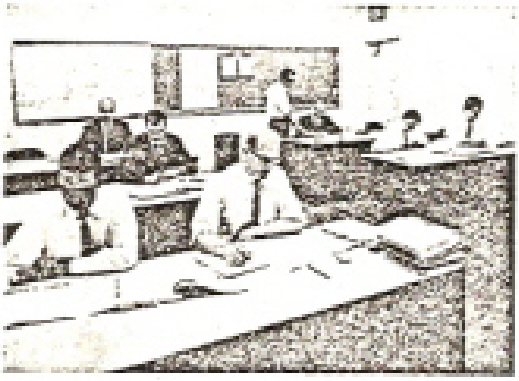
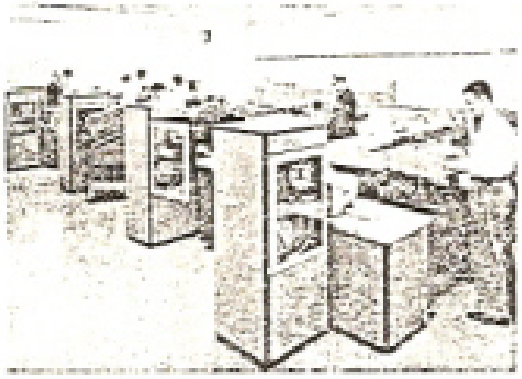
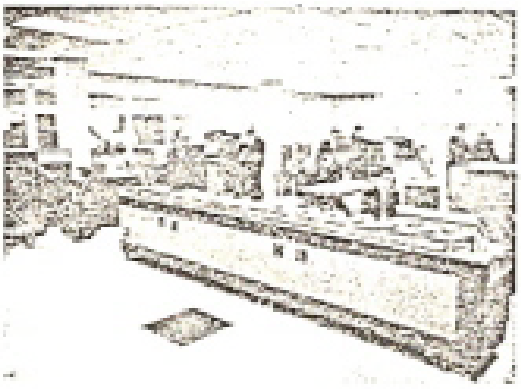
APTITUDE TEST S-5

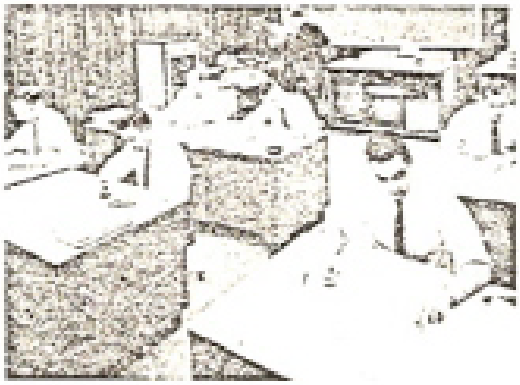
(REVISION 1)





NCR International TECHNICAL SERVICE ★





Technical Service Department
International Division
THE NATIONAL CASH REGISTER COMPANY
Dayton, Ohio, U.S.A. 45409

4-1360-12 12-9-68 NCR

★Service Mark

NAME_____ DATE_____
(Please Print)

COUNTRY_____ AGE_____

PLEASE READ INSTRUCTIONS CAREFULLY

On the following pages are a number of interesting problems for you to solve. Some of the problems may be more difficult than others, but the answers to all the problems may be readily found with clear thinking.

As you turn to each new section, read carefully the instructions given for that section, then proceed to try to find the answers to *all* problems.

Work as quickly and as accurately as you can. Do not spend too much time on any one problem. Do your figuring in the spaces provided.

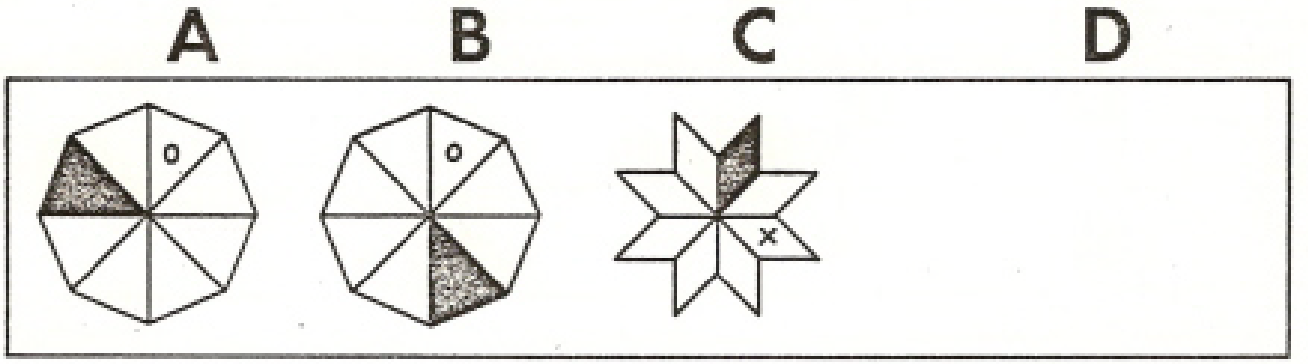
Please return this booklet to your test administrator when you have finished.

READ THE ABOVE INSTRUCTIONS AGAIN THEN TURN TO THE NEXT PAGE AND BEGIN.

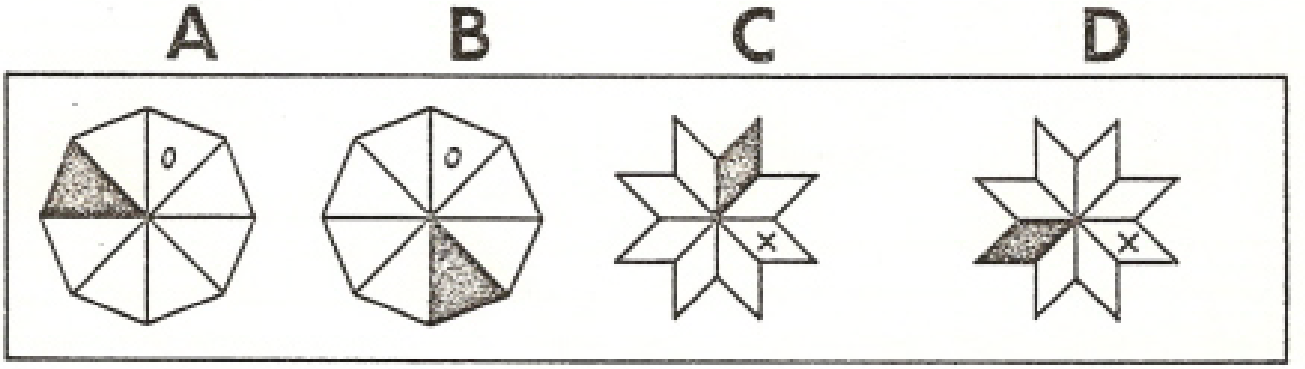
SECTION I

DIRECTIONS

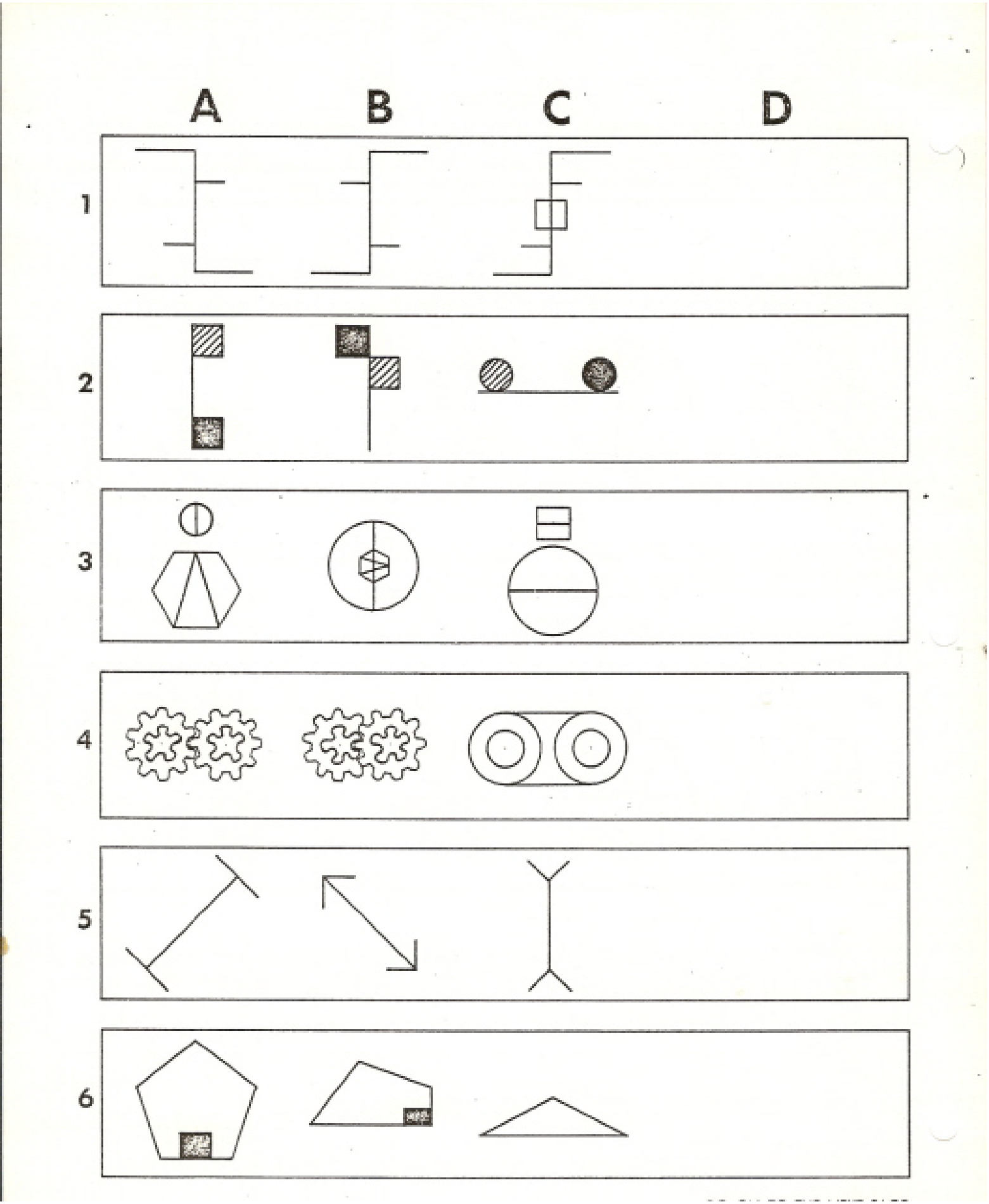
ON THE NEXT PAGE YOU WILL BE GIVEN PROBLEMS SIMILAR TO THE EXAMPLE SHOWN BELOW. IN EACH PROBLEM YOU WILL FIND THAT THERE IS A CERTAIN RELATIONSHIP BETWEEN FIGURE "A" AND FIGURE "B".



DETERMINE THE RULE THAT CHANGES FIGURE "A" TO FIGURE "B", THEN DRAW IN SPACE "D" A FIGURE WHICH IS RELATED TO FIGURE "C" AS FIGURE "B" IS RELATED TO FIGURE "A".



NOTE THAT THE CHANGE BETWEEN FIGURES "A" AND "B" AND BETWEEN FIGURES "C" AND "D" IS THE SAME. THAT IS, IN EACH CASE, THE BLACKENED AREA HAS BEEN MOVED 3 POSITIONS COUNTER CLOCKWISE.


A
B
C
D
1
2
3
4
5
6

SECTION II

DIRECTIONS

READ EACH OF THE FOLLOWING PROBLEMS CAREFULLY. PLACE AN "X" IN THE PROPER BOX, DENOTING WHETHER THE CONCLUDING STATEMENT IS *TRUE* OR *FALSE*.

	TRUE	FALSE
1. All students in the class are female. All female students in the class are married. Therefore, all students in the class must be married.	☐	☐
2. David likes to play all kinds of sports, But as some sports are dangerous, Then David must always be in danger when playing sports.	☐	☐
3. Tom is older than Ed, So Tom cannot be older than Bob, Since Bob is younger than Ed.	☐	☐
4. Some planes are dangerous to fly, This is a cargo plane, Therefore, this plane must be dangerous to fly.	☐	☐
5. Water will flow into the tank: If valves "A" and "B" are open at the same time, Or if valves "C" and "D" and "E" are open at the same time, Or if all valves are open at the same time. Therefore, no water will flow into the tank if only valves "A" and "C" and "E" are open at the same time.	☐	☐
6. The lamp will light: If switch "A", but not switch "B" is in the ON position, Or if switch "B", but not switch "A" is in the ON position. Therefore, the lamp will not light if either switch "A" or "B", but not both, is in the OFF position.	☐	☐
7. If "D" is larger than "A", And "E" is smaller than "B", And since "C" is larger than "A", And "A" is smaller than "B", Then we can assume that "A" is the smallest.	☐	☐

SECTION III

DIRECTIONS

IN THE FOLLOWING PROBLEMS, THE MISSING DIGITS ARE TO BE DETERMINED. ENTER THE CORRECT ANSWERS IN THE PROPER SPACES.

1. Two numbers are *multiplied* together. Letters are used to represent the digits, each of which has a different numerical value, 0 to 9. Find the value of each letter which, when substituted into the problem, will produce the correct *product*.

			C	8	H
			9	G	7
		G	4	B	D
	1	C	A	8	
C	G	E	4		
C	A	A	3	F	D

ANSWERS
A=
B=
C=
D=
E=
F=
G=
H=

---

2. Two numbers are *added* together. Letters are used to represent the digits, each of which has a different numerical value, 0 to 9. Find the value of each letter which, when substituted into the problem, will produce the correct sum.

		D	E	B
	N	D	E	C
A	T	A	B	D

ANSWERS
A=
B=
C=
D=
E=
N=
T=

---

3. Two numbers are *multiplied* together. Some of the digits are given and the remainder of the digits are represented by squares. Find the missing digits necessary to produce the correct *product*.

			□	7	□
			□	6	□
		□	□	3	□
	□	8	6	□	
3	8	□	□		
□	1	□	□	1	4

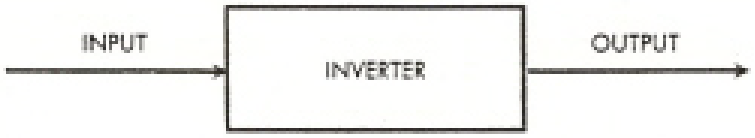
THIS PAGE MAY BE USED FOR FIGURING

SECTION IV

DIRECTIONS

STUDY THE FOLLOWING EXAMPLES VERY CAREFULLY.

EXAMPLE



The terms used in the above figure are defined as follows:

Inverter— a device which takes whatever is put into it, and changes it into just the opposite condition when it is taken out.

Input — that which is put into the inverter.

Output — that which is taken out of the inverter.

EXAMPLE

To illustrate further it is shown that any "TRUE" condition put into the inverter will produce a "FALSE" output.

EXAMPLE

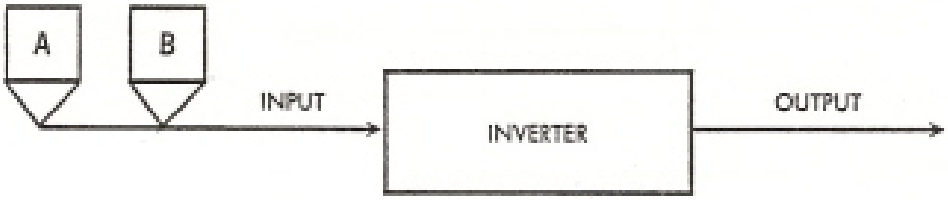
Likewise any "FALSE" condition put into the inverter will produce a "TRUE" output.

READ EACH OF THE FOLLOWING THREE PROBLEMS CAREFULLY. SOLVE THEM BY USING A SIMILAR APPROACH AS SHOWN IN THE SAMPLE PROBLEM.

---

1. GIVEN CONDITIONS: Anytime that *either* "A" is *TRUE* or "B" is *TRUE* then the input to the inverter is *TRUE*.

PROBLEM: What will be the state of the output of the inverter if "A" and "B" are both *FALSE*?

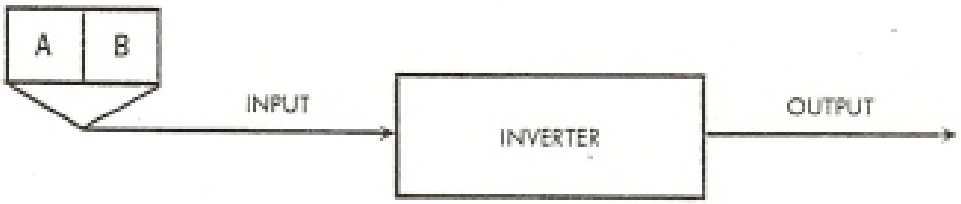


ANSWER_____

---

2. GIVEN CONDITIONS: Only when "A" is *TRUE* and "B" is *TRUE* at the same time will the input to the inverter be *TRUE*.

PROBLEM: When will the output from the inverter be *TRUE* in terms of the states of "A" and "B"? *(Identify the state of "A" and "B" in each of the 3 answers you show below.)*



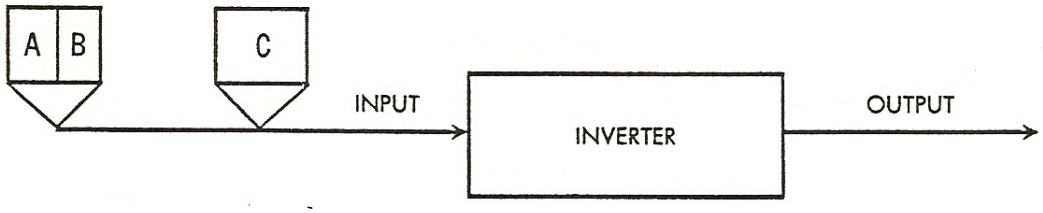
ANSWERS 1-_____

2-_____

3-_____

3. GIVEN CONDITIONS: If "A" and "B" are *TRUE at the same time*, or if "C" is *TRUE* by itself (regardless of the states of "A" or "B"), then and only then will the inverter input be *TRUE*.

PROBLEM: When will the output from the inverter be *TRUE* in terms of the states of "A", "B" and "C"? *(Identify the state of "A", "B" and "C" in each of the 3 answers you show below.)*



ANSWERS 1-_____

2-_____

3-_____

GO ON TO THE NEXT PAGE

THIS PAGE MAY BE USED FOR FIGURING

SECTION V

DIRECTIONS

THE FOLLOWING PROBLEMS ARE OF A PURE LOGICAL NATURE. THEY DO NOT INVOLVE ANY PLAY ON WORDS, DELIBERATELY DECEPTIVE STATEMENTS OR GUESS WORK. IT WILL BE NECESSARY THAT THE EXAMPLE SHOWN BELOW BE STUDIED VERY CAREFULLY.

EXAMPLE

1. If SALLY is married to SAM, then GLORIA is not married to JOE.
2. If JANE is married to SAM or JOE, then SALLY is married to ED.
3. If SALLY is married to ED or JOE, then JANE is married to SAM.

WHAT IS THE NAME OF EACH WIFE'S HUSBAND?

The necessary information to solve this problem is given in the form of three conditional statements. To keep track, mentally, of the many facts and conclusions is difficult. To simplify the solution a chart is used of the type shown below. An "F" (for FALSE) and a "T" (for TRUE) is entered in each square as determined by the conclusion derived from each statement.

Let us begin by assuming that statement 1 is TRUE, and "*SALLY is married to SAM*". Accordingly, a T is entered in the square opposite SAM in the column headed SALLY. F's are entered in the squares remaining opposite SAM, and in the squares remaining under SALLY, since a husband or wife can have only one spouse.

Also from statement 1 we read, "*then GLORIA is not married to Joe*". Enter an F in the square opposite JOE and under GLORIA. Hence, the chart indicates JANE must be married to JOE.

However, according to statement 2, "*If JANE is married to SAM or JOE, then SALLY is married to ED*". This clearly contradicts our original assumption from statement 1, that "*SALLY is married to SAM*".

Therefore, we must reject our original assumption from statement 1 and state, "*SALLY is not married to SAM*".

	JANE	SALLY	GLORIA
SAM	F	T	F
JOE		F	F
ED		F	

We continue by constructing a new chart (shown below) based upon our new assumption from statement 1, that "*SALLY is not married to SAM*". Enter an F opposite SAM and under SALLY. This leads us to statement 3, that states "*JANE is married to SAM*". Hence, a T can be entered opposite SAM and under JANE, and F's can be entered in the remaining squares under JANE, and also in the remaining square opposite SAM.

Then from statement 2, we conclude that "*SALLY is married to ED*". Enter a T opposite ED and under SALLY, and F's in the remaining squares opposite ED and in the remaining square under SALLY.

In order to complete the chart it follows that GLORIA is married to JOE. Enter a T opposite JOE and under GLORIA.

	JANE	SALLY	GLORIA
SAM	T	F	F
JOE	F		
ED	F	T	

ANSWER

JANE is married to SAM.
SALLY is married to ED.
GLORIA is married to JOE.

BE SURE YOU UNDERSTAND THE PRECEDING EXAMPLE. SOLVE THE FOLLOWING THREE PROBLEMS USING A SIMILAR APPROACH AS SHOWN IN THE SAMPLE PROBLEM. ENTER THE CORRECT ANSWERS IN THE PROPER SPACES.

1. ALICE, MARY and WANDA will marry BILL, JACK and JOHN in one order or another.

   BILL is a baker.

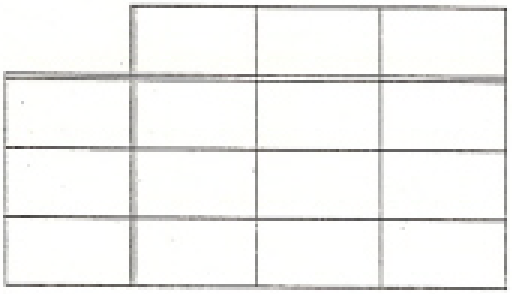
   MARY is not engaged to the farmer.

   The salesman's future wife is not ALICE.

   JACK is engaged to WANDA.

   JOHN graduated from an agricultural school.

   WHO WILL EACH OF THE GIRLS MARRY?



ANSWER

WANDA will marry _____

MARY will marry _____

ALICE will marry _____

---

2. EARL, DAN, ADAM and NORMAN each own a car. One owns a blue car, one owns a white car, one owns a red car, and one owns a black car.

   EARL and ADAM were in the parking lot the afternoon the owner of the red car drove his car out of the parking lot.

   Both the owner of the black car and DAN have had friendly discussions about international politics with the owner of the white car.

   The owner of the black car, who has taken a photograph of NORMAN, will be introduced to EARL next week.

   WHAT COLOR OF CAR DOES EACH MAN OWN?

ANSWER

EARL owns a _____ car.

DAN owns a _____ car.

ADAM owns a _____ car.

NORMAN owns a _____ car.

THIS PAGE MAY BE USED FOR FIGURING

3. Four meaningless figures 4, 5, 6 and 7 represent four meaningless symbols C, D, E and F in one order or another.

   If 4 is not D, then 6 is not E.

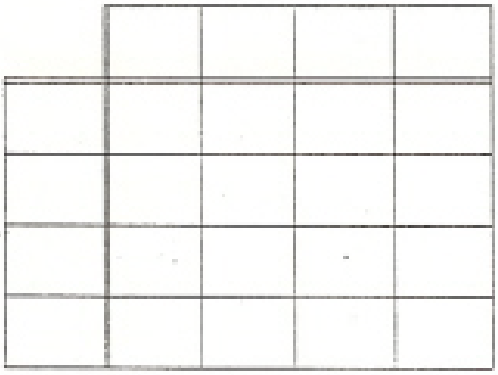
   If 5 is either E or F, then 4 is D.

   If 6 is not C, then 5 is F.

   If 7 is E, then 5 is not D.

   If 7 is not D, then 5 is D.

   WHAT ARE THE SYMBOLS REPRESENTED BY FIGURES 4, 5, 6 AND 7?



ANSWER

_____ is represented by 4

_____ is represented by 5

_____ is represented by 6

_____ is represented by 7

THE SPACE BELOW MAY BE USED FOR FIGURING

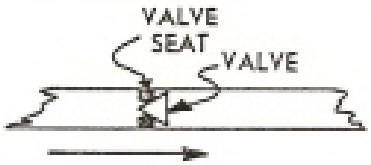
DIRECTIONS

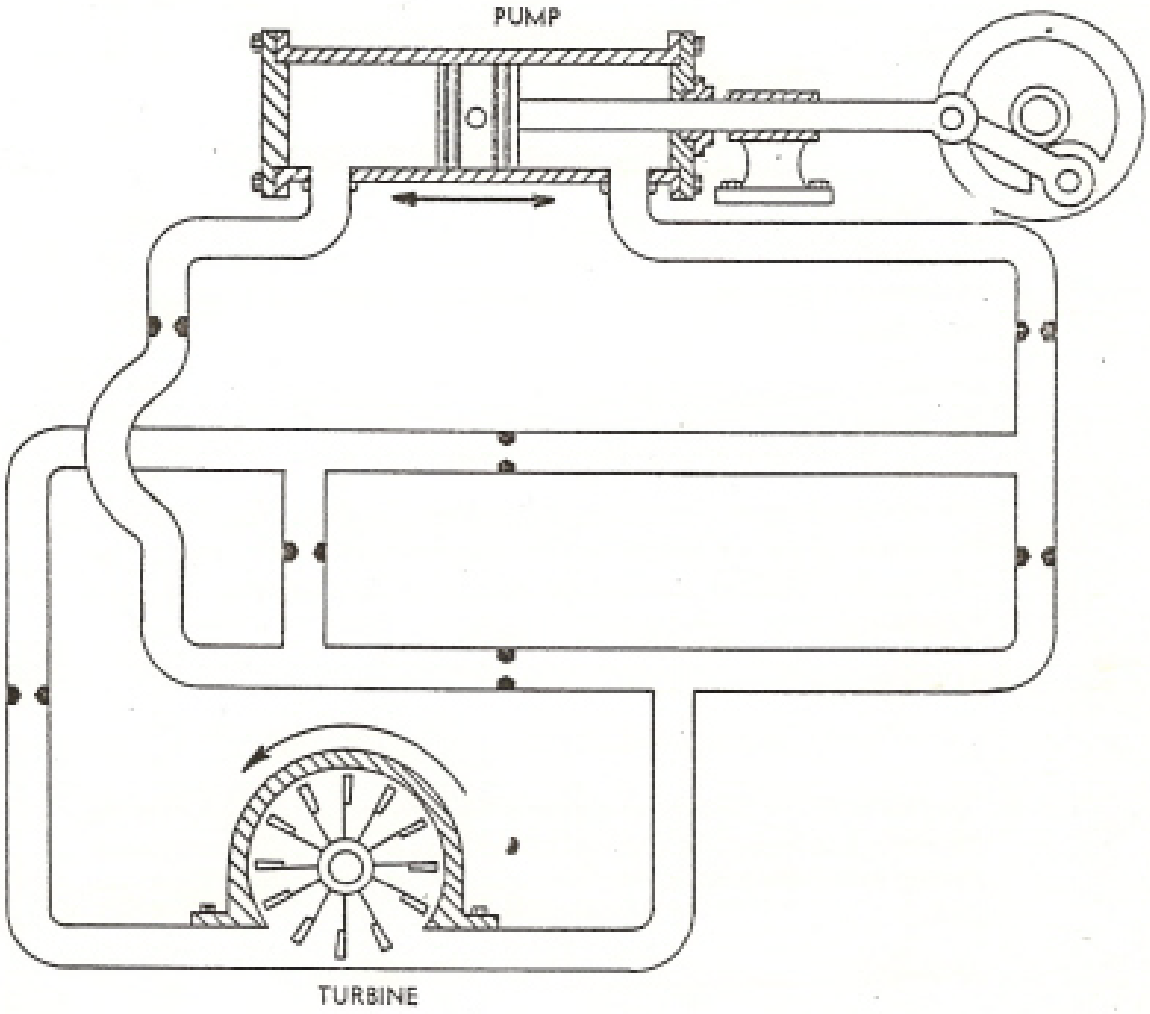
STUDY THE FOLLOWING PROBLEM CAREFULLY. THEN PROVIDE THE ANSWER AS INSTRUCTED.

4. A system of pipes, connected to a pump and a turbine, is completely full of water. Place 4 spring-loaded valves in their proper valve seats (see example below), so the turbine will always be turning in the direction of the arrow while the pump is operating.

EXAMPLE

With the valve inserted as shown, water can flow only in the direction of the arrow.





SECTION VI

DIRECTIONS

STUDY THE FOLLOWING PROBLEMS CAREFULLY. DO YOUR FIGURING ON THE PAGE OPPOSITE THESE PROBLEMS. ENTER THE CORRECT ANSWER IN THE PROPER SPACE.

---

1. If 90 volts cause a current of 3 amperes to flow through a circuit of 30 ohms resistance, and if 64 volts cause a current of 3.2 amperes to flow through a circuit of 20 ohms resistance, how many amperes will flow through a circuit of 500 ohms resistance when connected to a voltage of 125 volts?

   ANSWER_____

---

2. SOLVE FOR X: $4X - 3 = 2X + 7$

   ANSWER_____

---

3. ADD:

$$\begin{array}{r} +\ 464 \\ -\ 543 \\ \hline \end{array}$$

   ANS.

4. ADD:

$$\begin{array}{r} +\ 343 \\ -\ 417 \\ +\ 225 \\ \hline \end{array}$$

   ANS.

5. SUBTRACT (B) FROM (A):

$$\begin{array}{rr} \text{(A)} & +\ 873 \\ \text{(B)} & -\ 349 \\ \hline \end{array}$$

   ANS.

---

6. At 9:30 in the morning the temperature reading was 7° above zero. At 6:30 in the afternoon the temperature had dropped to —11°. Assuming that the rate of decrease in temperature has been constant, at what time did the temperature reach —3°?

   ANSWER_____

---

7. The total resistance of a circuit consisting of two parallel resistors is equal to the product of the two resistances divided by their sum. What is the total resistance of a circuit of two parallel resistors of 120 ohms and 180 ohms respectively?

   ANSWER_____

---

8. The perimeter of a rectangular garden is 68 yards (meters). The length of the garden is 2 yards (meters) more than three times its width. How many yards (meters) wide is the garden? (Use the English or Metric System, whichever you prefer.)

   ANSWER_____

THIS PAGE MAY BE USED FOR FIGURING

9. A room is 16 feet (meters) long and 12 feet (meters) wide. The floor is to be covered by linoleum with a black border 18 inches (centimeters) wide extending entirely around the room. How many square feet (meters) of black border will be used? (Use the English or Metric System, whichever you prefer.)

ANSWER_____

---

10. The ampere (abbreviated amp.) is the basic unit of measurement for current flow. If the current flow is smaller than one ampere, the unit of measure used is the milliampere (abbreviated ma.) which is equal to one-thousandth ampere. For current flow less than one-thousandth ampere, the unit used is the microampere (abbreviated ua.) which is equal to one-millionth ampere.

Four transistor circuits are connected to a battery.

The current flow in the first circuit is 1.84 amp.
The current flow in the second circuit is 235 ma.
The current flow in the third circuit is 176 ua.
The current flow in the fourth circuit is one-fourth of the sum of current flow of the first and third circuits.

WHAT IS THE TOTAL CURRENT FLOW OF ALL CIRCUITS?

ANSWER_____

---

11. $A = \frac{1}{3}R$, $L = 3X^3$, $N = -2$, $S = A^2$, $X = 2$, $R = \frac{1}{3}L$

THEREFORE $S = ?$

ANSWER $S =$_____

---

12. FACTOR: $2ab - 6bc + 10bd$

ANSWER_____

---

13. There is one path leading to the top of a hill. A hiker travels at the rate of 4 miles per hour uphill and 12 miles per hour downhill. If he spends no time at the summit, what will be his average speed for the entire trip?

ANSWER_____

THIS PAGE MAY BE USED FOR FIGURING

14. An electric timer controls 5 indicator lamps – A, B, C, D and E. In its simplest form, this timer may be compared to an electric clock whose hand indicating seconds operates 5 switches which are wired to 5 lamps. Under the following given conditions, the lights flash momentarily for less than one second at perfectly synchronized intervals.

    1. Light A will flash at regular intervals of 12 seconds.
    2. Light B will flash 10 times per minute at regular intervals.
    3. Light C will flash every 2nd second except at instants when Lights B and D but not Light A flash.
    4. Light D will flash 4 times as often as Light A.
    5. Light E will flash every instant Lights B or C but not Light A flash.
    6. At the first second after the timer starts running, Lights A and B and C and D but not Light E flash simultaneously.

QUESTIONS

a. HOW MANY TIMES DURING THE *FIRST HALF-MINUTE* DO LIGHTS B AND D AND E FLASH SIMULTANEOUSLY?

ANSWER_____

b. HOW MANY TIMES DURING THE FIRST *HALF-MINUTE* DOES LIGHT C FLASH?

ANSWER_____

c. HOW MANY TIMES DURING THE *FIRST HALF-MINUTE* DOES LIGHT E FLASH?

ANSWER_____

GO BACK AND BE SURE YOU HAVE

GENERAL DIRECTIONS FOR ADMINISTERING THE S-5 TEST

TO THE TEST ADMINISTRATOR:

PREPARATION

In addition to your study of these directions, you should thoroughly familiarize yourself with all parts of this test. Perhaps the best way for you to do this is by taking the test yourself in a bona fide manner. Thus, you can anticipate many of the questions of the examinees who do not have a full command of the given language.

The explanations of each sample problem should suffice for the examinee to gain a full understanding of the over-all scope of a given battery of questions. However, if asked for further explanation, you may define certain words or rephrase a certain sentence in different words. This is only for those examinees who have difficulties understanding the given explanations or questions due to a language barrier.

TEST MATERIALS

Each examinee should be provided with:

(A) Test booklet
(B) Two sharp pencils with erasers
(C) Ruler

You should keep a watch handy in order to record the exact starting and stopping time in the spaces provided on the back side of this sheet.

EXAMINATION ROOM

A clock should be in view for the examinee to observe.

Testing should be conducted in a room which provides good lighting, ventilation and a pleasant atmosphere. IT IS IMPERATIVE THAT THE ROOM IS FREE FROM NOISE AND DISTURBANCES.

Examinees should be provided with reasonably comfortable seats and desks or tables with a sufficiently large writing surface. In case a group of persons is tested, examinees should be seated in such a way that they will not be tempted to look at the answers of others and so that you can give an individual language assistance, if necessary, without disturbing the others.

YOUR ROLE DURING TESTING SESSIONS

You should attempt to put the examinees at ease. Check with them to see whether or not they are tired. You should establish and maintain a working atmosphere without producing an air of nervous tension. DISTURBANCES ARE TO BE AVOIDED AT ALL COST. Answer legitimate questions that may be asked, but do not elaborate on explanations or instructions. It is essential that you stay within the meaning and, as far as possible, use the words printed on the test paper or synonyms thereof.

You are to observe the examinee closely during the test and record his reactions in the spaces provided on the back side of this sheet.

Keep track of the time and collect the test paper after three (3) hours of working time. Make sure the examinee does not leave with the test booklet.

READ TO THE EXAMINEES THE FOLLOWING GENERAL DIRECTIONS LOUD AND CLEAR.

"This test is divided into six sections, each of which consists of a group of related problems. Sample problems with proper explanations are given in order to familiarize you with the different types of problems and to acquaint you with a method for solving them. You probably will find some of the problems quite easy and others more difficult. You are expected to put forth your best effort on each problem.

"There are a few general rules for taking this test that will help you to earn the best score: Work carefully and accurately. Do not spend too much time on any problem you find particularly difficult. Mark the problem that you skip, leave it until last, and then go on to the next problem. In doing this you will make best use of your time. If you work at an average speed you will have sufficient time to read, analyze and solve all of the problems.

"Make your calculations in the spaces provided in the test booklet. Be sure you copy your answers correctly in the designated spaces.

"Do you have any questions?

"Fill in the data asked for on the inside of the cover page, and begin your test by reading the instructions immediately below.

"Ready? Good luck! Begin!"

Nº 7650

55 APTITUDE TEST REPORT AND RATING SHEET

(Revision 1)

NAME_____ DATE TESTED_____
(Please Print)

COUNTRY_____ CODE_____ AGE_____ TEST ADMINISTRATOR_____

TIME STARTED_____ TIME COMPLETED_____ TOTAL TIME_____ (MIN.)

SECTION	I	II	III	IV	V	VI			
1.	0	0	5	0	0	4	8.	5	
2.	3	3	4	3*	2	5	9.	3	
3.	4	2	5	6*	5	2	10.	5	
4.	2	3			2	2	11.	4	
5.	4	2				3	12.	3	
6.	5	3				3	13.	4	TOTAL SCORE
		2				5	14.	5*	=
SUBTOTALS	_____	_____	_____	_____	_____	_____			

NOT ACCEPTABLE	DOUBTFUL	ACCEPTABLE
1 - 76	77 - 85	86 - 118

DIRECTIONS FOR USE OF THE REPORT AND RATING SHEET

1. Cross out the box for each problem whose answer is incorrect.
   *NOTE — In problems 2 and 3 of Section IV, if one (1) or more of the three (3) answers are incorrect, mark the problem wrong. In problem 14 of Section VI, if one (1) or more of the three (3) answers are incorrect, mark the problem wrong.
2. Determine the Subtotal for each Section by adding the point values in the boxes that are not crossed out and then place the Total Score in the box provided.
3. Determine the Decile Rating from the above table and place it in the box provided.
4. Indicate your observations of the examinee during the test in the spaces below.
5. Make a record of the Subtotals and the Total Score for your files.
6. These tests are serially numbered as all tests must be accounted for.
7. *Destroy this test booklet immediately (by shredding) and return this sheet (COMPLETED) to:*

TECHNICAL INSTRUCTION DEPARTMENT
INTERNATIONAL TECHNICAL SERVICE DIVISION
THE NATIONAL CASH REGISTER COMPANY
DAYTON, OHIO USA 45409

OBSERVATIONS MADE DURING THE TEST PERIOD

Check (√) the appropriate definitions which best indicate the examinee's attitude and work habits.

_____At ease	_____Confident	_____Quick	_____Tries very hard
_____Tense	_____Unresponsive	_____Slow	_____Works smoothly
_____Nervous	_____Shows-off	_____Careless	_____Necessary to repeat instructions . .
_____Tired	_____Impatient	_____Indifferent	_____Easily confused

Other observations:_____

_____