# INTRODUCTION TO THE MINING JOB

# SELECTION TEST BATTERY

Prairie State

2010

This battery of aptitude tests was designed and validated to aid in the selection of candidates for mining positions at Prairie State. There are six paper-and-pencil tests in the battery. No prior knowledge of mining job tasks is required. The tests are designed to assess underlying abilities that are necessary to readily learn critical job requirements and perform successfully on the job.

The tests in the battery are timed and the entire administration session lasts approximately two hours. The tests measure reading comprehension, attention to detail, logical reasoning, and mechanical concepts.

The aptitude tests comprising the battery with test item examples are provided below.

## READING COMPREHENSION

Industrial Reading Test – This 40-minute test assesses the ability to quickly read, understand, and interpret written material. The examinee reads passages and answers questions that follow. An example of this test is:

Read the Sample Passage below. Then read the first question and choose the best answer. Do the same with the second question.

### Sample Passage

Metals play a very important role in modern industry. However, pure metals are rarely used. Instead, different metals are mixed together to form combinations called alloys. For example, brass is a combination of copper and either zinc or tin, and "German silver" is a combination of copper, zinc, and nickel. Alloys are generally harder than the individual metals which compose them and poorer conductors of heat and electricity than pure metals. For example, brass is a poor conductor of electricity and copper is one of the best.

Alloys are best described as
A. one metal combined with a small amount of another metal.
B. two metals mixed together in equal amounts.
C. two or more metals mixed together in unequal amounts.
D. two or more metals mixed together.

Y. Compared to the pure metals whi[ch com]pose them, alloys are
A. better conductors of electricity
B. poorer conductors of heat.
C. generally softer.
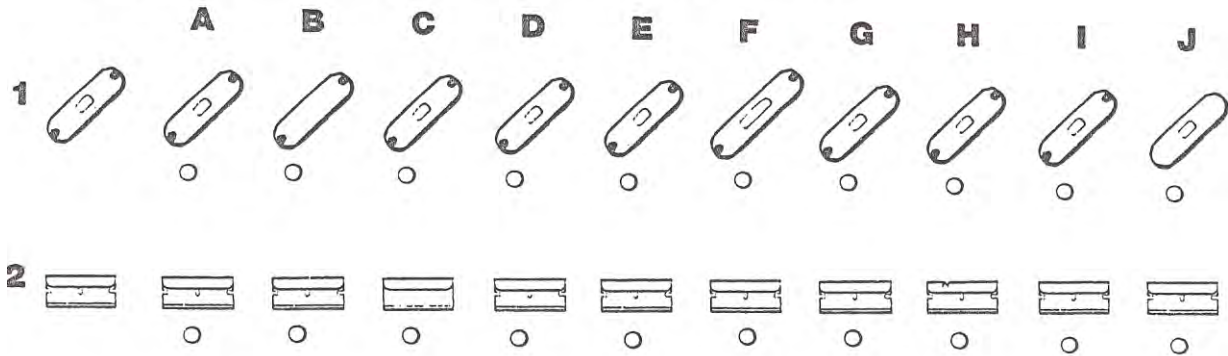D. less important in industrial us[e]

You should have selected answers D and B.

**ATTENTION TO DETAIL** – Two tests measure the ability to pay careful visual attention to the details of a job. They include the following:

Attention to Detail Test – This 5-minute test assesses the ability to see differences in small details in figures. Examinees identify flaws in parts that are supposed to be the same as a referent part. However, some are imperfect. Below are two sample items:

On the following pages you will see items consisting of a series of parts. The parts in each series are supposed to be the same, but some are imperfect and have flaws. You are to find the ones that are faulty. The first item in each series is the perfect sample of the part you are to inspect. Examine the first part and then look carefully at the other parts in the series to find the ones that are faulty. Mark your answers by completely filling in the circle beneath the imperfect parts.

Below are sample items. Examine the first part in the series and mark the imperfect parts.

In sample item 1, B is missing the rectangular hole, F is stretched out, and J is missing the two round holes.
In sample item 2, C is missing grooves, and H is cracked.

Visual Speed and Accuracy Test – This 5-minute test requires persons to determine similarities or differences in pairs of numbers.  It provides an indication of visual discrimination among similar objects.  Examples are provided below.

Look at the pairs of numbers below.  The first pair of numbers, 792 and 792, are exactly alike.  Therefore, the circle to the right with the letter **S (same)** has been filled in.  The second pair of numbers, 6122 and 6123, are not exactly the same.  Therefore, the circle with the letter **D (different)** has been filled in.  The next pair, $898 and $898, are marked to show that they are the same.  The fourth pair, 72.10 and 72,10, are marked as different because one has a period in it while the other has a comma.

Now mark the next four items for practice.

| | | |
|---|---|---|
| 792 | 792 | ● Ⓓ |
| 6123 | 6122 | Ⓢ ● |
| $898 | $898 | ● Ⓓ |
| 72.10 | 72,10 | Ⓢ ● |
| 33333 | 33323 | Ⓢ Ⓓ |
| 117! | 117! | Ⓢ Ⓓ |
| 42 | 24 | Ⓢ Ⓓ |
| 6696 | 6696 | Ⓢ Ⓓ |

You should have marked them **D, S, D,** and **S**.

**LOGICAL REASONING** - Two tests are used to measure this ability.  Scores are combined on these tests to form a composite.

Verbal Reasoning Test: measures the ability to identify relationships and arrive at supportable conclusions.  Examinees are required to read a set of facts and determine whether certain conclusions are supported by the facts.  An example of the Verbal Reasoning test is shown below:

## Directions

Look at the sample problem below.  First read the list of facts.  After you have read all the facts, look at each conclusion.  From the facts, you can tell that some of the conclusions are definitely true and some are definitely false, but in some cases you just cannot tell from the facts whether the conclusion is either true or false.  If you decide a conclusion is definitely true, mark the "T" circle.  If it is definitely false, mark the "F" circle.  If the facts do not give enough information to tell whether a conclusion is definitely true or definitely false, mark the "X" circle.

In the example below, the facts say that Chris is a welder, and that Company B employs no welders Chris could not work for Company B because it does not hire welders.  Therefore, the first conclusion is definitely true, and the "T" circle has been marked.  The facts also say that Chris' only child is a girl, which means that her son could not be ill since she has no son.  Therefore, the second conclusion is definitely false, and the "F" circle has been marked.  From the facts that are given, there is not enough information to know definitely where Chris works.  Chris does not work for Company B because that company hires no welders.  It is possible that she works for Company C, but it is also possible that she works somewhere else.  Therefore, the third conclusion is uncertain, and the "X" circle has been marked.

Now mark each of the two remaining conclusions.  "T" for true, "F" for false, and "X" for uncertain.

| FACTS | | CONCLUSIONS |
|---|---|---|
| **Chris is a welder** | 1. ● Ⓕ Ⓧ | Chris does not work for Company B |
| **Terry works for Company B** | 2. Ⓣ ● Ⓧ | Chris' son is ill |
| **Chris' only child is a girl** | 3. Ⓣ Ⓕ ● | Chris works for Company C |
| **Company A makes automotive parts** | 4. Ⓣ Ⓕ Ⓧ | Terry is a welder |
| **Company B employs no welders** | 5. Ⓣ Ⓕ Ⓧ | Chris welds automotive parts |

You should have marked "F" and "X" for the fourth and fifth conclusions.

Numerical Reasoning Test: measures the ability to determine relationships of patterns in a series of numbers. Examinees read series of numbers and identify the next one in a sequence. An example of the Numerical Reasoning test is shown below:

## Directions

Look at the sample problems below. Each series of numbers is followed by a question mark where the next number of the series should be. There are patterns in the series. Your task is to look in the answer columns to the right of the question mark and find a number which will continue the series. Indicate your answer by making a heavy mark in the circle in front of the proper number.

In the first sample problem (1, 4, 7, 10, 13, 16, 19, _?_ ) each number is 3 more than the preceding number. Therefore, the next number should be 3 more than 19. 19 plus 3 is 22. Therefore, the circle in front of 22 has been marked.
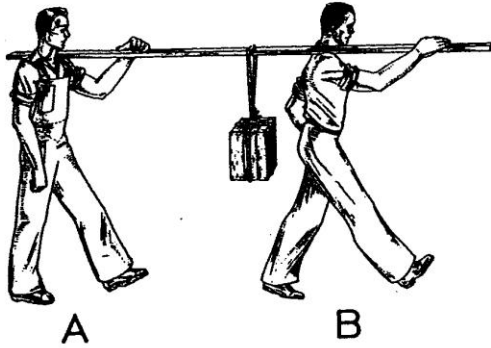
Now look at the four remaining sample problems. Find the pattern in each series, decide what number should come next, and mark it in the answer columns. Work these problems now.

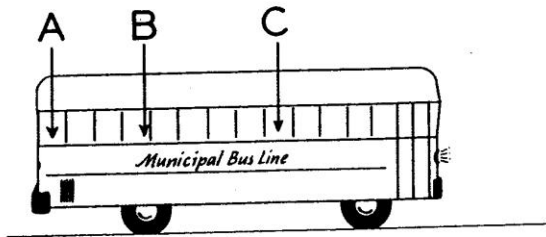| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | 1 | 4 | 7 | 10 | 13 | 16 | 19 | ? | ○ 20 | ○ 21 | ● 22 | ○ 23 | ○ 24 |
| **2.** | 20 | 18 | 16 | 14 | 12 | 10 | 8 | ? | ○ 7 | ○ 6 | ○ 5 | ○ 4 | ○ 3 |
| **3.** | 20 | 20 | 19 | 19 | 18 | 18 | 17 | ? | ○ 17 | ○ 16 | ○ 15 | ○ 14 | ○ 13 |
| **4.** | 4 | 6 | 5 | 7 | 6 | 8 | 7 | ? | ○ 6 | ○ 7 | ○ 8 | ○ 9 | ○ 10 |
| **5.** | 2 | 4 | 6 | 8 | 11 | 13 | 15 | ? | ○ 14 | ○ 15 | ○ 16 | ○ 17 | ○ 9 |

You should have marked 6. 17. 9. and 17.

## MECHANICAL CONCEPTS

Bennett Mechanical Comprehension Test – This 30-minute test assesses basic comprehension of mechanical principles such as leverage, rotation, momentum, and flow. Respondents are provided with paired pictures or diagrams of possible mechanical relationships and are asked to identify the correct alternative. An example of the Mechanical Concepts Test is shown below:



**X**

Which man carries more weight? (If equal, mark C.)



**Y**

Which letter shows the seat where a passenger will get the smoothest ride?