2480
0010 PRINT\PRINT\PRINT " IF YOU WISH TO STOP HERE, TYPE 'Y' OTHERWISE PRESS
RETURN."
0012 INPUT Q$
0014 IF Q$="Y" THEN 2480 ELSE 2000
0480 PRINT\PRINT\PRINT
0481 PRINT " "A1$ " HAS ENDED THIS SESSION. "A1$ " HAS ANSWERED "S% " QUEST
IONS CORRECTLY. "
0485 PRINT\PRINT\PRINT " HERE ARE THE CORRECT ANSWERS AND "A1$ "S ANSWERS. "
0486 PRINT\PRI
0500 PRINT TAB(3) "PROBLEM TA (28) "CORRECT ANSWER";TAB(58) "STUDENT'S ANSWER"
0501 PRINT TAB(3) "*****" TA (28) "*****" *****;TAB(58) "*****" *****\P
RINT\PRINT\PRINT
0505 FOR JZ=1Z TO ZZ
0506 IF JZ<10Z THEN PRINT TAB(11)"/JZ;
0507 IF JZ>9Z THEN PRINT TAB(10)"/JZ;
0510 PRINT TAB(31)"/A(JZ); TAB(35)"/B(JZ)
0511 NEXT JZ
3000 END

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Ready







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115 IF Z<>4 THEN 120 ELSE PRINT " WHAT VOLUME WILL " V3 " LITERS OF HELIUM, MEASURE
D AT T2 "C, OCCUPY"
116 PRINT " AT T1 "C ? "
118 A(4)=(INT(100*V3*(T1+273)/(T2+273)))/100
120 IF Z<>5 THEN 125 ELSE PRINT " A STEEL TANK CONTAINS CARBON DIOXIDE AT T1 "C
AND A PRESSURE OF P4 "ATM."
121 PRINT " DETERMINE THE INTERNAL PRESSURE WHE THE TANK IS HEATED TO T2 "C.
122 A(5)=(INT(100*P4*(T2+273)/(T1+273)))/100
125 IF Z<>6 THEN 130 ELSE PRINT " GIVEN V " LITERS OF AMMONIA AT T1 "C AND P1
"TORR, DETERMINE ITS"
126 PRINT " VOLUME AT T2 "C AND P3 "TORR. "
127 A(6)=(INT(100*V3*((T2+273)/(T1+273))*(P1/P3)))/100
130 IF Z<>7 THEN 135 ELSE PRINT " THE VOLUME OF A QUANTITY OF SULFUR DIOXIDE AT
T1 "C AND P3 "TORR, IS"
131 PRINT " V3 LITERS. CALCULATE ITS VOLUME AT STANDART CONDITIONS (STP). "
133 A(7)=(INT(100*V3*(273/(T1+273))*((P3/760))))/100
135 IF Z<>8 THEN 140 ELSE PRINT " A MASS OF HYDROGEN OCCUPIES V4 "LITERS AT T2
" F AND P5 "ATM. FIND ITS"
136 PRINT " VOLUME AT T1 " F AND P4 "ATM. "
137 C(8)=V4*P5*100*(FNC(-T1)+273)/D(8)=(FNC(T2)+273)*P4
138 A(8)=(INT(C(8)/D(8)))/100
140 IF Z<>9 THEN 145 ELSE PRINT " TO HOW MANY ATMOSPHERES PRESSURE MUST A LITER O
F GAS MEASURED AT P4 "ATM"
141 PRINT " AND T2 "C BE SUBJECT TO BE COMPRESSED TO 1/2 LITER WHEN THE TEMPERAT
URE"
142 PRINT " IS T1 "C?"
144 A(9)=(INT(100*P4*(1/.5)*((T2+273)/(T1+273))))/100
145 IF Z<>10 THEN 499 ELSE PRINT " A GIVEN SAMPLE OF A GAS HAS A VOLUME OF V4 "L
ITERS AT T1 "C AND P2
146 PRINT " TORR, ITS VOLUME AND TEMPERATURE ARE CHANGED TO V3 "LITERS AND T2
"C,
147 PRINT " RESPECTIVELY. CALCULATE THE PRESSURE AT THIS CONDITIONS. "
149 A(10)=(INT(100*P2*V4*(T2+273)/(T1+273)*V3))/100
499 PRINT\PRINT
500 Z9=0\IF NZ=1 THEN 1999.
501PRINT
502 INPUT " YOUR ANSWER ---->" B(Z)
503 PRINT
505 IF (ABS(A(Z)-B(Z)))>.01 THEN 600 ELSE PRINT A9%\S1=S1+1
506 GOTO 1999.
507 ! S1 COUNTS CORRECT ANSWERS
600 C1=C1+1\IF C1=1 THEN PRINT B2% ELSE PRINT B3%;
605 IF C1=1 THEN 501 ELSE PRINT A(Z);
606 IF Z=2 THEN PRINT "ml" ELSE IF Z=3 THEN PRINT "ml" ELSE IF Z=5 THEN PRINT "AT
M" ELSE IF Z=9 THEN PRINT "ATM" ELSE IF Z=10 THEN PRINT "TORR" ELSE PRINT "liters
"
1999 Z1=Z1+1\PRINT\IF Z1=6 THEN 2019 ELSE IF Z1=11 THEN 2016
2014 IF Z>9 THEN 2400
2015 C1=0\NEXT Z
2016 PRINT\PRINT\PRINT " IF YOU WISH TO CONTINUE TO HARDER PROBLEMS TYPE 'Y
ES' OTHERWISE 'NO'.";
2017 INPUT S6%
2018 PRINT\PRINT\ IF S6%="NO" THEN 2400 ELSE 2498
2019 PRINT
2020 PRINT " IF YOU WISH TO CONTINUE TYPE 'YES', OTHERWISE TYPE 'NO'.";
2021 INPUT S5%
2022 PRINT\PRINT\PRINT
2025 IF S5%="NO" THEN 2400 ELSE 2015
2400 PRINT " " N1% " HAS ENDED THIS SESSION AT " TIME$(0)", " N1%
2401 PRINT\PRINT " HAS ANSWERED " S1 " QUESTIONS CORRECTLY. "\PRINT
2 PRINT " HERE ARE THE CORRECT ANSWERS AND N1% 'S ANSWERS: "
2 PRINT\PRINT\PRINT
2 PRINT TAB(5) "*****" :TAB(18) "*****" :TAB(40) "*****"

```

```
2500 PRINT TAB(5) "PROBLEM ";TAB(18) "CORRECT ANSWER";TAB(40) "STUDENT'S ANSWER"  
2501 PRINT TAB(5) "*****";TAB(18) "*****";TAB(40) "*****"  
2505 PRINT\nPRINT  
2510 FOR Z=1 TO 10  
2512 IF Z<10 THEN PRINT TAB(7) "Z"; ELSE PRINT TAB(6) "Z"  
2513 PRINT TAB(24) "A(Z); TAB(45) "B(Z)"  
2520 NEXT Z  
2530 IF S6$="YES" THEN CHAIN"CHE038" ELSE 3000  
3000 END
```

ME038 12:36

20-Apr-77

```
REM - THIS IS A MORE DIFFICULT PRACTICE SESSION IN GAS LAWS.
THIS PROGRAM HAS BEEN DEVELOPED BY DR. JULIO GALLARDO, OF HOSTOS COMMUNITY
COLLEGE, AND WAS SUBSIDIZED BY A GRANT FROM THE NATIONAL SCIENCE FOUNDATION.
PRINT\PRINT\PRINT
INPUT "      CODE # "; NZ
! NZ=1 WILL GIVE A PRINT OUT OF THE PROBLEMS WITH ANSWERS.
PRINT\PRINT IF NZ=1 THEN 49
! N1$ WILL BE THE STUDENT'S NAME WHILE S1$ WILL BE HIS SOCIAL SECURITY NUMBER
1 DIM A(15),B(15)
2 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR NAME. " ; N1$
3 PRINT
4 INPUT " AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER. " ; S1
5 PRINT
10 PRINT " YOUR NAME IS, " N1$ " AND YOUR SOCIAL SECURITY NUMBER " \PRINT
11 PRINT " IS, " S1$ ". ARE THEY CORRECT? TYPE 'YES' OR 'NO'. " ;
12 INPUT S2$
15 PRINT\PRINT IF S2$="NO" THEN 12 ELSE IF S2$="YES" THEN PRINT "      TYPE 'YES
\ OR 'NO' ONLY!!!! " ELSE 27
26 PRINT\PRINT GOTO 20
27 PRINT\PRINT\PRINT "      " N1$ " HAS STARTED THIS SESSION AT " TIME$(0)
19 Z1=11
10 RANDOMIZE
12 FOR Z = Z1 TO 15
15 T1=(INT(1000*RND+500))/10 T2=(INT(1000*RND+400))/10
16 ! T1 AND T2 ARE TEMPERATURES WITH VALUES BETWEEN 50 AND 150 DEGREES
18 P1=(INT(7050*RND+5500))/10 P2=(INT(8050*RND+4050))/10 P3=(INT(7000*RND+8000))/
10 M1=(INT(1845*RND+155))/1000 M2=(INT(1845*RND+155))/1000
19 ! P1,P2,P3 ARE VALUES OF PRESSURE BETWEEN 400 AND 1500
20 P4=(INT(40*RND+15))/10 P5=(INT(43*RND+16))/10
21 ! P4 AND P5 ARE VALUES OF PRESSURE IN ATM
22 V1=(INT(10000*RND+2000))/10 V2=(INT(10000*RND+2000))/10
23 ! V1 AND V2 ARE VALUES OF VOLUME IN MILLILITERS AND V3 IN LITERS
24 V3=(INT(75*RND+15))/10 V4=(INT(400*RND+100))/10
27 PRINT\PRINT
28 Z9=Z9+1 FOR I=30 TO 49 PRINT TAB(I) "*" ; \NEXT I
29 PRINT TAB(50) "*" \IF Z9=2 THEN 80 ELSE PRINT TAB(30) "*" ; \PRINT TAB(35) "PROBL
EM " Z ; \PRINT TAB(50) "*" \GOTO 68
30 DEF FNC(T1)=(5*(T1-32))/9
31 DEF FNB(T1)=9*T1/5 +32
35 A9$= "      CORRECT !!!!! "
37 B2$= "      YOU ARE INCORRECT. TRY AGAIN"
38 B3$= "      YOU ARE WRONG AGAIN. THE CORRECT ANSWER IS -----"
39 PRINT\PRINT
50 IF Z > 11 THEN 155 ELSE PRINT " AN IDLING, UNTUNED CAR ENGINE CAN PRODUCE " V2
1/min OF EXHAUST AT " T1 "C"
51 PRINT " THAT CONTAINS " V3, "% BY VOLUME OF CARBON MONOXIDE (CO). HOW MANY MOLE
S OF CO"
52 PRINT " DOES THE EXHAUST DELIVER PER MINUTE (R=0.082 l-atm/mole/deg)."
54 A(11) = (INT(1219.512*V2*V3/(273+T1)))/100
55 IF Z > 12 THEN 160 ELSE PRINT " ASSUME THAT YOUR LUNGS CAN HOLD ABOUT " V2 "ml
IF AIR AT STP. IF YOU TAKE A"
56 PRINT " DEEP BREATH AND HOLD IT, THEN DIVE INTO THE OCEAN TO A DEPTH AT WHICH
THE"
57 PRINT " TEMPERATURE IS" T1 "C AND THE PRESSURE IS" P3 "TORR, WHAT WILL BE THE
\PRINT " VOLUME OF AIR IN YOUR LUNGS? "
58 A(12)=(INT(V2*(T1+273)*278.39/P3))/100
60 IF Z > 13 THEN 165 ELSE PRINT " IF " V2 "ml OF A GAS MEASURED AT " T2 "C AND " P3
"TORR HAS A MASS OF " M1
61 PRINT " #, WHAT IS ITS MOLECULAR MASS? "
13)=(INT(M1*6232*1000*(T2+273)/(V2*P3)))/100
```

```

165 IF Z>14 THEN 170 ELSE PRINT " CALCULATE THE DENSITY OF METHANE (CH4) AT " T
166 PRINT TAB(37) "4"
167 A(14)=(INT(25.67*P1/(273-T1)))/100
170 IF Z>15 THEN 500 ELSE PRINT " HALOTHANE IS A NONFLAMMABLE, NONIRRITATING, GE
171 PRINT " MANY INSTANCES IS SUPERIOR TO ETHYL ETHER. AT" T1 "C AND" P1 "TORR," M1
172 PRINT " g OF THE GAS OCCUPIES A VOLUME OF" V1 "ml. ITS COMPOSITION IS 12.2% CA
173 PRINT " 0.5% HYDROGEN, 40.5% BROMINE, 18.0% CHLORINE, AND 28.9% FLOURINE. CAL
174 PRINT " THE MOLECULAR MASS FOR HALOTHANE. "
175 A(15)=(INT(M1*6232*1000*(T1+273)/(V1*P1)))/100
199 PRINT\PRINT
500 Z9=0\IF NZ=1 THEN 1999.
501PRINT
502 INPUT "          YOUR ANSWER ----->" B(Z)
503 PRINT
505 IF (ABS(A(Z)-B(Z)))>.01 THEN 600 ELSE PRINT A9$\S1=S1+1
506 GOTO 1999
507 ! S1 COUNTS CORRECT ANSWERS
500 C1=C1+1\IF C1=1 THEN PRINT B2$ ELSE PRINT B3$;
505 IF C1=1 THEN 501 ELSE PRINT A(Z);
506 IF Z=11 THEN PRINT " moles " ELSE IF Z=12 THEN PRINT " ml " ELSE IF Z=13 THEN
PRINT " amu " ELSE IF Z=14 THEN PRINT " g/ml " ELSE IF Z=15 THEN PRINT " amu "
1999 Z1=Z1+1\PRINT\IF Z1=16 THEN 2400
2014 IF Z>14 THEN 2400
2015 C1=0\NEXT Z
2022 PRINT\PRINT\PRINT
2400 PRINT " N1$ " HAS ENDED THIS SESSION AT " TIME$(0) ". "N1$
2401 PRINT\PRINT " HAS ANSWERED " S1 " QUESTIONS CORRECTLY. "\PRINT
2405 PRINT " HERE ARE THE CORRECT ANSWERS AND "N1$ " S ANSWERS: "
2498 PRINT\PRINT\PRINT
2499 PRINT TAB(5) "***** ";TAB(18) " *****";TAB(40) "*****"
2500 PRINT TAB(5) "PROBLEM ";TAB(18) " CORRECT ANSWER";TAB(40) "STUDENT'S ANSWER"
2501 PRINT TAB(5) "***** ";TAB(18) " *****";TAB(40) "*****"
2505 PRINT\PRINT
2510 FOR Z = 11 TO 15
2512 PRINT TAB(6) Z;
2513 PRINT TAB(24) A(Z); TAB(45) B(Z)
2520 NEXT Z
50000 END

```





HOW MANY PROBLEMS DO YOU WANT ? 3

\*\*\*\*\*  
PROBLEM 1  
\*\*\*\*\*

A BRASS BAR WEIGHING 39.45 LBS IS MADE OF 79.08 % ZINC AND THE BALANCE OF COPPER. HOW MANY LBS. OF COPPER DOES IT CONTAIN?

\*\*\*\*\*  
PROBLEM 2  
\*\*\*\*\*

A TRUCK CARRYING 674.12 LBS OF COAL WEIGHED 1464.58 LBS. WHAT PERCENT OF THE TOTAL WEIGHT WAS DUE TO THE WEIGHT OF THE TRUCK?

\*\*\*\*\*  
PROBLEM 3  
\*\*\*\*\*

HOW MANY SHEETS OF METAL 1/8 INCHES THICK ARE THERE IN A FILE 75.54 INCHES HIGH?

DO YOU WANT MORE PROBLEMS ? NO

PROBLEM	CORRECT ANSWER	STUDENT ANSWER
*****	*****	*****
1	8.25294	0
2	53.9718	0
3	604.32	0

CODE # ?

AFTER THE QUESTION MARK (?), TYPE YOUR NAME. ? JOHN DOE

AFTER THE QUESTION MARK (?), TYPE YOUR SOCIAL SECURITY NUMBER. ? 000001977

YOUR NAME IS, JOHN DOE, AND YOUR SOCIAL SECURITY NUMBER

IS, 000001977. ARE THEY CORRECT? TYPE 'Y' FOR YES AND 'N' FOR NO. ? U

TYPE 'Y' OR 'N' ONLY !!!!!

YOUR NAME IS, JOHN DOE, AND YOUR SOCIAL SECURITY NUMBER

IS, 000001977. ARE THEY CORRECT? TYPE 'Y' FOR YES AND 'N' FOR NO. ? Y

HOW MANY PROBLEMS DO YOU WANT ? 3

\*\*\*\*\*  
PROBLEM 1  
\*\*\*\*\*

A BRASS BAR WEIGHING 56.77 LBS IS MADE OF 48.74 % ZINC AND THE BALANCE OF COPPER. HOW MANY LBS. OF COPPER DOES IT CONTAIN?

YOUR ANSWER -----> ? 29.10

CORRECT!!!

\*\*\*\*\*  
PROBLEM 2  
\*\*\*\*\*

A TRUCK CARRYING 988.11 LBS OF COAL WEIGHED 1908.91 LBS. WHAT PERCENT OF THE TOTAL WEIGHT WAS DUE TO THE WEIGHT OF THE TRUCK?

YOUR ANSWER -----> ? 4.8

YOU ARE INCORRECT. TRY AGAIN.

YOUR ANSWER -----> ? 48

YOU ARE WRONG AGAIN. THE CORRECT ANSWER IS -----> 48.24

\*\*\*\*\*  
PROBLEM 3  
\*\*\*\*\*

YOUR ANSWER -----> ? 62.5

YOU ARE INCORRECT. TRY AGAIN.

YOUR ANSWER -----> ? 62.58

CORRECT!!!

DO YOU WANT MORE PROBLEMS ? NO

THE STUDENT JOHN DOE, HAS ENDED THIS SESSION.

JOHN DOE, HAS ANSWERED 2 , QUESTIONS CORRECTLY.

HERE ARE JOHN DOE'S ANSWERS AND THE CORRECT ANSWERS.

PROBLEM *****	CORRECT ANSWER *****	STUDENT ANSWER *****
1	29.1003	29.1
2	48.237	48
3	62.58	62.58

leads