Apprentice Metering Systems Technician Test (AMT Test)

Preparation Guide

Public

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APPRENTICE METERING SYSTEMS TECHNICIAN TEST

Purpose

The AMT Test is a computer-based knowledge test that is used in the selection process for hiring employees into the Apprentice Metering Systems Technician position.

About the Test

- The AMT Test allows you to demonstrate your knowledge and understanding of the fundamentals of basic electricity, solid state (electronics), electrical safety, mathematics, as well as your preparedness for advanced technical training.
- There are 85 fill-in-the-blank and multiple-choice questions on the test and the total allotted time to take test is 2 hours and 15 minutes (135 minutes).

During the Test

It is important that you follow the directions of the Test Administrator. If you have any questions about the testing session, be sure to ask before the testing begins.

Once you start the test, you may not leave the room, talk, smoke, eat, or drink. Bathroom breaks are not allowed once you start the test. You should consider these factors before beginning the test.

All cellular devices, smart phones, smart watches, music players, ear phones, personal calculators, cameras or other electronic equipment will not be allowed in the testing area. Please secure these items before entering the testing location.

You will not be able to use your own calculator during testing. The Test Administrator will provide you with a non-programmable scientific calculator that you can use for the test.

The Test Administrator will provide the following materials:

- Calculator: **Texas Instruments TI-30Xa**
- Scratch paper
- Two pencils

Once the test has been submitted for scoring, the test administrator will collect all material.

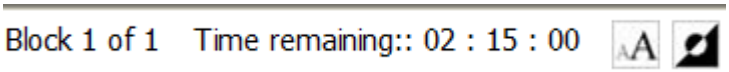
Computer-Based Test Directions

The AMT Test is a computer-based test.

You will be seated at a computer testing station. The Test Administrator will assist with launching the test. You will be asked to enter your candidate ID and password; this information will be provided by the Test Administrator.

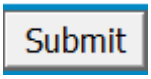
You only need minimal computer experience and typing skills. You will only use the keyboard for minimal entries (information to identify you and a password). You will answer all questions with a computer mouse.

A test time will be visible throughout the exam in in the top right corner. The time will start once you launch the exam. The test automatically closes when the time limit expires. If the test times out before you submit, the test will end and any unanswered questions are scored as incorrect.



When you have selected your answer to a question, click the “Next Question” button in order to move to the next question. To return to a question, click the “Previous Question” button.

Answers can be changed any time during the test until the time runs out or when you click the “Submit” button. **Once you click “Submit”, you cannot change your answers**. Please do not select “Submit” until all questions have been answered. If you click “Submit” by mistake, you will receive a display warning box. Click “Cancel” if you want to continue working.

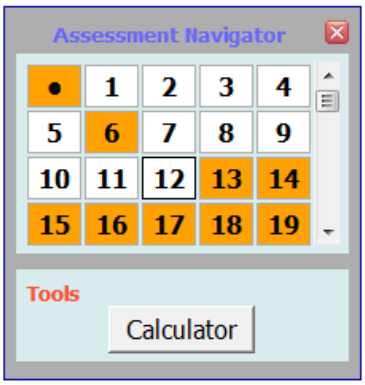


The “Assessment Navigator” will help identify questions that have been answered.

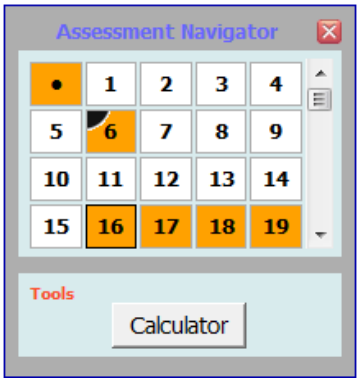
- Orange = unanswered question
- White = answered question

In the example below, questions 6 and 13-19 have not been answered, while 1-5 and 7-12 have been answered.

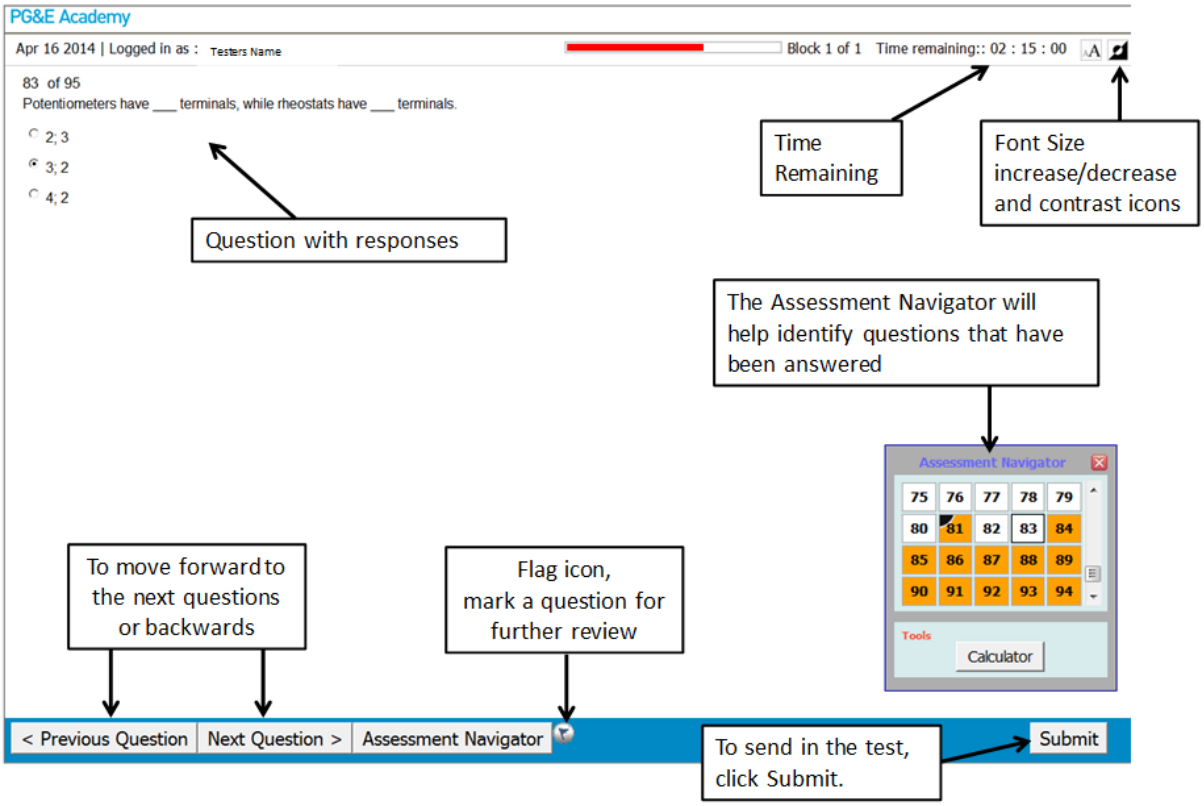
In addition, you can use the “Assessment Navigator” to jump to a particular question by clicking on the question number.



The “Flag” button  , at the bottom of the window, allows you to mark a question for further review. When you click on the “Flag” button, this adds a black corner to the question number in the “Assessment Navigator”. In the example below, question 6 has been flagged. Click the “Flag” button again to unflag the question.



Below is an example of what you can expect to see when taking the computer-based test.



Note: During the test if you experience any technical issues, raise your hand for assistance.

Resources

Although there are no education requirements, it is highly recommended that all candidates be thoroughly familiar with the following concepts:

- Basic Electricity (AC and DC)
- Solid State Fundamentals
- Mathematics problem solving (Algebra and Basic Trigonometry)

Some suggested resources to review (note, this is not an all-encompassing list):

AC DC Principles,
Author Paul T. Shultz
Published by American Technical Publishers, Inc., 2007
ISBN 10: 0826913504 / ISBN 13: 9780826913500

AC/DC Principles Workbook
by ATP Staff
Published by American Technical Publishers, Inc
January 1, 2007
ISBN-10:0826913512 | ISBN-13:978-0826913517

AC/DC Principles Resource Guide
[answers for workbook]
ATP Staff
Published by American Tech Publishers, Inc July 2008
ISBN-10:0826913539 / ISBN-13:978-0826913531

Electricity: Principles & Applications w/ Student Data CD-ROM 8th Edition
By Richard Fowler
Publication Date: Jan 26, 2012
ISBN:0077567625 / 9780077567620

Solid State Fundamentals for Electricians
(Workbook) - 3rd edition
by James V. Donald
Publisher: American Technical Publishers, Inc
June 2001
ISBN13: 978-0826916358 / ISBN10: 082691635X

Solid State Devices and Systems
by Gary J. Rockis
Published by American Tech Publishers, Inc
March 13, 2012
ISBN-10: 0826916376 | ISBN-13: 978-0826916372 | Edition: 4

Solid State Devices and Systems Study Guide
Perfect Paperback – April 27, 2012
by Gary Rockis
Published by American Tech Publishers April 2012
ISBN-10: 0826916384 ISBN-13: 978-0826916389

McDougal Littell Algebra 1
by MCDOUGAL LITTEL
Published by Littell Mathematics January 5, 2006
ISBN-10: 0618594027 | ISBN-13: 978-0618594023 | Edition: 2007

Trigonometry: A Right Triangle Approach
(5th Edition) [Hardcover]
by Michael Sullivan, Michael Sullivan III
Publication Date: March 22, 2008 | ISBN-10: 0136028969 | ISBN-13: 978-0136028963 |

Student Solutions Manual for Trigonometry: A Right Triangle Approach [Paperback]
Michael Sullivan, Michael Sullivan III, Randy Gallaher, Kevin Bodden
Publisher: Pears June 2008
ISBN-10:0136029418 | ISBN-13:978-0136029410

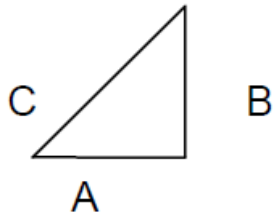
Additional resources for improving understanding of the concepts may be found at local libraries, online and bookstores.

Make sure that you are physically and mentally alert when you are scheduled to take your test.

We hope you find this information helpful. Pacific Gas and Electric Company wishes you the best of luck in qualifying on your test.

Practice Problems

1. For the triangle shown, if A = 8 and B = 6, calculate C



C = _____

2. A car averages 15 miles per gallon of gas in city driving and 20 miles per gallon in highway driving. At these rates, how many gallons of gas will the car use on a 600 mile trip if 4/5 of the trip is highway driving and the rest is city driving?

a. 40
b. 32
c. 24
d. 48

3. The ___ of a right triangle represents the ratio of the lengths of the sides opposite and adjacent to an acute angle.

a. tangent
b. sine
c. cosine
d. delta

4. Solve for x: $8(x - 1) - 4x = 16$

a. 11
b. 4
c. 6
d. 8

5. Calculate the resistance of a lamp which draws 250 milliamperes when connected to a 12.6 volt battery.

_____ ohms

6. A toaster draws 10 amps from a 120 volt source, what is the cost to operate the toaster for 2 hours, if energy cost 40 cents per kWh?

$ _____

7. A(n) ___ is the y-value of a trigonometric function.

a. radius vector
b. angle
c. ordinate
d. exponent

8. The _____ is the side of a right triangle that is opposite the right angle.

a. opposite
b. abscissa
c. adjacent
d. hypotenuse

9. _____ states that the square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two sides.

a. Watt's Law
b. Ohm's Law
c. Pythagorean Theorem
d. Quadratic Equation

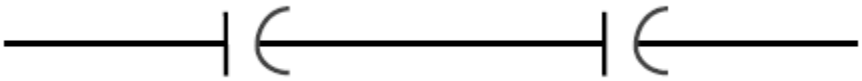
10. The base unit of energy is the _____

a. Proton
b. Joule
c. Hertz
d. Volt

11. Reducing the inductance in a series RL circuit causes the true power to _____ .

a. decrease
b. remain the same
c. increase
d. there is no inductance in a series RL circuit

12. What does this electrical/electronic symbol represent?



a. Two capacitors in parallel
b. Two resistors in series
c. Two resistors in parallel
d. Two capacitors in series

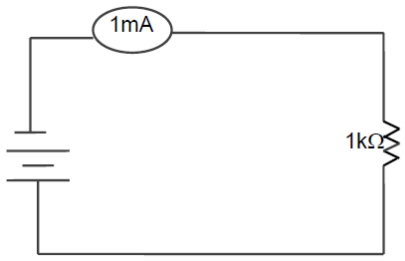
13. What is not a safe practice when attempting to put out an electrical fire?

a. Using an ABC fire extinguisher
b. Switching off the main power
c. Using water
d. All of the above

14. Calculate the reactance of a 100 µF capacitor when the circuit frequency is 60 Hz

_____ ohms

15. Solve for Voltage



_____ volts

16. A 30 ohm load is connected to the 6 volt secondary of a transformer with a 120 volt primary. What ohmic value does the load appear to be to the source?

a. 12000 ohms
b. 24 ohms
c. 3600 ohms
d. 600

17. In a series circuit, the statement *VT = V1 + V2 + V3 + VN* is a representation of _____.

a. Ohm's law
b. Lenz's law
c. Watt's law
d. Kirchhoff's voltage law

18. A 6 microfarad capacitor and a 4 microfarad capacitor are connected in parallel across a 50 volt, 100 hertz source. Determine the total reactance.

_____ ohms

19. A current of 1 ampere is split between 10 ohm and 20 ohm resistors in parallel. Find the current through the 10 ohm resistor.

_____ milliamps

20. A diode is an electrical component that _____.

a. restricts ampacity to a specific value
b. allows current flow in only one direction
c. stores energy in the form of electric charge
d. opposes any change in the magnitude of current flow

21. For a _____ transformer connection, the three-phase windings are connected in a continuous loop.

a. delta
b. wye
c. open-wye
d. open-delta

22. A series circuit contains two resistors: one resistor is good and the other is open. Across which resistor will a voltmeter indicate more voltage?

a. across the open resistor
b. the same voltage will show
c. across the good resistor
d. neither—there is zero voltage in an open circuit

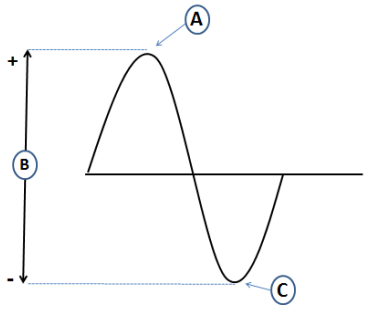
23. _____ can be defined as opposition to electrical current flow.

a. Resistance
b. Voltage
c. Capacitance
d. Reluctance

24. The two coils of a transformer are called the _____ and the _____.

a. delta; wye
b. primary; secondary
c. air; core
d. positive; negative

25. Which letter represents peak voltage in this diagram?

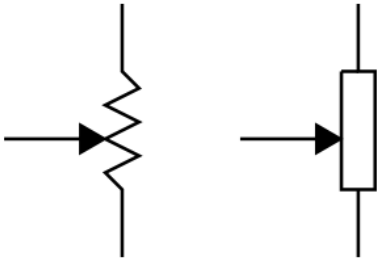


a. B
b. C
c. A
d. None of the above

26. What is the sum of the measure of the angles of a triangle?

a. 270 degrees
b. 90 degrees
c. 360 degrees
d. 180 degrees

27. What do these electrical/electronic symbols represent?



a. inductors
b. potentiometers
c. solenoids
d. diodes

28. _____ is the branch of mathematics that uses the relationships between the lengths of the sides of a triangle and the angles to perform calculations.

a. Geometry
b. Calculus
c. Trigonometry
d. Algebra

29. A softball is thrown at a speed of 40 miles per hour in a course that makes an angle of 60 degrees with the positive x-axis. What is the initial speed in the horizontal direction?

a. 20 mph
b. 69.28 mph
c. 34.64 mph
d. 33 mph

Practice Problem Answer Key

1. 10
2. (b) 32
3. (a) tangent
4. (c) 6
5. 50.4 ohms
6. 96 cents
7. (c) ordinate
8. (d) hypotenuse
9. (c) Pythagorean Theorem
10. (b) Joule
11. (c) increase
12. (d) Two capacitors in series
13. (c) using water
14. 26.5 ohms
15. 1 volt
16. (a) 12000 ohms
17. (d) Kirchhoff's voltage law
18. 159.15 ohms
19. 667 milliamps
20. (b) allows current flow in only one direction
21. (a) delta
22. (a) across the open resistor
22. (a) Resistance
24. (b) primary – secondary
25. (c) A
26. (d) 180 degrees
27. (b) potentiometers
28. (c) Trigonometry
29. (a) 20 mph