



Australian Government

A U S T R A L I A N  
A P P R E N T I C E S H I P S

Your Life. Your Career. Your Future.

# Electrical and Electronic

Practice Aptitude Quiz

# Practice Aptitude Quiz

## Part 1: About this quiz

Use this quiz to prepare for an Apprenticeship in the Electrical and Electronic industry

This quiz:

- Is NOT a formal assessment tool or pre-requisite for any job application
- Shows key learning standards for the Electrical and Electronic industry
- Has been developed with the help of industry leaders, TAFE and high schools

### Quiz details

This quiz will:

- Take approximately 1 hour and 45 minutes to complete
- Ask you numeracy and literacy questions specific to the Electrical and Electronic industry
- Assess your literacy and numeracy at a Year 10 standard
- Allow you to use a calculator
- Share correct answers at the end

### Who should take this quiz?

You should complete this quiz if you:

- Are thinking about starting an Apprenticeship in the Electrical and Electronic industry
- Want to practise for a formal aptitude test

### Need help with your literacy and numeracy skills?

If you want to improve your literacy and numeracy skills, reach out to any of the below:

- Australian Apprenticeship Support Network providers
- Your Registered Training Organisation when you start training
- Reading Writing Hotline:  
1300 655 506  
[www.readingwritinghotline.edu.au](http://www.readingwritinghotline.edu.au)
- Careers advisers and your teachers (if you're in high school)

### More information about the Electrical and Electronic industry

Visit [www.yourcareer.gov.au/industries/d/electricity-gas-water-waste-services](http://www.yourcareer.gov.au/industries/d/electricity-gas-water-waste-services)

On this page you'll be able to:

- See the most popular Electrical and Electronic occupations
- Get general information and statistics about the industry
- Search for Electrical and Electronic courses

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## How to use this quiz

This is an interactive form that can be filled out on your computer.

You can either:

- Fill it out on your computer; OR
- Print it out; OR
- Write your answers down on paper as you go.

Use the answers section at the end of the quiz to see how you went.

## How to complete this quiz on your computer

1. Download and save the quiz onto your computer
2. Open the file from your computer
3. Fill in the form using a keyboard and mouse

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## Part 2: The Quiz

### Section 1: Language and Literacy

1. Read the following media release then answer the questions that follow:

4 April 2011

**More maths and physics at school says electrical industry.**

(Source: NECA press release)

Today, peak Australian electrical industry body, the National Electrical and Communications Association (NECA), supported calls to place a renewed focus on maths and physics at secondary school.

NECA was responding to an Industry Skills Council that said the average result in some apprentice tests involving maths and physics was 57% compared to 70% in previous years.

NECA chief executive office, Mr James Tinslay, said while the electrical industry was attracting large numbers of apprentices it is still important for the next generation of apprentices to have solid numeracy skills when they leave school and not rely on tertiary education to fill the void.

“NECA has experienced record applications and completion of apprenticeships in its group training companies throughout Australia. It is promising to see so many young people making a career out of learning a trade but it is not surprising when you consider the massive opportunities in the industry,” Mr Tinslay said.

“As the number of new apprenticeships grow to help manage skill shortages in the electrical and communications industry, it is important that vocational training focus on workplace skills and not substitute for schooling.”

With large infrastructure projects such as the National Broadband Network (NBN) and the boom in mining operations in Australia, it is a great time to begin a career in the electrical industry.

“The industry will continue to grow and NECA expects to see more apprentices begin their careers in the coming years. There can be a gap between year 10, year 12 and entry levels of maths and physics required to undertake an electrical apprenticeship, and this needs addressing.

“NECA supports calls for a renewed focus on these skills at secondary school to help students prepare for a career in the electrical and communications industry,” Mr Tinslay said.

a. What does NECA stand for?

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- b. What does NECA support?
- c. What two projects or activities are providing career opportunities in the electrical industry?
- d. What two subjects should vocational training focus on in secondary schools, in the opinion of the NECA?

## 2. Occupational Health and Safety (OHS)

There are agencies in each State and Territory whose primary role is to promote and encourage safe, fair and productive working lives by working with employers, employees, unions and industry representatives. These agencies are responsible for administering industrial relations (IR) legislation and managing OHS functions in each state or territory.

For example, SafeWork SA is South Australia's occupational health, safety and welfare (OHS) agency. The following extract is from the SafeWork SA website – [www.safework.sa.gov.au](http://www.safework.sa.gov.au)

**Read the extract and answer the questions on the following pages:**

### Hierarchy of control measures

The hierarchy of control is a sequence of options which offer you a number of ways to approach the hazard control process. Everyone in the workplace must adhere to the OHS policies and procedures. Here is a list of some OHS policies and procedures, with typical examples.

#### **Eliminate the hazard:**

- Remove hazardous electrical plants from the workplace;
- Cease in-house operations of hazardous work.

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*If this is not practical, then...*

**Substitute the hazard with a lesser risk:**

- Use low voltage electrical plant;
- Substitute movable electrical plant for fixed.

*If this is not practical, then...*

**Isolate the hazard:**

- Place hazardous electrical plant in enclosures with restricted access;
- Place out-of-service tags on plant.

*If this is not practical, then...*

**Use engineering controls:**

- Use RCDs (safety switches) to protect socket outlets which supply electrical plant.

*If this is not practical, then...*

**Use administrative controls:**

- Perform regular inspection and tests on electrical plant and electrical installations;
- Implement safe work practices, instruction and training.

*If this is not practical, then...*

**Use Personal Protective Equipment (PPE):**

Use rubber mats, insulated gloves, eye protection, boots, and head gear (also to be used in conjunction with above measures).

**Examples of some Personal Protective Equipment (PPE) and safety signs that may be used in the Electrical Trades:**

**Gloves**



**Photo A**

**Breathing Mask**



**Photo B**

**Goggles**



**Photo C**

**Non-conductive Tools**



**Photo D**



**Sign A**



**Sign B**



**Sign C**

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**Answer the following questions:**

a. Where does Personal Protective Equipment stand on the hierarchy of control?

b. How do you eliminate a hazard?

c. What are RCDs and why are they used?

d. What is the role of each state and territory OHS agency?

e. Name at least two PPE items to use when installing a light fitting overhead:

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## Section 2: Numeracy

1. Match the type of number with the examples provided:

$\frac{3}{8}$	$35^\circ$	75%
5:4	16.37	$3\frac{1}{4}$

- a. Percentage \_\_\_\_\_
- b. Decimal Number \_\_\_\_\_
- c. Fraction \_\_\_\_\_
- d. Mixed Number \_\_\_\_\_
- e. Ratio \_\_\_\_\_
- f. Angle \_\_\_\_\_

2. Arrange in ascending order: (from smallest to largest)

4                  -2                   $\frac{1}{2}$                   3.7                  0                  -8

3. Write in descending order: (from largest to smallest)

$\frac{1}{4}$                                                    $\frac{2}{3}$                                                   0.3

4. Express the following in scientific notation:

- a. 17,601 \_\_\_\_\_
- b. 729,123 \_\_\_\_\_
- c. 0.00015 \_\_\_\_\_
- d. 12.72 \_\_\_\_\_

5. Calculate the following:

- a.  $10^2$  \_\_\_\_\_
- b.  $3^3$  \_\_\_\_\_
- c.  $\sqrt{36}$  \_\_\_\_\_
- d.  $(\sqrt{9})^2$  \_\_\_\_\_



# Practice Aptitude Quiz

**6. Add the following:**

a. \$2, \$21.45 and \$8.23

---

b. 18.32, 471.019 and 315

---

**7. Calculate the following:**

a. 5,218 - 1,784

---

b. 43.18 - 29.461

---

**8. Multiply the following:**

a. 6.87 by 10

---

b. 13.8 by 3

---

c. 46.2 by 8.5

---

**9. Divide the following:**

a. 3.45 by 10

---

b. 3,024 by 14

---

c. 56.2 by 0.2

---

**10. Simplify the following:**

a.  $2 + 3 \times 4$

---

b.  $4 - 10 \div 2$

---

c.  $\frac{50+50}{2 \times 25}$

---

d.  $(16 - 5) \times 3$

---

**11. Add the following:**

a.  $\frac{1}{4}$  and  $\frac{1}{2}$

---

b.  $\frac{2}{9}$  and  $\frac{5}{6}$

---

c.  $3\frac{3}{4}$  and  $\frac{1}{8}$

---

# Practice Aptitude Quiz

12. Calculate the following:

a.  $\frac{5}{6} - \frac{1}{4}$

---

b.  $2\frac{1}{14} - \frac{4}{7}$

---

13. Evaluate the following:

a. 10% of \$44

---

b. 25% of 12.84

---

14. Michelle is a first-year apprentice who earns \$600 a week as an apprentice electrician. She gets a pay rise of 5%. What is her new wage?

15. An article bought for \$250 is sold for \$375. Find:

a. The profit in dollars.

---

b. The profit as a percentage of the cost price.

---

16. Jonas, an electrician, buys the following from an electrical wholesaler: cable \$215; power points \$95; and fixings \$8. Jonas receives a 10% trade discount.

a. How much would Jonas pay with no discount?

---

b. How much would Jonas pay with discount?

---

c. How much has Jonas saved?

---

17. Barry scored 80% in an exam. There were 25 questions.

a. How many questions did Barry get right?

---

b. How many questions did Barry get wrong?

---

18. What percentage is 30 out of 50?

# Practice Aptitude Quiz

19. Electrical goods are subject to a goods and services tax (GST) of 10% of the sale price. If a refrigerator's pre-tax price is \$850:

a. What is the tax?

---

b. What is the selling price?

---

20. The efficiency of a machine is rated at 70%. If the input to the machine is 200 watts, what is the output power available?

21. Remove the brackets and simplify the following:

a.  $(2x + y) - (x - 4y)$

---

b.  $(3a - b) - (2a - 3b)$

---

22. If  $P = F/A$  find P, if  $F = 60$  and  $A = 20$ ?

23. Re-arrange the following formulae to make the letter in brackets the subject of the formula:

a.  $P = VI$  (V)

---

b.  $P = \frac{\pi Qn}{30}$  (Q)

---

24. The formula for working out the voltage is  $V = E - iR$ . Re-arrange the formula to:

a. Make E the subject

---

b. Make R the subject

---

25. The ratio of a diameter of 'pulley A' to 'pulley B' is 4.5 to 2. If 'pulley A' has a diameter of 450 mm what is the diameter of 'pulley B'?

# Practice Aptitude Quiz

26. What is the ratio of the number of light bulbs to double power points?

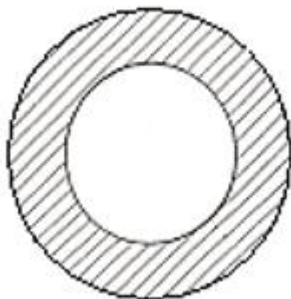


27. The mass of two resistor boxes are in the ratio of 2:5. The smaller box has a mass of 20 kg. What is the mass of the larger box?

28. Convert 5 amps to milliamps (mA):

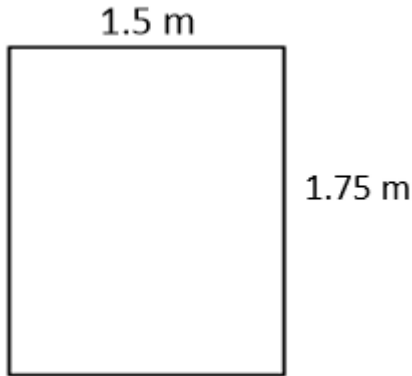
29. Convert 12k ohms to ohms ( $\Omega$ ):

30. A large washer has an outer radius of 10 mm and a hole with a diameter of 14 mm. What is the area of the washer? (Use  $\pi = 3.14$ ):



# Practice Aptitude Quiz

31. Calculate the area of the solar panel which has a base length of 1.5 m and a height of 1.75 m:

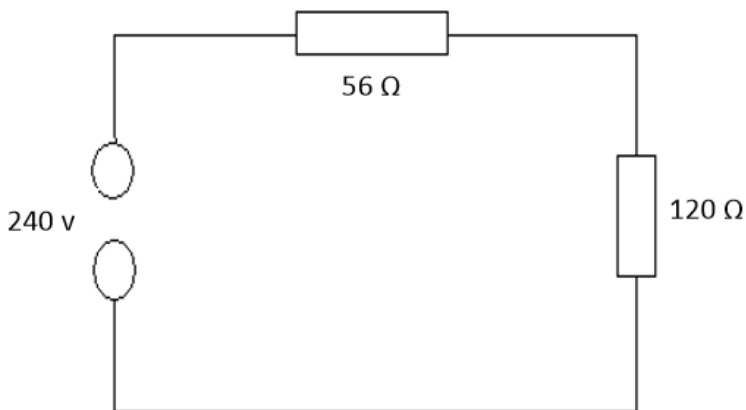


32. An electric car is travelling at 60 km per hour, how far will it travel in 3 hours?

33. Two numbers add up to 40. Find the other number if one of the numbers is 15:

34. Meeha is a data-cabling technician. She receives a gross salary of \$45,000 a year. How much does she receive each fortnight?

35. A simple circuit has two resistors, one 56 ohms and the other is 120 ohms, and is connected to a supply voltage of 240 volts. Answer the questions on the next page:

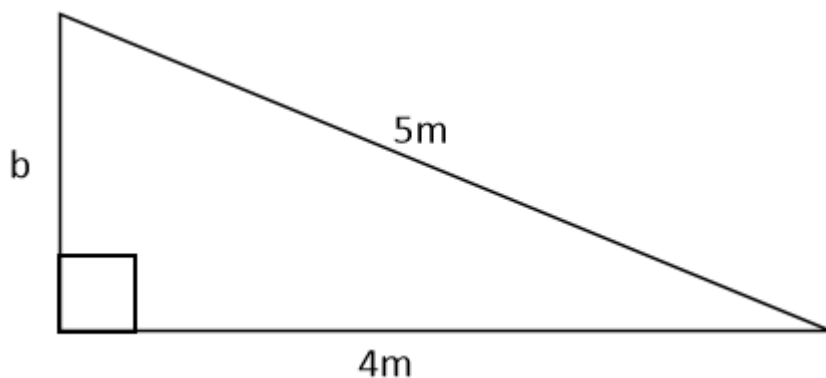


P = Power  
I = Current  
R = Resistance  
V = Voltage

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- a. Calculate the current flowing (in amps) in the circuit using the formula  $V=IR$  correct to 3 decimal places:
  
- b. Calculate the total power (in watts) dissipated using the formula  $P = I^2R$ . For 'I', use the answer you calculated in the previous question, correct to 2 decimal places:

**36. A right-angled triangle has the following dimensions. Using Pythagoras' Theorem find the missing side (b):**



**37. The perimeter of a room needs to be wired. The room measures 3.2 m x 3.2 m:**

- a. How much wire is required to go around the outside of 3 of the walls?
  
- b. If Thermo Plastic Sheathed (TPS), Orange Circular and Category 6 (cat6) cable are all to be used when wiring the 3 walls, what is the total amount of wire required?

# Practice Aptitude Quiz

## Answers

### Section 1: Language and Literacy

1.
  - a. National Electrical and Communications Association
  - b. To place a renewed focus on maths and physics at secondary school.
  - c. Large infrastructure projects such as the National Broadband Network (NBN) and the boom in mining operations in Australia.
  - d. Maths and Physics
2.
  - a. PPE stands last on the hierarchy of control.
  - b. Eliminate a hazard by removing hazardous electrical plants from the workplace and ceasing in-house operations of hazardous work.
  - c. RCDs are safety switches used to protect socket outlets which supply electrical plant.
  - d. The main role of agencies is to promote and encourage safe, fair and productive working lives by working with employers, employees, unions and industry representatives.
  - e. Foot protection, hard hat, eye protection, breathing protection, hand protection, non-conductive ladder, non-conductive hand tools.

### Section 2: Numeracy

1.
  - a. 75%
  - b. 16.37
  - c.  $\frac{3}{8}$
  - d.  $3\frac{1}{4}$
  - e. 5:4
  - f.  $35^\circ$
2. -8, -2, 0,  $\frac{1}{2}$ , 3.7, 4
3.  $\frac{2}{3}$ , 0.3,  $\frac{1}{4}$
4.
  - a.  $1.7601 \times 10^4$
  - b.  $7.29123 \times 10^5$
  - c.  $1.5 \times 10^{-4}$
  - d.  $1.272 \times 10^1$
5.
  - a. 100
  - b. 27
  - c. 6
  - d. 9
6.
  - a. \$31.68
  - b. 804.339
7.
  - a. 3,434
  - b. 13.719
8.
  - a. 68.7
  - b. 41.4
  - c. 392.7
9.
  - a. 0.345
  - b. 216
  - c. 281
10.
  - a. 14
  - b. -1
  - c. 2
  - d. 33
11.
  - a.  $\frac{3}{4}$
  - b.  $\frac{19}{18}$  or  $1\frac{1}{18}$
  - c.  $\frac{27}{8}$  or  $3\frac{3}{8}$
12.
  - a.  $\frac{7}{12}$
  - b.  $1\frac{1}{2}$

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- 13.      a. \$4.40                                        b. 3.21
- 14.      \$630
- 15.      a. \$125                                        b. 50%
- 16.      a. \$318                                        b. \$286.20                                        c. \$31.80
- 17.      a. 20                                                b. 5
- 18.      60%
- 19.      a. \$85                                            b. \$935
- 20.      140 watts
- 21.      a.  $x + 5y$                                         b.  $a + 2b$
- 22.       $P = 3$
- 23.      a.  $V = P/I$                                         b.  $Q = 30P/\pi n$
- 24.      a.  $E = V + iR$                                         b.  $R = \frac{E-V}{I}$
- 25.      200 mm
- 26.      2:3
- 27.      50 kg
- 28.      5000 mA 12000
- 29.       $\Omega$  (Ohms)
- 30.      160.14 mm<sup>2</sup>
- 31.      2.625 m<sup>2</sup>
- 32.      180 km
- 33.      25
- 34.      \$1730.77
- 35.      a. 1.364 amps                                        b. 325.53 W
- 36.      3 m
- 37.      a. 9.6 m                                            b. 28.8 m