Testing Guide

WAYNE COUNTY DEPARTMENT OF PERSONNEL/HUMAN RESOURCES

REIMAGINE YOUR CAREER!

Helping You Achieve Your Testing Goals

This guide is for the **Project Supervisor** exam. The test itself is 35 questions and you will have 60 minutes to complete the test. You may use calculators provided by the computer desktop or actual calculators (we have a few to provide if needed).

- Please keep your phones on silent.
- Restrooms are available at any time in the lobby.

Alert the testing facilitator if you receive an emergency call or need to leave the room. Be aware of the time remaining on your exam.

You will receive the results of your test via mail.

- If you pass your name will be forwarded to the departments with the vacancies for any type of interviews/etc.
- If you fail, you can reapply and be scheduled to retake the exam.

If reasonable accommodation is needed to participate in the job application, exam or interview process, to perform essential job functions, and/or to receive other benefits and privileges of employment, please contact the Wayne County Department of Personnel/Human Resources at 313-224-5901 or via email at hrexam@waynecounty.com. Hearing or speech impaired persons using TDD's or similar devices may contact the Michigan Relay Center, toll free at (800) 6493777 or 711 to communicate directly with the Department of Personnel/Human Resources during regular working hours.

TEST PREPARATIONS

Please give yourself a few minutes to review the instructions. If you have any questions, please notify the testing facilitator. Do not use the *Back, Forward, or Refresh* buttons to navigate within the test. You may end the session whenever you like by clicking the *End Test* button; your progress up to that point will be recorded, but you will not be able to resume the test. Also, you may review the job description for additional content information.

Suppose you have been asked to analyze an existing truss bridge. Overall, the bridge is in good condition. However, two of the members are showing early signs of failure. Which of the following methods would you use in order to analyze the forces of the two members in question?

Select the single best answer:

- A. The method of joints
- B. The method of rotations
- C. The method of sections
- D. The method of symmetry
- E. The method of equilibrium

Suppose you have a drainage area that flows into a reservoir. The outlet of the reservoir is a 24 in. cmp. Which of the following phrases best describes the proper method of calculating the change in storage of a reservoir?

Select the single best answer:

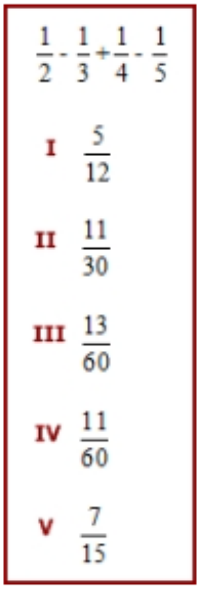
- A. The allowable release rate multiplied by the duration of the rainfall
- B. The geometric volume of the reservoir
- C. Inflow minus outflow
- D. The volume of the reservoir minus any water that has been absorbed into the ground
- E. Depth of reservoir

If you have a sitty clay soil with density of soil solids with ps=2500kg/m^3, S = 100%, and a water content of 50%, which of the following meqasurements most nearly describes the void ration *e* of the soil?

Select the single best answer:

- A. 1.250
- B. 2.356
- C. 1.674
- D. 0.523
- E. 1.956

Given the equation shown on the top line of the image below, which of the numbered lines displays the correct simplification of the fraction in the solution?



Select the single best answer:

- A. I
- B. II
- C. III
- D. IV
- E. V

A manufacturer makes 5-pound bowling balls. The acceptable tolerance is +/- 0.10 pounds. The process that makes the bowling balls is normally distributed (a bell-shaped curve) with an average of 5.00 pounds and a standard deviation of 0.25 pounds.

The values for half of the standard normal distribution are given in the table below. (Remember that for a standard normal distribution, the mean is at z = 0.)

Of a sample of 1,000 bowling balls, how many balls (to the nearest integer) in the production lot should be accepted?

z	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.00	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.10	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.20	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.30	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.40	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.50	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.60	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.70	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.80	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.90	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.00	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.10	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.20	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.30	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.40	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.50	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.60	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.70	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.80	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.90	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.00	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.10	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.20	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.30	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.40	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.50	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.60	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.70	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.80	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.90	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.00	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.10	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.20	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.30	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.40	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998
3.50	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.60	0.9998	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.70	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.80	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.90	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Select the single best answer:

- A. 250
- B. 311
- C. 478
- D. 500
- E. 689

In engineering, which of the following phrases best describes the concept of strain?

Select the single best answer:

- A. Strain can be shown by any unit of length
- B. Strain is expressed as force divided by area
- C. Strain is a dimensionless quantity and therefore has no unites
- D. Strain is expressed as force multiplied by length
- E. Strain can be shown by any unit of force

A simply supported steel I-beam with a length of 12 ft. spans two rigid supporting walls. The beam was installed on a hot summer day when the temperature was 30^0C. The thermal expansion coefficient of steel is 6.5 X 10^{-6} per ^{0}F, then which of the following measurements best describes the change in the length of the beam on a cold winter day when the temperature drops to -20^0C?

Select the single best answer:

- A. 0.1142 inches
- B. 0 inches
- C. 0.007 inches
- D. 0.0058 inches
- E. 0.0003 inches

A field density test is performed by the balloon method. The dry density in the field, pd_{field} was found to be 1.68. The maximum dry density in the lab, pd_{max}, was found to be 1.86. Which of the following percentages most nearly describes the relative compaction?

Select the single best answer:

- A. 85.3%
- B. 78.6%
- C. 90.3%
- D. 95.2%
- E. 88.6%

Suppose you want to test the water content of the soil in your yard. A sample of wet soil plus the dish hs a mass of 462 g. After drying in an oven overnight, the sample and the dish have a combined mass of 364 g. The mass of the dish alone is 39 g. Which of the folloiwng percentages most nearly describes the water content of the soil?

Select the single best answer:

- A. 25.6%
- B. 20.4%
- C. 32.6%
- D. 30.2%
- E. 26.9%

Suppose you are developing the plat of a new subdivision. Which of the follow steps is taken first when determining the direction of the boundary?

Select the single best answer:

- A. turning angles with your level
- B. setting up the base on an existing benchmark
- C. leveling your level
- D. drawing a sketch of the area
- E. calibrating your level

Suppose you are hired to design the expansion of an existing concrete parking garage. Which of the following factors describes the most important consideration when designing the new addition?

Select the single best answer:

- A. the building material of the existing structure
- B. the cost of the existing structure
- C. the amount of money the client is willing to pay you
- D. the height of the surrounding buildings
- E. the grade of the street adjacent to the existing structure

Suppose you are working on a highway improvement project. You have been assigned the task of median drainage. The natural grade of the surrounding land is 0.2%. Due to the flat nature of the land, which of the following is the best method of draining the median?

Select the single best answer:

- A. place a standard 3 ft. deep median drain and outlet it to the roadside ditch
- B. sawtooth the flowline of the median and place pipes at the low points. Then grade the median above the roadway, allowing the flow to sheet across the pavement
- C. grade the median above the roadway, allowing the flow to sheet across the pavement
- D. remove the median and place a concrete safety barrier throughout the length of the project
- E. grade the median toward the nearest stream

Suppose you are extending an existing box culvert to accommodate a highway improvement project. Which of the following protections should be placed at the culvert outlet during construction?

Select the single best answer:

- A. a ditch deck
- B. a silt fence
- C. a sediment basin
- D. a berm
- E. a slope drain

Which of the following terms applies to drawings that show where a utility company's lines (such as water, gas, power, or telephone/cable lines) end and the building's utility systems begin?

Select the single best answer:

- A. point of connection (POC)
- B. point of no return
- C. right of way
- D. easement zone
- E. eminent domain

A certain blueprint has a scale of 1/8" = 1'-0". What is the length of an actual object that measures 4 3/8" on this blueprint?

Select the single best answer:

- A. 15'
- B. 24'
- C. 35'
- D. 43'-5"
- E. 48'

Notes