

# Practice Attitude

# QUIZ

**Telecommunications**

# Telecommunications Industry

# QUIZ

## Practice Aptitude Quiz

It is critical for young people to build their career management skills so they can make informed choices regarding their study and training options and navigate a pathway toward their occupation and career of choice.

This career development resource combines labour market information with a practical industry specific activity to help develop awareness about the skills needed to pursue a career pathway in the Telecommunications industry.

## PART 1: About the Telecommunications Industry

### 1. The Telecommunications Industry in a nutshell

#### Key sectors:

- > Cabling
- > Radio Frequency (RF) and Optical Communications
- > Media and Internet Protocol (IP) networks
- > Transmission
- > Digital and IP Networking
- > Wireless
- > Switching

Telecommunications covers the convergence of technologies across a number of industry areas, including telecommunications, sustainable networks, IP networks, optical and radio networks, mesh networks, cloud networks, information technology and digital media.

What is the National Broadband Network (NBN)? The NBN is an Australian Government initiative and represents the largest ever infrastructure project undertaken in this country which will deliver high speed broadband to all Australians. The NBN is a new, wholesale only, open access high speed broadband network.

The NBN will involve the laying of fibre optic cabling to at least 90 per cent of Australian homes, schools and businesses, capable of delivering speeds of 100 megabits per second, or up to 100 times faster than many people experience today.

The remaining premises will be connected via a combination of next generation high speed wireless and satellite technologies delivering broadband speeds of 12 megabits per second or more.

### 2. Key occupation information (sourced from Job Outlook - [www.joboutlook.gov.au](http://www.joboutlook.gov.au) and Jobs Australia 2010 [www.deewr.gov.au/Employment/ResearchStatistics/Documents/AustralianJobs.pdf](http://www.deewr.gov.au/Employment/ResearchStatistics/Documents/AustralianJobs.pdf))

#### Weekly average earnings for major occupations:

- > Information and Communications Technology (ICT) Support Technicians - \$1000
- > Telecommunications Trades Worker - \$1150
- > ICT Managers - \$1879
- > Telecommunications Engineering Professionals - \$1250
- > Telecommunications Technical Specialists - \$1250

## Jobs and demand information:

**ICT Support Technicians:** provide support for the deployment and maintenance of computer infrastructure and web technology and the diagnosis and resolution of technical problems.

- > Job prospects - above average
- > Weekly earnings - \$1000
- > Occupation size - 49700

Potential entry level qualifications:

- > Certificate II in Telecommunications
- > Certificate II in Telecommunications Cabling
- > Certificate II in Telecommunications Access Network Cabling

**Telecommunications Trades Workers:** install, maintain and repair data transmission equipment, aerial lines, conduits, cables, radio antennae and telecommunications equipment and appliances.

- > Job prospects - above average
- > Weekly earnings - \$1150
- > Occupation size - 24100

Potential entry level qualifications:

- > Certificate II in Telecommunications Cabling
- > Certificate II in Telecommunications Digital Reception Technology
- > Certificate III in Telecommunications
- > Certificate III in Telecommunications Cabling
- > Certificate III in Broadband and Wireless Networks Technology
- > Certificate III in Telecommunications Digital Reception Technology

**Telecommunications Technical Specialists:** develop, monitor and carry out technical support functions for telecommunications networks and install computer equipment, computer systems and microwave, telemetry, multiplexing, satellite and other radio and electromagnetic wave communication systems.

- > Job prospects - above average
- > Weekly earnings - \$1250
- > Occupation size - 6300

Potential entry level qualifications:

- > Certificate II in Telecommunications Digital Reception Technology
- > Certificate III in Telecommunications
- > Certificate III in Broadband and Wireless Networks Technology
- > Certificate III in Telecommunications Digital Reception Technology
- > Certificate IV in Telecommunications Engineering

**Telecommunications Installation and Cabling Workers:** install telecommunications and data cabling and cabling products on customer premises. They may install and maintain basic IP networks with network security in the home and small to medium enterprise installations. They install software and network peripherals, and configure and test emerging technology IP network elements, including secure wireless LANs, servers and routers for enterprise networks.

- > Job prospects - above average
- > Weekly earnings - \$1000
- > Occupation size - 49700

Potential entry level qualifications:

- > Certificate II in Telecommunications
- > Certificate II in Telecommunications Cabling
- > Certificate II in Telecommunications Access Network Cabling
- > Certificate III in Telecommunications Cabling

**Telecommunications Technicians:** install telecommunications equipment and products on either enterprise or customer premises including installation of voice and data telecommunications equipment. The work includes assessing installation requirements, planning and performing installations, testing installed equipment and fault finding.

- > Job prospects - above average
- > Weekly earnings - \$1000
- > Occupation size - 49700

Potential entry level qualifications:

- > Certificate II in Telecommunications
- > Certificate II in Telecommunications Digital Reception Technology
- > Certificate III in Telecommunications
- > Certificate III in Broadband and Wireless Networks Technology
- > Certificate III in Telecommunications Digital Reception Technology
- > Certificate IV in Telecommunications Engineering

### 3. Career Pathways

- > Australian Apprenticeships Job Pathways - view potential career pathways for this industry [www.aapathways.com.au/search\\_job\\_02.cfm?c=27](http://www.aapathways.com.au/search_job_02.cfm?c=27)

**Other useful careers sites are:**

- > My Future - [www.myfuture.edu.au/](http://www.myfuture.edu.au/)
- > Job Guide - [www.jobguide.thegoodguides.com.au/](http://www.jobguide.thegoodguides.com.au/)
- > Career Factsheets - [www.ncdw.com.au/index.php/Career-Factsheets.html](http://www.ncdw.com.au/index.php/Career-Factsheets.html)

## 4. Job Hunting

### Job vacancy website:

- > Australian Job Search - [www.jobsearch.gov.au/](http://www.jobsearch.gov.au/)  
The Australian Government's job site. Input your postcode, select the Occupation Category "Electrical and Electronic Trades", then select "Communications and/or Electrical and Telecommunications Workers" scroll down to the "Additional Search Criteria" section and click on "Apprenticeships/ Traineeships", then click on the "Find Jobs" button.

### Job hunting hints and labour market information:

- > Australian Apprenticeships Pathways - [www.aapathways.com.au](http://www.aapathways.com.au)  
Click on "Search" to find potential Australian Apprenticeships occupation ideas. You can also find Job Hunting hints in the "Self Help" menu item.
- > My Future: Labour Market Information - [www.myfuture.edu.au/services/default.asp?FunctionID=5400](http://www.myfuture.edu.au/services/default.asp?FunctionID=5400)  
Click on the map or use the drop down menu to find general labour market information for your region including 'top occupations and incomes'. Data is based on the most recently available census.

## 5. Useful Contacts

Here are some links to a range of support services, organisations and government agencies that may help with careers research and job hunting:

### Support services:

- > Search for your local Australian Apprenticeships Centre - [www.aapathways.com.au/search\\_aac.cfm?](http://www.aapathways.com.au/search_aac.cfm?)
- > Group Training Organisations employ Australian Apprentices and places them with businesses.  
[www.grouptraining.com.au/](http://www.grouptraining.com.au/)
- > Job Services Australia providers work with eligible job seekers to develop an individually tailored Employment Pathway Plan. The plan maps out the training, work experience and additional assistance needed to find job seekers sustainable employment.  
[www.jobsearch.gov.au/provider/pages/whichprovider.aspx](http://www.jobsearch.gov.au/provider/pages/whichprovider.aspx)

### Industry Organisations:

- > Innovation and Business Skills Australia - [www.ibsa.org.au/](http://www.ibsa.org.au/)
- > Innovation and Business Skills Australia State and Territory network - [www.ibsa.org.au/links/industry-training-advisory-bodies-and-skills-boards.aspx](http://www.ibsa.org.au/links/industry-training-advisory-bodies-and-skills-boards.aspx)
- > Australian Computer Society - [www.acs.org.au/index.cfm?action=show&conID=careeremployment](http://www.acs.org.au/index.cfm?action=show&conID=careeremployment)
- > National Electrical and Communications Association - [www.neca.asn.au/index.php/careers\\_apprenticeships/](http://www.neca.asn.au/index.php/careers_apprenticeships/)
- > National Broadband Network Corporation - [www.nbnco.com.au/](http://www.nbnco.com.au/)

- > Communications Alliance - [www.commsalliance.com.au](http://www.commsalliance.com.au)

## **Government Agencies:**

- > Department of Broadband, Communications and the Digital Economy - [www.dbcde.gov.au/jobs](http://www.dbcde.gov.au/jobs)
- > National Broadband Network - [www.nbn.gov.au/](http://www.nbn.gov.au/)
- > Australian Media and Communications Authority - [www.acma.gov.au/WEB/STANDARD/pc=PC\\_1527](http://www.acma.gov.au/WEB/STANDARD/pc=PC_1527)

## Part 2: About this Resource

# QUIZ

### Guidance

This Telecommunications Practice Aptitude Quiz is intended to be a general illustration of some of the key learning standards required of people attempting an Australian Apprenticeships entry level qualification in the Telecommunications industries.

This assessment tool has been developed to provide you with an understanding of the literacy, numeracy, problem solving and contextualised knowledge and skills you will need when undertaking entry level training in the Telecommunications industry. The literacy and numeracy questions in this quiz are specifically contextualised to the Telecommunications industry.

The level of reading, writing and mathematical skills assessed by this quiz is equivalent to that of the Year 10 or School Certificate level in Australia.

The important thing to remember is that these skills and knowledge are vitally important for you to succeed and be safe in the telecommunications industry.

**Literacy:** It's important to have good reading and writing skills because the telecommunications industry is always changing and is converging with other disciplines such as computer networking in the Information Technology area and physics (optical and radio). You need to keep up to date with safety issues, quality standards and technological advances, complete worksheets and provide written records. No matter which area you work in and what level of skill and expertise you gain, having good English reading and writing skills will help you succeed.

**Numeracy:** The basic foundations for all telecommunications workers are sound applied mathematical skills which are used in practical, everyday situations. The telecommunications worker needs to perform measurements of a technical nature and interpret the results. This means you need to be comfortable working with numbers both mentally for simple calculations, and working with a calculator for more complicated calculations.

**Problem Solving and Specific Knowledge:** Many of the mathematical skills you need are closely linked to a basic knowledge of science and telecommunications technologies. You will perform calculations within the basic mathematical and scientific rules. You will derive solutions to simple problems using applied mathematics.

The quiz provides you with an **indication** of your skill level in these areas relative to industry expectations.

It is not a formal test and so there is no pass or fail mark.

This quiz has been developed with the assistance of industry, TAFE and the secondary school sector as a careers resource.

**The assessment should be able to be completed in approximately 1 hour 45 minutes.**

**The Practice Aptitude Quiz can be:**

- used by a number of different organisations and people such as careers practitioners with young people, Group Training Organisations and Job Services Australia organisations with job seekers;

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- > used with individuals or in a class setting to provide general guidance on the level of study involved in undertaking an entry level qualification in these industries;
- > provided to people to enable them to practice their skills before sitting an actual aptitude test;
- > used by Mathematics teachers as a guide to the applied mathematics used as industry requirements at the entry point of this particular Australian Apprenticeship career path;
- > used by teachers as classroom based activities for students in Year 10 and VET telecommunications centred studies. (Note – completion of some practice activities before the test would be valuable.)



## Part 3: The Quiz

### Section 1: LITERACY, READING AND COMPREHENSION

#### Spelling

1. Rearrange the following words in alphabetical order:

Telecommunications	
Electronics	
Wireless	
Solar	
Cable	

2. Explain what you understand by the following terms:

a. Telecommunications

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b. Cable

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c. Wireless

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3. The following text has 10 spelling errors. Correct those errors and list them in the order they appear in the text. List the mistakes below, as you find them.

Renewable energy derived from naturel processes such as sunlite, wind and tides are replenished constntly. Renewable sistems that convurt energy to electricity include solar pannels and wind turbines. Electrical energy produced is imporent and must not be waisted, therefore bateries can be used to store that energy for later use.

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## Comprehension

This is a test of how well you understand what you read. Read the following article then answer questions 4 to 12 that follow.

### Information and Communication Technology (ICT)

Telecommunication is the transmission of messages, over significant distances, for the purpose of communication. Today, telecommunications is a complex network of mobile phone technology, internet, wireless and computer networking more commonly referred to as Information and Communication Technology (ICT).

A number of key concepts on modern telecommunication systems are discussed below.

- > A basic telecommunication system consists of three primary elements that are always present in some form, and they are:
  - > a sender or transmitter that takes information and converts it to a communication signal;
  - > a transmission medium carries the communication signal using either electrical, radio or optical technologies ;
  - > a receiver that takes the communication signal from the transmission medium and converts it back into usable information.

Wireless devices such as mobile phones or Bluetooth hands-free sets communicate using radio waves whilst other devices such as CD players and remote control units communicate using optical light sources such as a laser or a LED.

- > ICT systems use either analog or digital communications signals. For an analog signal, the signal varies continuously in intensity with respect to the information. Modern communication systems use digital signals where the information is encoded as a set of discrete values (for example, a set of 'on' or 'off' states and 'light' or 'no light'). Noise degrades an analog signal during transmission and as such the noise becomes part of the analog signal. However, noise can easily be removed from digital signals during processing, making this relative immunity to noise a key advantage of digital signals over analog signals.
- > Telecommunication has significant economic, social and cultural impacts on modern society.
  - > **Economic impact:** Companies or individuals use telecommunications to help build their global business using customised websites. Relatively poor communities use telecommunication to their advantage. Isolated villagers in Bangladesh use mobile phones to speak directly to wholesalers and arrange a better price for their goods. Similarly coffee growers in Africa share mobile phones to follow hourly variations in coffee prices and sell at the best price.
  - > **Social impact:** Use of e-mail and SMS are fast becoming redundant among younger users as a means of communications. The internet enables individuals to use social networking websites such as Facebook, Twitter and MySpace to socialise and interact with friends, relatives and prospective employers by posting photographs, events and profiles for others to see. Sites like LinkedIn foster commercial and business connections. YouTube and Flickr specialise in users' videos and photographs.  
Voice-over-Internet Protocol (VoIP), a form of internet telephony, which is fast replacing traditional land line telephone, has become as easy and as convenient to use as a normal telephone to communicate. The benefit is that, as the internet carries the voice traffic, VoIP can be free or cost much less than a traditional telephone call, especially over long distances.

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**Cultural impact:** In cultural terms, telecommunication has increased the public's ability to access music and live entertainment more affordably from their own home using the internet. Internet TV (IPTV) is becoming more common particularly with better broadband availability.

Telecommunication has also transformed the way people receive their news. Many people use the World Wide Web to access news, weather and sports reports, to plan and book vacations and to find out more about their interests. Major events and natural disasters across the world are being televised or made available on the internet thus keeping us informed very soon after the event.

4. **What type of communication is most commonly used today? (Circle the correct response)**

- a. Telegram
- b. Internet
- c. Smokesignals
- d. Posted letters

5. **Choose the most appropriate response for the technical advantage of digital signalling over analog signalling. (Circle the correct response)**

- a. Cheaper
- b. Faster
- c. More immune to noise
- d. Less immune to noise

6. **What medium is used by mobile phones to communicate? (Circle the correct response)**

- a. Optical device
- b. Laser device
- c. LED source
- d. Radio waves

7. **What are the three basic elements that are common in most telecommunications systems?**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

8. **Name two types of light sources stated that are used in optical communications.**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_

9. **Name the three types of significant impacts that telecommunication has brought on modern society.**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

10. What type of network is used by VoIP calls to replace traditional telephone calls?

\_\_\_\_\_

11. What is the name of the social networking website commonly used for commercial and business connections?

\_\_\_\_\_

12. Name two types of communications that are becoming less common among young people in recent times.

1. \_\_\_\_\_

2. \_\_\_\_\_

## Section 2: MATHEMATICS

*Calculators may be used*

### Numbers (Rounding, Scientific Notation, Evaluation)

13. Round the following:

a. 52.28565 to two decimal places \_\_\_\_\_

b.  $4568.5 \times 10^{-4}$  to two decimal places \_\_\_\_\_

c. 646.75 to the nearest tens \_\_\_\_\_

d. 329 to the nearest hundreds \_\_\_\_\_

14. Rearrange in ascending order (from smallest to largest)

5	
-3	
$\frac{1}{2}$	
4.3	
0	
-7	

15. Which of the following represents the number 62,000,000,000 in scientific notation? (Circle the correct response)

a.  $62 \times 10^{10}$

b.  $6.2 \times 10^{10}$

c.  $6.2 \times 10^{-10}$

d.  $0.62 \times 10^{10}$

16. Evaluate the following:

- a.  $10^2$
- b.  $5^3$
- c.  $64^{1/2}$
- d.  $(\sqrt{16})^2$

## Arithmetic (Addition, Subtraction, Multiplication, Division)

17. Solve the following:

- a.  $4562 - 1287$  \_\_\_\_\_
- b.  $86 + 22 - 16$  \_\_\_\_\_
- c.  $-25 + 82 + 5$  \_\_\_\_\_

18. Multiply the following:

- a. 53.86 by 10 \_\_\_\_\_
- b. 25.4 by 3 \_\_\_\_\_
- c.  $128.5$  by  $10^{-2}$  \_\_\_\_\_

19. Divide the following:

- a. 2.56 by 10 \_\_\_\_\_
- b. 1024 by 8 \_\_\_\_\_
- c. 256 by 4 \_\_\_\_\_

20. Solve the following:

- a.  $3 + 6 \times 4$  \_\_\_\_\_
- b.  $22 - 80 \div 4$  \_\_\_\_\_
- c.  $(25 + 50) \div (2 \times 12.5)$  \_\_\_\_\_
- d.  $(12 - 8) \times 3$  \_\_\_\_\_

21. Two voltages add up to 120 Volts. One of the voltage measures 80 Volts, what is the voltage of the other?

\_\_\_\_\_

## Fractions

22. Solve and express your answers in fractions:

- a.  $\frac{1}{4} + \frac{1}{2}$  \_\_\_\_\_
- b.  $\frac{2}{9} + \frac{5}{6}$  \_\_\_\_\_
- c.  $\frac{3}{4} - \frac{1}{8}$  \_\_\_\_\_

23. Evaluate the following:

- a. 10% of \$520 \_\_\_\_\_
- b. 25% of 120.8 \_\_\_\_\_

24. As an apprentice Tania earns \$520 per week and is awarded a pay rise of 5%. What is her new weekly wage?

\_\_\_\_\_

25. The efficiency of a machine is rated at 80%. If the input is 200 Watts, what is the available output power in Watts?

\_\_\_\_\_

26. A satellite dish receives 300 milliwatts of power on a clear day. If during heavy rain it only receives 120 milliwatts of power. Calculate the percentage drop in power on a rainy day.

\_\_\_\_\_

## Decimals

27. Express as a decimal.

- a.  $\frac{3}{5}$  \_\_\_\_\_
- b.  $26.25 + 54.5 - 30.3$  \_\_\_\_\_
- c.  $7 \times 2 \div 5$  \_\_\_\_\_
- d.  $10 \div 4 + 3 \div 2 + 5 \div 4$  \_\_\_\_\_

## Algebra

28. Remove the brackets and simplify the following:

- a.  $(2x + 3y) - (x - 2y)$  \_\_\_\_\_
- b.  $(4a - 2b) - (5b - 2a)$  \_\_\_\_\_

29. A mathematical relationship is expressed as  $I = V/R$ , where  $I$  is electric current in Amps,  $V$  is voltage in Volts and  $R$  is resistance in Ohms. Find  $I$  if  $R=5$  Ohms and  $V=35$  Volts.

\_\_\_\_\_

30. The formula for working out voltage in an electronic circuit is  $V = E-IR$ . Rearrange the formula to make each of the following the subject of the equation:

- a.  $E$  \_\_\_\_\_
- b.  $R$  \_\_\_\_\_
- c.  $I$  \_\_\_\_\_

## Ratios

31. A cube has a volume of 8 cubic metres. If each side of the cube is doubled in length, what is its new volume in cubic metres?

\_\_\_\_\_

32. Dominic helps install a renewable energy system constantly generating 800Watts of power which is shared between a wind turbine and a solar panel. Calculate the power generated by the solar panel if its output power ratio compared to that of the wind turbine is:

a. 4:1 at the peak of the day

\_\_\_\_\_

b. 1:5 late in the afternoon

\_\_\_\_\_

## Conversions

33. Convert the following:

a. 6.2km to metres

\_\_\_\_\_

b. 15 Amps to milliamps

\_\_\_\_\_

c. 250 Mega bits per second to kilo bits per second

\_\_\_\_\_

34. Gabe's mobile phone plan charges 25 cents for every 20 seconds (or part thereof) when he makes a call. What is he charged when making a call continuously for 1 ½ minutes at the prescribed charge rate?

\_\_\_\_\_

## Section 3: PROBLEM SOLVING & SPECIFIC KNOWLEDGE

### Problem Solving

35. Franco is part of a mobile phone antenna installation team that has to install a repeater antenna away from a main antenna to improve radio reception. To get around obstructions from the main antenna, they drive 16km South, then 12km West, then 4km South again and then 6km East before finally driving 12km North to mount the repeater antenna. What is the distance (in km) in a straight line is the repeater mounted from the main antenna?

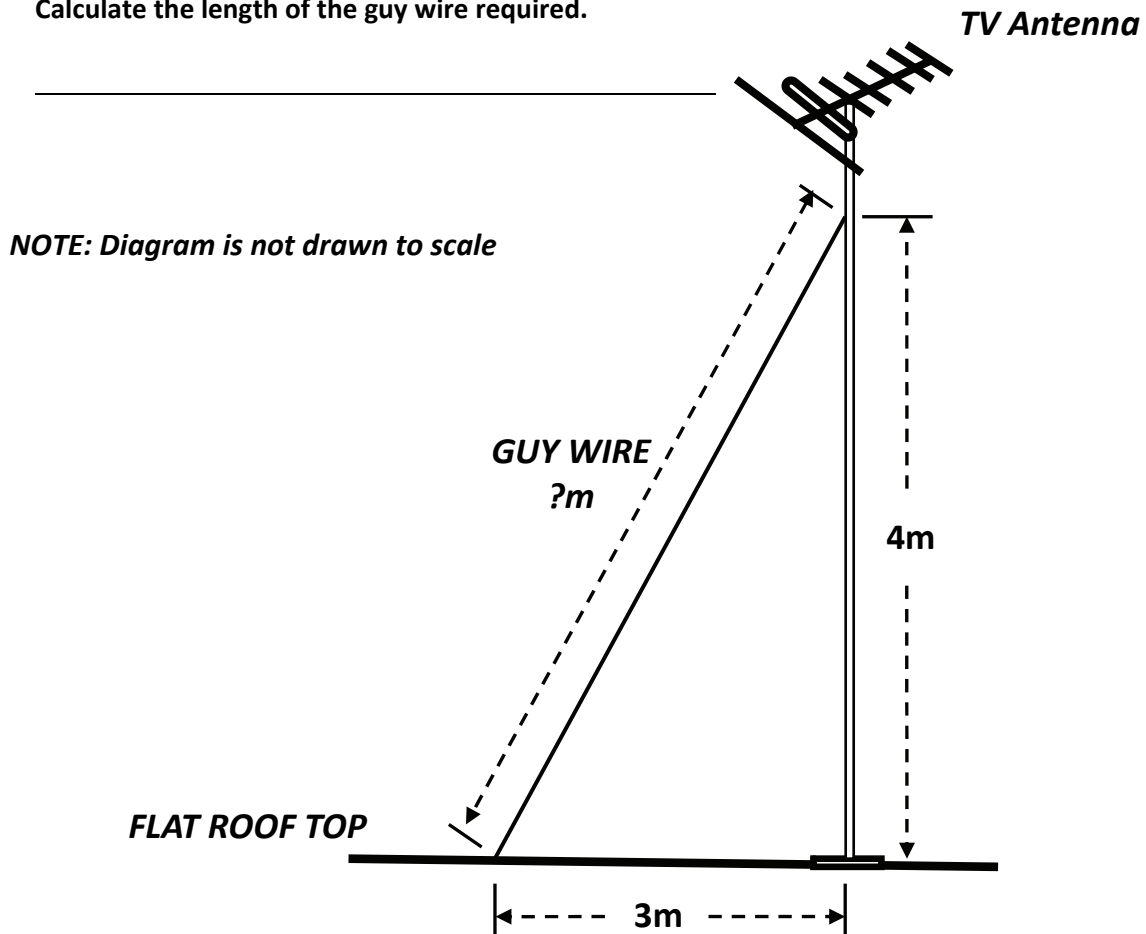
\_\_\_\_\_

36. A telecommunications cable on a cable drum ready for installation has a specified resistance of 4 Ohms/100m of cable.

Estimate the length of the cable if the total cable resistance is measured as 14 Ohms.

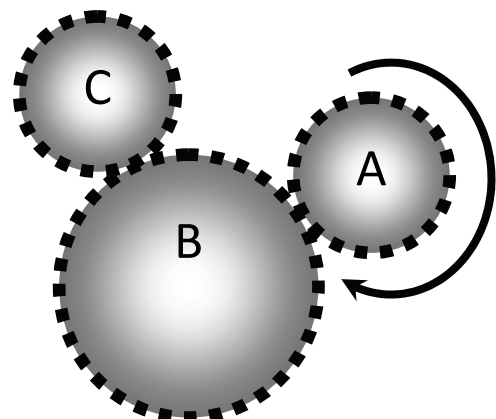
\_\_\_\_\_

37. A television antenna is mounted on a flat roof using a metal antenna mast and secured with a guy wire for stabilisation. The guy wire is attached 4m up from the base of the mast and anchored 3m away along the roof top from the base of the mast as shown below. Calculate the length of the guy wire required.



38. Three gears used for antenna positioning are meshed together as shown. When Gear A is rotated clockwise as shown, determine the spin direction of Gears B and C. (Circle the correct combination)

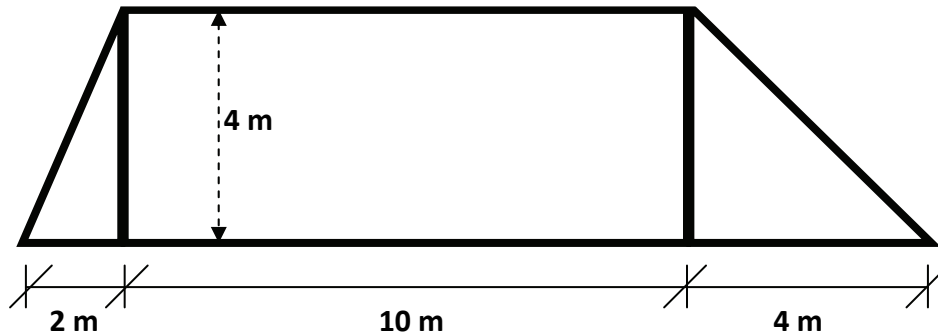
- a. B & C rotate clockwise.
- b. B & C rotate anticlockwise.
- c. B rotates clockwise & C rotates anticlockwise.
- d. B rotates anticlockwise & C rotates clockwise.





39. The surface of a roof facing north is to be fitted with solar panels to generate electricity. The roof measurements shown below are indicated in metres

**NOTE: Diagram is not drawn to scale**



- a. Calculate the surface area of the roof in square metres.
- \_\_\_\_\_
- \_\_\_\_\_
- b. The effective usable roof surface for panel mounting is 60%. Calculate the maximum number of solar panels that can be mounted if each solar panel has a surface area of 2.44 square metres.

\_\_\_\_\_

\_\_\_\_\_

## Specific Knowledge

40. Verify this statement “a AA cell and a AAA cell have the same voltage” when measured. (Circle the correct response.)
- TRUE
  - FALSE – “AAA” cell has larger voltage
  - FALSE – “AA” cell has larger voltage
41. An example of an electrical insulator is: (Circle the correct response.)
- Brass
  - Copper
  - Plastic
  - Acid

**42. The term LED device refers to: (Circle the correct response.)**

- a. Led Zeppelin
- b. Lunar Elliptical Dome
- c. Light Electric Display
- d. Light Emitting Diode

**43. The light output from a fibre or a device using a laser source can be dangerous. (Circle the correct response.)**

- a. If the light is not visible
- b. If the light is visible
- c. Because the beam is concentrated and intense
- d. Because it is expensive

**44. The microwave energy from a telecommunications microwave radio system can be dangerous. (Circle the correct response.)**

- a. Because the energy not visible
- b. Because it uses harmful radio waves
- c. Because it uses harmful optical waves
- d. Because it is expensive

**45. Light from a laser source can travel in an optical conductor. Which of the following materials is NOT an optical conductor? (Circle the correct response.)**

- a. Clear plastic
- b. Glass
- c. Water
- d. Rubber

**46. A computer can be connected to the broadband network using one of the following: (Circle the correct response.)**

- a. Memory stick
- b. Modem
- c. MP3 player
- d. Internet

## Section 1: LITERACY, READING AND COMPREHENSION

### Spelling

1. **Cable; Electronics; Solar; Telecommunications; Wireless**
2. **Answers should include:**
  - a. Telecommunications is a means of communications by the transmission of messages or information over significant distances between two parties.
  - b. Cable is the physical connection that permits electrical transmission of information between the sender and receiver. Can be a combination of wire cabling, fibre optic cabling and co-axial cabling.
  - c. Wireless is the means of telecommunications transmission whereby no physical means are used. The transmission medium can be radio waves, infrared or optical communications in free space.
3. naturel -> natural; sunlite -> sunlight; replenished -> replenished; constantly -> constantly; sistems -> systems; convurt -> convert; pannels -> panels; imporent -> important; waisted -> wasted; bateries -> batteries.

### Comprehension

4. b) Internet
5. c) More immune to noise
6. d) Radio waves
7. Sender or Transmitter; Transmission medium; Receiver
8. Laser and LED
9. Economic, social and cultural
10. Internet
11. LinkedIn
12. E-mail and SMS

## Section 2: MATHEMATICS

### Numbers (Rounding, Scientific Notation, Evaluation)

13. a) 52.29    b) 0.46    c) 650    d) 300
14. -7    -3    0     $\frac{1}{2}$     4.3    5
15. b)  $6.2 \times 10^{10}$
16. a) 100    b) 125    c) 8    d) 16 (*from  $\sqrt{16} = 4$ , and  $4^2 = 16$* )

### Arithmetic (Addition, Subtraction, Multiplication, Division)

17. a) 3275    b) 92    c) 62
18. a) 538.6    b) 76.2    c) 1.285
19. a) 0.256    b) 128    c) 64
20. a) 27    b) 2    c) 3    d) 12
21. 40 Volts

## Fractions

22. a)  $\frac{3}{4}$       b)  $\frac{19}{18}$  or  $1\frac{1}{18}$       c)  $3\frac{1}{8}$

## Percentages

23. a) \$52      b) 30.2  
 24. \$546 (from  $1.05 \times \$520 = \$546$ )  
 25. 160 Watts (from  $0.8 \times 200W = 160W$ )  
 26. 60% drop in power (from: 180 mW of power drop;  $180 \div 300 \times 100\% = 60\%$ )

## Decimals

27. a) 0.6      b) 50.45      c) 2.8      d) 5.25

## Algebra

28. a)  $x + 5y$       b)  $6a - 7b$   
 29. 7Amps  
 30. a)  $E = V + IR$       b)  $R = (E - V)/I$       c)  $I = (E - V)/R$

## Ratios

31. 64 Cubic metres (from: 8Cum cube has sides 2m long; with 4m sides, volume is  $4^3 = 64$  Cum)  
 32. a) 640W from  $800 \times 4 \div 5$       b) 133W from  $800 \div 6$

## Conversions

33. a) 6,200m      b) 15,000mA      c) 250,000kbps  
 34. \$1.25 (from:  $1\frac{1}{2}$  mins or 90 secs is  $4\frac{1}{2} \times 20$  sec timeslots. Therefore use 5 times the 25c charge per time slot)

## Section 3: PROBLEM SOLVING & SPECIFIC KNOWLEDGE

### Problem Solving

35. 10km away from the main antenna (from: total distance in a southerly direction is 8km and total distance in a westerly direction is 6km. Using the 3-4-5 triangle or Pythagoras's theorem we get 10 km.)  
 36. 350metres (from:  $14 \div 4 \times 100m$ )  
 37. 5 metres (from: using the 3-4-5 triangle or Pythagoras's theorem we get 5m.)  
 38. d) B rotates anticlockwise & C rotates clockwise  
 39. a) 52 square metres (from: sum of all areas: (i) left triangle ( $4 \times 2 \div 2 = 4sqm$ ); (ii) oblong ( $4 \times 10 = 40sqm$ ) and (iii) right triangle ( $4 \times 4 \div 2 = 8sqm$ ))  
 b) 12 panels (from:  $0.6 \times 52 \div 2.44 = 12.8$ . Round down to 12 full panels)

### Specific Knowledge

40. a) TRUE (they have same cell voltage)  
 41. c) Plastic (all others are electrical conductors)  
 42. d) Light Emitting Diode  
 43. c) Because the beam is concentrated and intense  
 44. b) Because it uses harmful radio waves  
 45. d) Rubber  
 46. b) Modem

## Contributions



**Australian Apprenticeships Pathways Website - [www.aapathways.com.au](http://www.aapathways.com.au)**

This website, part of the Australian Apprenticeships and Traineeships Information Service, provides sample Australian Apprenticeships job descriptions and links to more Australian Apprenticeships information and resources. The service is funded by the Department of Education, Employment and Workplace Relations.



**Innovation and Business Services Australia - [www.ibsa.org.au](http://www.ibsa.org.au)**

Innovation & Business Skills Australia (IBSA) is one of 11 Industry Skills Councils which have custodianship of all VET Education Training Packages. IBSA oversees 12 Training Packages in the following industry sectors: Financial Services, Education, Business Services, Cultural & Related Industries, Information & Communications Technology and Printing & Graphic Arts. IBSA works closely with industry, education and government to ensure that the qualifications in these sectors reflect real industry skill requirements and to build capability, professionalism, and innovative capacity in Australia's workforce.



**TAFE NSW - <https://www.tafensw.edu.au>**

TAFE NSW is Australia's leading provider of vocational education and training with more than 500,000 enrolments in NSW each year. Whether you're an individual looking for your first job, a promotion, a career change or a pathway to a degree or you're an employer seeking training solutions for your workforce, TAFE NSW can deliver a range of courses and services to suit your needs. Some programs are delivered Australia wide.



**The Career Education Association of Victoria - [www.ceav.vic.edu.au](http://www.ceav.vic.edu.au)**

The CEAV is the Victorian peak body for secondary school career practitioners, work experience coordinators, VET coordinators and MIPS coordinators. The CEAV provides professional development opportunities for members and also works with business, industry, and the education and training sector.



**Industry Training Australia P/L - [www.itaust.com.au](http://www.itaust.com.au)**

Industry Training Australia (ITA) delivers consultancy services to government and non-government organisations in the education and training sector. ITA develops and delivers information and communication services, including the Australian Apprenticeships Pathways website, for service provider networks and the general public.

**For enquiries about this Telecommunications Practice Aptitude Quiz contact the Australian Apprenticeships and Traineeships Information Service on 1800 338 022.**