



Industry Certifications – Practice Questions

Overview

The following are practice questions and represent the types of questions found in the certifications. They do NOT represent all of the content. For information on content to prepare for, see the REC Foundation document “[Knowledge and Occupational Skills List](#).”

Each certification comes with an additional voucher code which can be used as a full practice test for any section, a retest for a failed section, or a retest to improve a score (check your local and state rules on how soon a retest is allowable). You can also save the extra code to accumulate for additional students to take the certification exams.

To obtain the answer key for these questions, teachers can email certifications@roboticseducation.org and provide their name, email, school, district, state, and phone number or call (903) 401-8010. For information on suggested course structure see the [Sample Course Sequence](#).

Fundamentals of Engineering

- 1) Which of the following species of wood are classified as softwood?
 - Maple
 - Ash
 - Spruce
 - Poplar
- 2) Civil engineers _____.
 - design electrical power systems
 - develop mechanical hardware
 - design bridges, roadways and dams
 - design systems with pulleys, gears, and torque
- 3) The hardness of steel can be increased by _____.
 - sintering
 - stretching
 - hammering
 - adding carbon
- 4) If you received three full time job offers, one for \$12 per hour, one for \$1,400 per month, and one for \$26,500 per year, which job should you take if salary was your only consideration?
 - \$1,400 per month
 - \$12 per hour
 - \$26,500 per year
 - \$12 per hour and \$1,400 per month are the same

- 5) Mike rode his bike 600 miles and he carried a spare tire on the trip. To provide equal wear on all 3 tires, he changed his tires while traveling. How many miles of wear did each tire accumulate?
- 300
 - 1200
 - 200
 - 400
- 6) A temperature of 40 degrees C is equal to _____ degrees F.
- 98
 - 126
 - 104
 - 158
- 7) What units are used to measure electrical current?
- Amperes
 - Resistance
 - Watts
 - Volts
- 8) Robots that run by themselves without human control must utilize _____.
- optical shaft encoders
 - a holonomic drive
 - transmitter and micro-switches
 - a microcontroller and autonomous programming
- 9) In which of the following settings would wearing safety eyewear NOT be necessary?
- When using power tools
 - When on the manufacturing floor
 - When working the Xerox copy machine
 - When assembling a product
- 10) Safety ORANGE represents:
- Safety guards and pinch points
 - Waste storage and cleanup areas
 - Walkways, railings, trip hazards and machine clearance areas
 - Danger/emergency and fire equipment
- 11) Where is the safest place to stand when operating a band saw?
- To the left of the machine
 - On the right hand side of the machine
 - In front of the machine
 - Three feet away from the machine
- 12) The following are 4 steps of the Engineering Design Cycle. If you place them in order, which of the following would be Step 2?
- Identify the problem
 - Design
 - Brainstorm
 - Test

- 13) If the X position is 3.5, the Z position is -0.3 and the Y position is 2, the Cartesian coordinates should be written as:
- (3.5, 2, -0.3)
 - (-0.3, 2, 3.5)
 - (3.5, -0.3, 2)
 - (2, 3.5, -0.3)
- 14) A 3 view or shop drawing is the same thing as _____ .
- a pictorial
 - an axonometric projection
 - an isometric drawing
 - an orthographic projection

Aerospace Pre-Engineering Module

- 1) The aspect ratio of a wing is useful to engineers because it helps to calculate lift and drag. What is the aspect ratio of a rectangular wing if the wingspan is 20 meters and the width of the wing, known as the chord length, is 2 meters?
- 2
 - 20
 - 10
 - 15
- 2) If an airplane is not accelerating and is climbing in altitude which is true?
- Thrust is greater than Drag and Lift is less than Weight
 - Drag is greater than Weight and Lift is greater than Thrust
 - Lift is equal to Drag and Weight is equal to Thrust
 - Lift is greater than Weight and Drag is equal to Thrust

Chemical Pre-Engineering Module

- 1) Use the Ideal Gas Law to determine the pressure in atmospheres of a gas, given a volume of 0.886 L, the number of molecules, $n = 0.00801$ mol, and temperature of 311 K. The gas constant, R , is $0.08206 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K}$.
- 2.31 atm
 - 23.1 atm
 - 0.002 atm
 - 0.231 atm
- 2) Determine the percent composition by mass of a 100-gram salt solution which contains 30 grams of salt.
- 1.5%
 - 15%
 - 0.30%
 - 30%

Civil Pre-Engineering Module

- 1) Pre-stressed concrete is concrete that is _____.
 - cured under high-heat atmospheric conditions
 - cured under high pressure atmospheric conditions
 - used in areas for heavy loads to allow bending and flexing
 - flexible and fluid
- 2) Trusses work because the individual members _____.
 - are stronger than one large beam
 - link and reallocate the loads of tension and compression evenly in a structure
 - are in a particular pattern unique to trusses
 - can withstand compression

Electrical Pre-Engineering Module

- 1) A motor on a train converts 160,000 J of electrical energy into 80,000 J of kinetic energy. How efficient is the motor?
 - 80%
 - 75%
 - 200%
 - 50%
- 2) Which of the following is not measured by frequency?
 - Light
 - Heat
 - Line Current
 - Sound

Pre-Engineering Technology Module

- 1) Frequency is measured in _____.
 - hertz
 - volts
 - amps
 - ohms
- 2) Which of the following is not an engineering drawing?
 - Isometric
 - Orthographic
 - Working Drawing
 - Artistic Rendering

Mechanical Pre-Engineering Module

- 1) The mechanical advantage of a machine is _____.
 - the input force divided by the output force
 - the distance the input moves divided by the distance the output moves
 - always greater than or equal to 1
 - the distance the output moves divided by the distance the input moves

- 2) According to the second law of thermodynamics, _____.
- everything in the universe will eventually reach absolute zero
 - entropy is always decreasing
 - entropy will increase forever
 - everything in the universe will eventually be the same temperature

Manufacturing Technology Pre-Engineering Module

- 1) A tensile test consists of a material that is subject to _____.
- rotational forces until deformation
 - uniaxial tension until failure
 - uniaxial tension until deformation
 - rotational forces until failure
- 2) Pneumatics systems require _____.
- fluids such as oil or water to operate
 - carbon Dioxide
 - nitric Oxide
 - a compressor

Computer Science Pre-Engineering Module

- 1) Which of these is not a common programming language?
- Fortran
 - Java
 - Clingonian
 - Perl
- 2) Which is the binary representation of 11?
- 00011010
 - 00101111
 - 00001011
 - 00110000