

## Written Examination Information and Outline

Test Number: 040301A

| CODE | TITLE   | TOTAL ITEMS |
|------|---|-------------|
| 8355 | TRANSPORTATION ENGINEERING TECHNICIAN - TRAINEE | 90          |

**Examination Type:** Written multiple-choice examination. Each item has 4 or 5 answer choices. Applicants must select the best answer from those presented.

**Below is a description of each test section. In some cases, example items are included.**

**Terminology** **18 items**

This section presents vocabulary words which may be found in job reading materials. A list of **example words** may be found at the end of this outline. While many of these words may not be included in the actual test, the list shows the **type** and **level of difficulty** of the vocabulary words found in this section. **All 18 terms on the test are included in the list.**

**Diagram Reading and Analysis** **10 items**

This section includes two groups of items. The first presents traffic flow diagrams of common interstate interchanges. The applicant must determine if the indicated traffic direction is correct. No experience or previous study is needed to answer these items.

The second group of items presents a 16X16 square grid of a land section with numbered square parcels. The applicant is to find specific parcels by using given map directions. No experience or previous study is needed for these items. Hint: Locate sections in reverse order.

**Example 1.**

Find the parcel located in the Northeast 1/4 of the Southwest 1/4 of the Northeast 1/4 of the Southeast 1/4 of the grid.

Answer: 163

**Example 2.**

Find the parcel located in the Southeast 1/4 of the Northwest 1/4 of the West 1/2 of the South 1/2 of the grid.

Answer: 173, 174, 189, 190

Hint: Locate sections in reverse order (last to first).

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 16  | 15  | 14  | 13  | 12  | 11  | 10  | 9   | 8   | 7   | 6   | 5   | 4   | 3   | 2   | 1   |
| 32  | 31  | 30  | 29  | 28  | 27  | 26  | 25  | 24  | 23  | 22  | 21  | 20  | 19  | 18  | 17  |
| 48  | 47  | 46  | 45  | 44  | 43  | 42  | 41  | 40  | 39  | 38  | 37  | 36  | 35  | 34  | 33  |
| 64  | 63  | 62  | 61  | 60  | 59  | 58  | 57  | 56  | 55  | 54  | 53  | 52  | 51  | 50  | 49  |
| 80  | 79  | 78  | 77  | 76  | 75  | 74  | 73  | 72  | 71  | 70  | 69  | 68  | 67  | 66  | 65  |
| 96  | 95  | 94  | 93  | 92  | 91  | 90  | 89  | 88  | 87  | 86  | 85  | 84  | 83  | 82  | 81  |
| 112 | 111 | 110 | 109 | 108 | 107 | 106 | 105 | 104 | 103 | 102 | 101 | 100 | 99  | 98  | 97  |
| 128 | 127 | 126 | 125 | 124 | 123 | 122 | 121 | 120 | 119 | 118 | 117 | 116 | 115 | 114 | 113 |
| 144 | 143 | 142 | 141 | 140 | 139 | 138 | 137 | 136 | 135 | 134 | 133 | 132 | 131 | 130 | 129 |
| 160 | 159 | 158 | 157 | 156 | 155 | 154 | 153 | 152 | 151 | 150 | 149 | 148 | 147 | 146 | 145 |
| 176 | 175 | 174 | 173 | 172 | 171 | 170 | 169 | 168 | 167 | 166 | 165 | 164 | 163 | 162 | 161 |
| 192 | 191 | 190 | 189 | 188 | 187 | 186 | 185 | 184 | 183 | 182 | 181 | 180 | 179 | 178 | 177 |
| 208 | 207 | 206 | 205 | 204 | 203 | 202 | 201 | 200 | 199 | 198 | 197 | 196 | 195 | 194 | 193 |
| 224 | 223 | 222 | 221 | 220 | 219 | 218 | 217 | 216 | 215 | 214 | 213 | 212 | 211 | 210 | 209 |
| 240 | 239 | 238 | 237 | 236 | 235 | 234 | 233 | 232 | 231 | 230 | 229 | 228 | 227 | 226 | 225 |
| 256 | 255 | 254 | 253 | 252 | 251 | 250 | 249 | 248 | 247 | 246 | 245 | 244 | 243 | 242 | 241 |

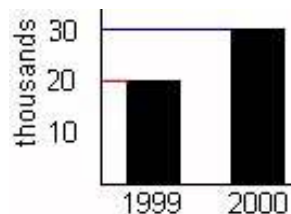
## Graph and Chart Interpretation 9 items

This section tests the applicant's ability to interpret data presented in various graphic formats. Graphs include: **Bar graphs**, **line graph** showing changes over time, and a **pie chart**. Each item refers to only one graph. Items require the applicant to read amounts from the graph and make data comparisons. No specific experience with the actual data is needed. All necessary information is presented in the graphs.

**Example:** In the graph at the right, what was the percentage increase from 1999 to 2000.

Answer: 50%

Obviously, graphs in the test are larger and may include more data bars.



## Mathematics 28 items

This section tests the applicant's ability to solve mathematical problems. Items require ability to work with fractions, and solve basic algebraic equations (one unknown). Mathematical operations include: all arithmetic operations plus percentages, averages, ratios, fractions, and measurement. Applicant must be able to recognize plotted straight lines given graph coordinate points (x,y) or basic algebraic equation. Applicant must be able to solve basic equations for one unknown. Below are 5 examples of some of the **types** of mathematics items included in this section.

1. Solve the equation:  $1 - 3x = 8x + 3$       **Answer:  $x = -2/11$**
2. If a scale of  $1/4$  inch equals 840 feet on a map, what represents 5040 feet?      **Answer: 1 1/2 inches**
3. Find the equivalent expression to:  $4 / (4 + 1/3)$  Reduce to lowest terms.      **Answer: 12/13**
4. The width of a rectangle is  $1/5$  of the perimeter. If the width is 5 feet, what is the length?

**Solution:** The perimeter must be 5 times the width (5), or 25 feet.

So,  $25 = 2(\text{length}) + 2(\text{width})$  Note: The perimeter of a rectangle

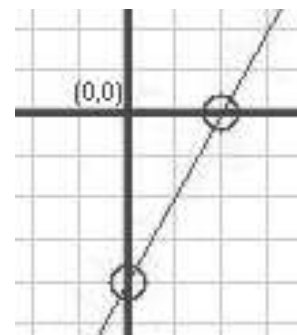
$25 = 2(\text{length}) + 10$  is the sum of all the sides.

$15 = 2(\text{length}) \rightarrow$  Therefore, the length is  $15/2$ .  $\rightarrow$  **Answer: 7 1/2 feet.**



5. Which of these is the equation represented by the graph at the right?

- A)  $y = 2x - 4$
- B)  $y = 4x - 2$
- C)  $x = 2y - 4$



**Answer: A**

**Note:** Actual test items and computations are **not** identical to the above examples. Applicants are not permitted to use calculators. Scratch paper is provided. Required computations have been kept to a minimum. This is primarily a test of the applicant's grasp of math and basic algebra rules and concepts.

## Topographic Map Reading and Surveying Terms 10 items

This section tests the applicant's knowledge of topographic map reading, terms and basic surveying terminology. Basic familiarity with these subjects would be useful. In-depth knowledge or study is not necessary. Applicant may prepare by becoming familiar with basic topographic map terms and basic surveying terms.

## Reading Comprehension

15 items

The items in this section test an applicant's ability to read, comprehend and interpret written material. Reading passages are typically ½ page or less. Each passage is followed by one or two questions about the meaning or content of the passage. All the information required to answer the questions is contained in the passages. The passages typically deal with construction regulations, construction specifications, safety procedures, roadway design reports. No previous experience or study material is required to answer the questions.

90 items = Total

## A Word About Test Preparation

The Division of Personnel does not distribute or recommend specific study material for this examination. Standard references, study guides, and related texts are available in many libraries and bookstores. These may be helpful in preparing for the examination. We hope the above expanded test outline may be of some guidance in test preparation.

## Example Word List - Terminology Section, Test Items 1-18

Word list with links to definitions is available at: <http://state.wv.us/admin/personnel/jobs/exams/8355W.htm>

The written examination includes 18 vocabulary words and job-related terms. Below is a list of words related to this type of work. Obviously, most of these words are not on the test; however, many of the words in the Terminology Section are included here. Some of the words may also be found in the Reading Comprehension Section and other parts of the examination. You may find it helpful to review this list for unfamiliar words and terms. **No additional information is available.**

|                |               |                 |               |                |
|----------------|---------------|-----------------|---------------|----------------|
| abrasion       | constituent   | elongated       | interval      | proportional   |
| accelerate     | constriction  | environment     | inverted      | provisional    |
| adhesion       | contiguous    | equalize        | irrelevant    | proximity      |
| adjacent       | continuous    | equivalent      | linear        | quality        |
| adverse        | corrosive     | essential       | magnetic      | quantify       |
| aeration       | criterion     | estimate        | magnitude     | range          |
| aggregate      | criticality   | evacuate        | modification  | ratio          |
| appropriate    | criticism     | evaporation     | negligible    | resilient      |
| approximate    | culvert       | exactness       | nuisance      | saturation     |
| auxiliary      | deleterious   | exclusive       | obsolescence  | seepage        |
| benchmark      | delineate     | extraction      | obstruction   | sequence       |
| boundary       | density       | fabricate       | occurrence    | similarity     |
| calibrate      | deterrent     | filtration      | opaque        | solvent        |
| capacity       | deviation     | flexible        | oscillate     | specifications |
| catalyst       | diameter      | fluctuate       | palliative    | stabilize      |
| causation      | differentiate | fragment        | penetration   | standard       |
| caustic        | dimensions    | frequency       | percolation   | superficial    |
| centrifugal    | disarray      | gradation       | perforation   | synopsis       |
| classification | disaster      | hydration       | perimeter     | systematic     |
| compaction     | dispersion    | hydraulic       | periphery     | transitory     |
| comparison     | dissipate     | impediment      | permeable     | unambiguous    |
| compensation   | distance      | inclination     | perpendicular | uncertainty    |
| compilation    | distinguish   | inconsequential | pliable       | variable       |
| complementary  | distribution  | indication      | plumb         | velocity       |
| complexity     | diverge       | inflammation    | porosity      | vertical       |
| compression    | drainage      | inorganic       | precision     | vicinity       |
| conclusion     | ductile       | interim         | probability   |                |
| condensation   | effluent      | intermediate    | profile       |                |
| conformity     | elastic       | interpretation  | progression   |                |