Practice Aptitude QUIZ

MAAP MY FUTURE
Mentor/Adviser Apprenticeship Program
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Careers in Automotive

Automotive Repair & Maintenance

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Automotive Repair and Maintenance Sector Practice

Aptitude Quiz

It is crucial 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 required to pursue a career pathway in the Automotive Repair and Maintenance sector.

Part 1: About the Automotive Repair and Maintenance sector.

Key sectors:

- Heavy Commercial Vehicle
- Agricultural Equipment
- Mobile Plant
- Light Vehicle
- Marine
- Motorcycles
- Outdoor Power Equipment
- Electrical/Electronics
- Vehicle Body

The automotive industry offers a broad and diverse range of careers that provide local, national and international career paths for trainees, apprentices and personnel in automotive manufacturing, retail, repair and maintenance operations.

Since the first motor vehicles were developed more than 100 years ago, the industry has been at the forefront of innovation and technological change. New super-lightweight body materials, battery electric vehicles and wireless electronic connectivity are just some of the technologies that will continue to shape the industry in coming years.

The industry has a long and proud tradition of apprenticeship training and this has resulted in the development of a strong industry capability and large pool of highly trained personnel. Australia’s automotive manufacturing operations rate among some of the best in the world, with many highly qualified personnel in the industry travelling globally to extend their careers in this sector.

The automotive industry is global. Many contemporary vehicle types are produced in Australia and overseas using common body, electrical and mechanical technologies. This means that skills learnt in Australia can be applied both domestically and around the world. Australia has a strong reputation for producing high-quality tradespeople in automotive and this had led to great career paths for people in the industry both at home and overseas. As skills are developed and deepened around specific areas of the vehicle, so does the capacity for people to become specialists and leaders in their field.

Automotive continues to be a vibrant and dynamic area to start and build a career. Once basic skills have been developed in the industry there are multiple pathways to explore,
including those in technology development, leadership management and business ownership.

**It’s big**

The global automotive industry produces nearly 100 million cars each year. If you joined them bumper to bumper they would go around the globe at least five times. The industry is known for developing some of the world’s most innovative technologies and has produced outstanding tradespeople and higher-level technicians for many years. Looking ahead, we know the shape and form of vehicles of the future will be very different from that of today, using autonomous driving systems, independent satellite navigation and an increasing use of vehicle dynamic control systems.

**Here are some facts about the industry**

The automotive industry in Australia employs 400,000 people and contributes around $35 billion to the Australian economy annually. The automotive industry comprises of two distinct sectors – the manufacturing sector and the retail, services and repair sector (RS&R). The automotive manufacturing sector encompasses the manufacture of motor vehicles, including:

- cars
- sport utility vehicles (SUVs)
- light commercial vehicles
- buses
- vans
- medium, heavy and special-purpose highway trucks.

The manufacturing sector also includes the production of motor vehicle bodies and automotive parts and accessories. The automotive retail, service and repair sector encompasses:

- vehicle and vehicle parts sales
- vehicle maintenance through regular servicing
- the repair of damaged vehicles
- the supply of aftermarket equipment
- heavy vehicle repair and servicing
- vehicle recycling and disposal
- fuel retailing
- motorsport
- marine
- bicycles
- outdoor power & equipment.

The automotive retail, service and repair sector is by far the largest component within the Australian automotive industry, accounting for approximately 87 per cent of employment. As the vehicle fleet increases so does the demand on skill supply to the industry. In many areas there are insufficient tradespeople to meet the demand for services and this has meant there are many great career opportunities available to new entrants, including apprentices and trainees.
Automotive Repair and Maintenance

2. Key occupation information

(Sources: Job Outlook - www.joboutlook.gov.au; and Australian Jobs 2012

Job and demand information

Automotive mechanical tradespersons carry out diagnostic procedures, testing, servicing and repair of vehicles. Automotive mechanical tradespersons may work as:

- **Light Vehicle Technicians** who service and repair the mechanical parts of motor vehicles such as engines, transmissions (clutch, gear box and differential) and suspension systems.
- **Mobile Plant Technicians** who overhaul, service and repair the mechanical parts of heavy mobile plant equipment such as the engine, transmission (clutch, gear box and differential) and the suspension systems (springs, steering, brakes, wheels and tyres).
- **Motorcycle Technicians** who use diagnosis procedures to determine faults, repair and servicing of engines and engine components, cooling systems, petrol fuel systems, emission control systems, clutch assemblies, manual transmissions, drivelines, braking, steering and suspension systems.
- **Agricultural Equipment Technicians** who overhaul, service and repair the mechanical parts of agricultural equipment such as the engine, transmission (clutch, gear box and differential) and the suspension systems (springs, steering, brakes, wheels and tyres).
- **Heavy Commercial Vehicle Technicians** who service and repair the mechanical parts of road transport vehicles such as the engine, transmission (clutch, gear box and differential) and the suspension systems.

Potential entry level qualifications:

- Certificate II in Automotive Servicing Technology
- Certificate III in Light Vehicle Mechanical Technology
- Certificate III in Mobile Plant Technology
- Certificate III in Motorcycle Mechanical Technology
- Certificate III in Agricultural Mechanical Technology
- Certificate III in Heavy Commercial Vehicle Mechanical Technology

Automotive Specialist Tradespersons work varies considerably however all carry out diagnostic procedures, test, service and repair vehicle components.

Automotive Specialist Tradespersons may work as:

- **Alternative Fuel Vehicle Repairers and Installers** who undertake diagnostic procedures, overhaul, repair, servicing and installation of alternative fuel systems, including LPG, CNG and LNG systems.
• **Diesel Engine Technicians** who carry out servicing, diagnosing, repairing and overhauling procedures on heavy vehicle diesel engines

• **Diesel Fuel Technicians** who carry out diagnostic procedures, overhaul and repair diesel fuel systems and components, service diesel fuel injection systems and service and repair emission control and engine force induction systems.

• **Drivetrain Technicians** who work on light and heavy commercial vehicles, motorcycles and mobile plant equipment performing diagnostic procedures, servicing, repair and overhaul of clutch assemblies and overhaul, servicing and repair of manual/automatic transmissions and final drive assemblies and driveline

• **Elevating Work Platform Technicians** who service, diagnose and repair the mechanical, electrical and hydraulic parts of elevating work platforms.

• **Engine Reconditioners** set up and operate machinery to restore and recondition the machined surfaces of engine components.

• **Forklift Technicians** who service, diagnose and repair the mechanical parts of forklifts, such as engines, transmissions, hydraulic systems and steering and suspensions.

• **Steering and Suspension Technicians** who perform diagnostic procedures to determine symptoms/faults then service and repair steering and suspension systems for light/heavy vehicles, plant, motor cycles, marine and outdoor power equipment.

• **Trailer Technicians (Heavy Vehicle)** who carry out diagnostic procedures, service, repair and overhaul of trailers, including the connections systems to prime movers and the trailer’s electrical, brake and suspension systems.

• **Underbody Technicians** who service, diagnose and repair wheels and tyres, brakes, steering and suspension systems, driveline and exhaust systems, as well as performing wheel alignments.

Potential entry level qualifications:

• Certificate II in Automotive Vocational Preparation
• Certificate II in Automotive Servicing Technology
• Certificate III in Automotive Alternative Fuel Technology
• Certificate III in Diesel Engine Technology
• Certificate III in Diesel Fuel Technology
• Certificate III in Drivetrain Technology
• Certificate III in Engine Reconditioning
• Certificate III in Forklift Technology
• Certificate III in Heavy Commercial Trailer Technology
• Certificate III in Automotive Steering and Suspension System Technology
• Certificate III in Elevating Work Platform Technology
• Certificate III in Automotive Underbody Technology

**Automotive Electricians** install, maintain, diagnose faults and repair electrical wiring and computer based equipment in cars, trucks, caravans, trailers, earthmoving and agricultural equipment and boats.
Potential entry level qualifications:

- Certificate II in Automotive Electrical Technology
- Certificate III in Automotive Electrical Technology

**Automotive Vehicle Body Tradespersons** repair vehicle bodies within a selected specialty area of the automotive retail service and repair sector of the automotive industry.

Automotive Vehicle Body Tradespersons may work as:

- **Vehicle Body Builders** repair vehicle bodies (that may include buses, caravans, tray and van bodies, semi-trailers, refrigerated vans, horse floats, fire and police vehicles), manufacture and modify purpose-built bodies to fit other manufacturers' chassis.
- **Panel Beaters** repair damage to metal, plastic and fibreglass bodywork on vehicles and make and form vehicle panels using machines or hand tools.
- **Vehicle Glazers** a mobile service unit or workshop repairing and/or replacing windscreens and side and rear glass to motor vehicles such as cars, trucks and vans.
- **Vehicle Painters/Spray Painters** carry out masking procedures, colour matching and mixing of paints, application of primer and finishing coats and polishing and waxing the finished paint work.
- **Vehicle Trimmers** make, install, repair or modify the seats, upholstery, linings, interior trim, roof and door linings and floor coverings of vehicles such as cars, trucks, vintage vehicles, buses, caravans, trains, aircraft and boats.

Potential entry level qualification:

- Certificate II in Automotive Body Repair Technology
- Certificate III in Automotive Body Repair Technology
- Certificate III in Automotive Glazing Technology
- Certificate III in Automotive Refinishing Technology
- Certificate III in Automotive and Marine Trimming Technology

**About the qualifications**

Every qualification includes an emphasis on “Foundation Skills” or the skills that employers identify as playing a significant part in contributing to an individual’s effective and successful participation in the workplace. Foundation Skills include Core Skills and Employability Skills and are non-technical skills.

Core Skills are:

- **Reading**
- **Writing**
- **Oral communication**
- **Numeracy**
- **Learning**
Employability Skills are:

- **Communication skills** that contribute to productive listening and understanding, speaking clearly and directly and harmonious relations across employees and customers;

- **Teamwork skills** that contribute to productive working relationships and outcomes;

- **Problem-solving skills** that contribute to productive outcomes;

- **Initiative and enterprise skills** that contribute to innovative outcomes;

- **Planning and organising skills** that contribute to long and short-term strategic planning;

- **Self-management skills** that contribute to employee satisfaction and growth;

- **Learning skills** that contribute to ongoing improvement and expansion in employee and company operations and outcomes;

- **Technology skills** that contribute to the effective performance of tasks.
3. Career Pathways

- Apprenticeships Pathways - view potential career pathways for this industry - Go to www.aapathways.com.au/search_job_02.cfm?c=9

Other useful careers sites are:

- My Future - www.myfuture.edu.au

4. Job Hunting

Job vacancy website:

- Australian Jobsearch - www.jobsearch.gov.au/findajob/advancedsearch.aspx The Australian Government’s job site. Input your postcode, then input the key word “Technicians and Trade Workers”, then go to “Specific Occupations and click on “Motor Mechanics”, then go 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. 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. 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.

What job is best for me?

- The MAAP My Future website has a great automotive career tool that can help you determine the automotive career that best suits you. You will receive a pdf report that outlines some best career fits for you in automotive. This also provides information within our report that can be used in your resume or in conversations with your careers adviser or with a potential employer. To find a career in the automotive industry that best suits you visit www.maapmyfuture.com.au and click on the Match me with a career in automotive tab.
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:

- 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/ProviderLocation.aspx?ProviderType=JNS&](http://www.jobsearch.gov.au/provider/ProviderLocation.aspx?ProviderType=JNS&)

Industry Organisations:

- AMWU - [www.amwu.asn.au](http://www.amwu.asn.au)

Government Agencies:

Part 2 – About this Resource

This 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 Automotive Repair and Maintenance sector.

This Practice Aptitude Quiz is neither a formal tool nor a direct pre-requisite for any job application.

This Quiz has been developed with the assistance of Industry and Registered Training Organisations, based on the needs and requirements of the Industry sector.

This Practice Aptitude Quiz has three components: Literacy, Reading and Comprehension; General Knowledge and; Mathematics. The mathematics skills required to complete the questions contained within this document are equivalent to mathematics at the Year 10 level.

The Quiz can be used by different organisations and people such as careers practitioners with young people, Group Training Organisations and Job Services Australia providers with job seekers.

The Practice Aptitude Quiz can be:
- used by careers practitioners with individuals or in a class setting to provide general guidance on the level of study involved in undertaking an entry level qualification in this industry;
- provided to people to enable them to practice their skills before sitting an actual aptitude test;
- used by teachers as a guide to industry math requirements at the entry point of this particular Australian Apprenticeship career path.

The Quiz should be able to be completed in approximately 1 hour and 30 minutes.

Please note that rates quoted in this for various items, including pay rates, are not meant to reflect today’s values, but are used purely for mathematical purposes.

Calculators may be used to complete this practice assessment, but the majority of the quiz should be attempted without calculators.

Answers are located at the end of the quiz.

After the Quiz

There are a range of support services available to help you find out about courses that may help you improve your literacy and numeracy skills and also your readiness for work.

If you are still at school you should discuss any concerns you may have with your career practitioner. Further information may also be provided by a Job Services Australia provider, an Australian Apprenticeships Centre, a Group Training Organisation or a training provider.
Useful Contacts
Here are some links to job seeker support services:

➢ Search for your local Australian Apprenticeships Centre -

➢ Find a local Group Training Organisations -

➢ 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 -
Section 1 – Literacy, Reading and Comprehension

1. Write the following vehicle components into alphabetical order:

| Timing cover |  |
| Cam shaft    |  |
| Rocker cover |  |
| Valve        |  |
| Cam gear     |  |
| Sump         |  |
| Piston       |  |
| Alternator   |  |
| Bonnet       |  |
| Cam timing belt | |

2. Write the plural of the following words:

| Technician |  |
| Woman      |  |
| Branch     |  |
| Child      |  |
| Sheep      |  |

3. Circle the correct spelling of each word

   a) dynamometer  dynamometer  dynamonitor  dinomonitor
   b) vacuum       vacoom         vacuum     vacum
   c) differential  differencial  differentil  differential

4. The following text has 10 spelling errors in it. Correct those errors and list them in the order you find them in the table on the following page

This email and any flies transmitted with it are confidential and intended souley for the use of the individuel or entity to whom they are addressed. If the recipient of this message is not the intended recipant, you are hereby notified that any dissemination, distribution or copying of this comunication is strictly prohibitted and may be unlawfull.

| 1. | 6. |
| 2. | 7. |
| 3. | 8. |
| 4. | 9. |
| 5. | 10. |
5. The following text has 5 spelling errors in it. Correct those errors and list them in the order you find them in the text.

Maintenence shedules for cars are very important. Lubrication and the replacment of worn spark plugs need regular atention.

1. 
2. 
3. 
4. 
5. 

6. Read the following article and answer the questions that follow.

Cars of today rely more and more on computers, compared to the cars of the past. Technology is getting more advanced and the automobile industry has always been trying to use that to their advantage. The whole car is becoming a computer; more and more functions that used to be operated manually are now done electronically. The millions of microprocessors do a great amount of tasks. The engine and parts under the hood power the car, but it’s the microprocessors that tell it what to do. You would be surprised exactly how many functions have something to do with computers.

Some of the major microprocessors are: the airbag module; Engine Control Unit (ECU) which controls the engine functions; the driver’s door module; climate control module; cruise control module; the transmission controller which controls automatic transmission; and ABS module which controls the anti-lock brakes and may handle the traction-control and stability-control systems.

The processor that is the most important is the ECU. It controls engine functions like the spark timing and obtaining the correct fuel to air mixture to intake into the engine block. It can also manage the emissions and the fuel economy of the car. It does so by creating the perfect ratio of fuel/air mixture.

Cars today may have as many as 100 microprocessors, many of which make cars easier to service. Every engine, every vehicle and every computer system is different -- but all the sensors, all the output devices, must be in perfect "sync" for cars, minivans, trucks and 4WDs to run efficiently. Some of the reasons for the increase in the number of microprocessors are:

- The need for sophisticated engine controls to meet emissions and fuel-economy standards.
- Advanced engine diagnostics and repair.
- Reduction of the amount of wiring in cars.
- New safety features.
- New comfort and convenience features.
- New entertainment and communication features.
Questions

a) Name 3 processes that the major microprocessors control?
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

b) What is one reason for the increase in the number of microprocessors?
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

c) What is the most important processor and what function does it have?
________________________________________________________________________
________________________________________________________________________

7. Read the following passage and answer the questions which follow.

Automotive Technician

The job of the Automotive Technician has certainly changed in the last decade with the introduction of computer technology. The automotive industry has become more sophisticated and high-tech, and so too have the skills of the Automotive Technician. What sort of training do you need?

To become an Automotive Technician usually requires the completion of an Australian Apprenticeship, which is based on an appropriate Automotive certificate III qualification.

The length of the training can vary and will involve both on-the-job and off-the-job components. The off-the-job training is provided through a training provider.

Employers generally require at least the completion of Year 11 with good results in English, maths and science. Many people complete Year 12 before entering an Australian Apprenticeship.

You may be able to start training for this occupation while still at school.

Automotive Technician may progress to positions such as service manager, workshop foreman, service advisor, technical sales representative, technical officer or diagnostic specialist.

What sort of things does an Automotive Technician do?
• Discuss problems with car drivers or vehicle operators to discover faults, listen to engines, fit and operate special test and diagnostic equipment and test drive vehicles.
• Repair or replace worn and faulty parts by removing and dismantling assemblies.
• Reassemble, test, clean and adjust repaired or replaced parts or assemblies, use various tools and equipment to make sure they are working properly and put them back into the vehicle.
• Diagnose, repair and replace engine management/fuel injection components
• Inspect vehicles and issues roadworthiness certificates or list the work required before a certificate can be issued.
You may enjoy being an Automotive Technician if you...

- Are interested in practical and manual work
- Are able to work with hand tools
- Have a technical aptitude
- Have problem-solving skills
- Have a driver’s licence

Questions:

Circle the correct response to the following four questions.

a. **To become an Automotive Technician, I need to complete:**
   i. a Bachelor in Automotive,
   ii. a Diploma in Automotive
   iii. an Automotive Apprenticeship
   iv. a Masters in Automotive

b. **Employers usually require you to have completed at least:**
   i. Year 10,
   ii. Year 11,
   iii. Year 12,
   iv. Year 13

c. **Which of the skills do you believe an Automotive Technician needs?**
   i. Listening
   ii. Communication
   iii. Writing
   iv. Listening, communication and writing

d. **Automotive Technicians:**
   i. Make inspections of light vehicles
   ii. Issue roadworthiness certificates
   iii. Repair engine components
   iv. All of the above
8. **Personal Protective Equipment** includes clothing, equipment and substances designed to be worn by a person to protect them from risks of injury or disease.

Below is a list of **Personal Protective Equipment (PPE)** commonly used in automotive workshops.

<table>
<thead>
<tr>
<th>PPE</th>
<th>Use in an Automotive Workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety glasses</td>
<td>To protect eyes from debris, when panels are sanded.</td>
</tr>
<tr>
<td>Overalls</td>
<td>Protects against fluids or chemicals causing damage to clothing and skin. Essential when doing spray work.</td>
</tr>
<tr>
<td>Gloves (light weight)</td>
<td>Protects hands from solvents and fluids.</td>
</tr>
<tr>
<td>Gloves (heavy weight)</td>
<td>Protects against chemicals, for example when using parts wash.</td>
</tr>
<tr>
<td>Face shield</td>
<td>To protect eyes and face from flying materials created when grinding or drilling.</td>
</tr>
<tr>
<td>Steel capped boots</td>
<td>Protects feet/toes from injury caused by dropping heavy items.</td>
</tr>
<tr>
<td>Ear muffs or ear plugs</td>
<td>Used to reduce hearing damage caused by loud noises such as air rattle gun, air chisel, hammering.</td>
</tr>
<tr>
<td>Respirator</td>
<td>Protects lungs from inhalation of dust, fumes.</td>
</tr>
<tr>
<td>Leather apron</td>
<td>Protects body and clothing from burns generated from welding.</td>
</tr>
<tr>
<td>Leather gloves</td>
<td>Protects hands and arms from burns generated from welding.</td>
</tr>
<tr>
<td>Welding mask</td>
<td>Protects eyes from damage from welding.</td>
</tr>
<tr>
<td>Cap/hair net</td>
<td>Reduces risk of hair getting caught in rotating equipment such as drills, grinders.</td>
</tr>
</tbody>
</table>

a. **Looking at the table, what PPE would you use to avoid burns when undertaking a welding job?**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

b. **When working with fluids or chemicals what PPE would you use?**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________


c. **How can you protect your feet from falling heavy objects?**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

d. **To prevent dust inhalation and protect your hearing from loud noises what PPE would you wear?**

________________________________________________________________________
________________________________________________________________________
9. What personal protective equipment do you think you would need in the following situations?

a. Grinding

b. Handling a car battery

c. Spray painting a car

d. Panel beating

e. Sanding
9. **Above are two photos of typical automotive workshops.**

a. **What major hazards exist?**

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

b. **What measures have been put in place to reduce the risk?**

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Section 2 – General Knowledge

1. The pictures below are of vehicle components. Write the name of the component (from the list below) beside the correct picture.

Cylinder block, sump, spark plug, alternator, rocker cover, piston, fuel injector, carburettor.

![Component Images]

a. ____________________

b. ____________________

c. ____________________

d. ____________________

e. ____________________

f. ____________________

g. ____________________

h. ____________________
2. Below is a list of tools. Write the name of the tool beside the correct picture.

Open ended spanner, vice grips, needle nose pliers, hacksaw, centre punch, tin snips, micrometer, Phillips head screwdriver.

a. ________________________

b. ________________________

c. ________________________

d. ________________________

e. ________________________

f. ________________________

g. ________________________

h. ________________________
3. Below is a list of car body parts. Write the name of the body part to the correct picture.

Bumper bar, door, skirt, bonnet, boot, wing mirror, windscreen, wiper arm.

a. _______________________

b. _______________________

c. _______________________

d. _______________________

e. _______________________

f. _______________________

g. _______________________

h. _______________________

4. Which of the following words reflect electrical terms or components? Circle the correct responses.

<table>
<thead>
<tr>
<th>Drive shaft</th>
<th>Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volt</td>
<td>Spring</td>
</tr>
<tr>
<td>Current</td>
<td>Diode</td>
</tr>
<tr>
<td>Washer</td>
<td>Resistor</td>
</tr>
<tr>
<td>Wheel cylinder</td>
<td></td>
</tr>
</tbody>
</table>
Section 3 – Mathematics

Numbers (Measurement, Scales, Decimals, Rounding, Estimates, Scientific Notation)

1. Which unit from the list below would you use to measure:
   (a) length ____ (b) time ____ (c) temperature ____ (d) weight ____
   (e) area ____ (f) speed ____ (g) volume ____ (h) cost ____

<table>
<thead>
<tr>
<th>kg</th>
<th>ml</th>
<th>km/hr</th>
<th>m²</th>
<th>$</th>
<th>m</th>
<th>min</th>
<th>°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. What are the following tape readings:
   (a) _________
   (b) _________

3. From the list of numbers below, select the one which represents a:
   (a) percentage ____ (b) decimal number ____ (c) fraction ____
   (d) mixed number ____ (e) ratio ____ (f) angle ____

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>35°</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>5:4</td>
<td>16.37</td>
<td>2¾</td>
<td></td>
</tr>
</tbody>
</table>

4. Convert the following:
   (a) 8 kilometres to metres
   (b) 3.5 kilograms to grams

5. Write the following decimal numbers, from largest to smallest:

   | 8.23 | 82.3 | 0.823 |

6. Find the decimal number halfway between:
   (a) 0.6 and 0.8
   (b) 2.8 and 2.9

7. Find the value of the following:
   (a) \(2^3\)
   (b) \(\sqrt{36}\)

8. Round:
   (a) 35.6754 to two decimal places
   (b) 425.8 to the nearest tens
9. Select the best estimate for:
(a) 4,209 x 63

<table>
<thead>
<tr>
<th>240,000</th>
<th>420,000</th>
<th>24,000</th>
</tr>
</thead>
</table>

(b) 60,000 ÷ 28

<table>
<thead>
<tr>
<th>200</th>
<th>2,000</th>
<th>20,000</th>
<th>4,000</th>
</tr>
</thead>
</table>

Addition, Subtraction, Multiplication, Division

10. Add:
(a) $2, $21.45 and $8.23

11. Subtract:
(a) 5,218 – 1,784 = ________________
(b) 43.18 - 29.46 = ________________

12. Multiply:
(a) 6.87 by 10
(b) 13.8 by 3
(c) 46.2 by 8

13. Divide:
(a) 3.45 by 10
(b) 3,024 by 4
(c) 56.2 by 0.2

14. Select the correct answer to 18.642 ÷ 0.02:
(a) 9.321  (b) 93.21  (c) 0.9321  (d) 932.1

Fractions

15. What fraction is between ¼ and ¾? ________________

16. Add the following:
(a) ¼ and ½
(b) 2/3 and 5/6
(c) 3¾ and 1/8

17. Calculate:
(a) 5/6 - 1/4
(b) 21/14 – 4/7
18. Express as a fraction in lowest terms:

(a) 0.75
(b) 2.6
(c) 30%

Geometry

19. Estimate the size of the following angles by selecting the appropriate answers from the list below.

(a)

(b)

20. Find the value of \( x^\circ \) in the following diagrams:

(a)

(b)

(c)

Measuring

Perimeter

21. Find the perimeter of this rectangle.

22. Find the circumference of this circle to one decimal place? (Use \( \pi = 3.14 \))
23. What is the area of the rectangle?

![Rectangle](image)

\[
\text{Area} = \text{length} \times \text{width} = 2 \text{ m} \times 5 \text{ m} = 10 \text{ m}^2
\]

24. Find the area of the triangle.

![Triangle](image)

\[
\text{Area} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 12 \text{ km} \times 7 \text{ km} = 42 \text{ km}^2
\]

25. Find the area of this circle to one decimal place. (Use \(\pi = 3.14\))

![Circle](image)

\[
\text{Area} = \pi \times \text{radius}^2 = 3.14 \times (10 \text{ cm})^2 = 314 \text{ cm}^2
\]

26. An oil can in the shape of a cylinder has a radius of 6 cm and a height of 20 cm. What is the volume of the can?

![Cylinder](image)

\[
\text{Volume} = \pi \times \text{radius}^2 \times \text{height} = 3.14 \times (6 \text{ cm})^2 \times 20 \text{ cm} = 2260.8 \text{ cm}^3
\]

27. Evaluate the following:

(a) 10% of $44

\[
0.1 \times 44 = 4.4
\]

(b) 25% of 12.84

\[
0.25 \times 12.84 = 3.21
\]

28. Christos scored 80% in his automotive exam. There were 25 questions.

(a) How many questions did Christos get right?

\[
0.80 \times 25 = 20 \text{ questions}
\]

(b) How many questions did Christos get wrong?

\[
25 - 20 = 5 \text{ questions}
\]

29. Michelle, a spare parts interpreter for GTA Automotive, earns $960 a week. She gets a pay rise of 5%. What is her new weekly wage?

\[
960 + (0.05 \times 960) = 960 + 48 = 1008 \text{ dollars}
\]
30. A new 4 cylinder automatic car costs $16,000. The price was reduced by 10%. Find:

(a) the amount the car was reduced by?
(b) the new cost of the car?

31. The price of a tyre is $120 each. Jamie gets 10% discount for paying cash. How much did Jamie pay for four tyres with the discount?
Section 4 – Problem Solving

32. Four workers each produced the following number of oil filters on a particular day: 108, 143, 127, 134. What is the total number of oil filters produced that day?

33. A bolt assembly for a car’s rear spring consists of a bolt of mass 8.34 g, a washer with mass 1.72 g, a lock washer with mass 0.8 g and a hexagonal nut with mass 2.3 g. What is the total weight of this bolt assembly?

34. The weight of three bolts are 52g, 49g, and 61g. What is the average weight of the bolts?

35. Two numbers add up to 40. Find the other number if one is 15?

36. After work, you and your four co-workers share a meal and split the costs evenly. If the bill totaled $168, how much did each person have to pay?

37. Peta the technician is paid $22.00 per hour plus time and a half for any hours over 35 hours. If she worked 42 hours, what was her pay for?
   (a) the first 35 hours of work only
   (b) the overtime pay only
   (c) the total pay

38. Daniel is a technician and he uses feeler gauges to check the size of small gaps. He has six different size feeler gauges: 0.015mm, 0.02mm, 0.04mm, 0.08mm, 0.12mm and 0.15mm. What combination of gauges would he use to check a size of:
   (a) 0.2mm
   (b) 0.095mm
Formulae

39. Robert drove 300 km in 6 hours. Calculate his average speed given that speed = distance divided by time.

40. If Pressure=Force/Area, find the Pressure if Force=60 and Area=20

41. If Pressure=Force/Area, make Force the subject of the formula.

Ratio

42. A 5 litre V8 vehicle uses unleaded petrol in the ratio of 3:1 when compared with a 4 cylinder 1.2 litre vehicle. If there was 24 litres of unleaded petrol in a drum to be shared between the two vehicles, how much would you pump out for the V8 vehicle to use?

43. The length of a truck’s tray top is Picture A = 5m. The length of a utility’s tray is Picture B = 2m. What is the ratio of the trucks tray top to that of the utility’s, in simplest terms?

44. An angle grinder cuts through 0.5cm of steel in 1 minute. How long will it take to make a cut 3.5cm deep?

45. A car travels at a constant speed. If the car takes 30 minutes to travel 50 kilometres, how many kilometres will it travel in 1 hour?

46. A car uses 12 litres of petrol per 100 kilometres. If the tank holds 60 litres, how far will it travel on a full tank?

47. The capacity (volume) of a 6 cylinder car is 2.4 litres. What is the volume of each cylinder?

48. A car’s engine crankshaft revolves 2,400 times each minute. How many seconds does it take to revolve 1,200 times?

49. Ali’s car uses 10 litres of petrol every 300 kilometres. What is the rate of petrol consumption in km per litre for Ali’s car?

50. An air conditioning unit circulates 320 cubic metres of air per minute. How many cubic metres of air is circulated in a hour?

51. A technician cut two pieces of rubber tubing each 14cm long from a tube 50cm long. How much of the original rubber was left?

52. Two gears have 12 and 15 teeth respectively. What is the ratio of the number of teeth on the first gear to the number of teeth on the second gears in lowest terms?
53. A simple series circuit has two resistors, one 56 ohms and the other is 120 ohms and is connected to a supply voltage of 240 volts.

We will change the 100v to 240 v in the diagram below

![Diagram of a simple series circuit with two resistors and a supply voltage.]

Note:
P = Power
I = Current
R = Resistors
V = Voltage

a) Calculate the current flowing (in amps) in the circuit using the formula \( V = IR \)

b) Calculate the total power (in watts) dissipated using the formula \( P = I^2R \)
ANSWERS

Section – Literacy, Reading & Comprehension

1. Alternator, Bonnet, Cam gear, Cam shaft, Cam timing belt, Piston, Rocker cover, Sump, Timing cover, Valve
3. a. carburettor, b. vacuum, c. differential
4. files, solely, individual, whom, recipient, recipient, dissemination, communication, prohibited, unlawful
5. maintenance, schedules, replacement, worn, attention.

6. a) the airbag module, the ECU (Engine Control Unit) which controls the engine functions, the driver’s door module, climate control module, cruise control module, the transmission controller which controls automatic transmission and ABS module controls the anti-lock brakes and may handle the traction-control and stability-control systems

b) • The need for sophisticated engine controls to meet emissions and fuel-economy standards.
• Advanced engine diagnostics and repair.
• Reduction of the amount of wiring in cars.
• New safety features.
• New comfort and convenience features.
• New entertainment and communication features.

c) The processor that is the most important is the ECU (Engine Control Unit). It controls engine functions like the spark timing and obtaining the correct fuel to air mixture to intake into the engine block. It can also manage the emissions and the fuel economy of the car.

7. a) (III) b) (II) c) (IV) d) (IV)

8. Safety Shoes, Protective Glasses, Overalls, Face Shield
   a) Safety Shoes, Face Shields, Protective Glasses, Overalls, Gloves
   b) Safety Shoes, Protective Glasses, Resistant Gloves, Overalls
   c) Safety Shoes, Protective Glasses, Overalls, Air Wash Hoods, Resistant Gloves, Respirator
   d) Safety Shoes, Protective Glasses, Welding Masks, Ear Muffs, Overalls, Respirator
   e) Safety Shoes, Protective Glasses, Dust Mask, Overalls, Ear Muffs

9. a) Open stairwell b) Permanent railings, chain access, warning markers

Section 2 – General Knowledge

1. (a) sump, (b) cylinder block, (c) alternator, (d) fuel injector, (e) piston, (f) carburettor, (g) rocker cover, (h) spark plug
2. (a) open ended spanner, (b) vice grips, (c) needle nose pliers, (d) centre punch, (e) phillips head screwdriver, (f) micrometer, (g) tin snips, (h) hacksaw
(a) bumper bar, (b) windscreen, (c) boot, (d) wing mirror, (e) door, (f) skirt, (g) bonnet, (h) wiper arm

4. volt, current, ohms, diode, resistor

Section 3 - Mathematics

1. (a) m (b) min (c) °C (d) kg (e) m² (f) km/hr, (g) ml (h) $  

2. (a) 48.8cm (b) 177.4cm

3. (a) 25% (b) 16.37 (c) 3/8 (d) 2¾ (e) 35°

4. (a) 8000m (b) 3500g

5. 82.3, 8.23, 0.823

6. (a) 0.7 (b) 2.85

7. (a) 8, (b) 6

8. (a) 35.68 (b) 430

9. (a) 240,000, (b) 2,000

10. (a) 31.68, (b) 804.339

11. (a) 68.7 (b) 41.4 (c) 369.6

12. (d) 932.1

13. 2/4 or 1/2

14. (a) 7/12 (b) 13/14

15. (a) 0.345 (b) 756 (c) 281

16. (a) ¼ (b) 9/6 = 1½ (c) 27/8 = 3 & 3/8

17. (a) ¾ (b) 6/10 = 3/5 (c) 30/100 = 3/10

18. (i) 30° (ii) 120°

19. (a) 58° (b) 20° (c) 50°

20. (a) 3434, (b) 13.719

21. (a) 52m

22. 25.12m

23. 10m²

24. 42km²

25. 314cm²

26. 2,260.8cm³

27. (a) $4.40 (b) 3.21

28. $1008

29. (a) $432

30. (a) 20 (b) 5

31. 34. 512

32. (a) $1,600 (b) $14,400

33. 35. 13.16g

34. 36. 54g

35. 37. 25

36. 37. 11.36g

38. $33.60

39. (a) $770 (b) $231 (c) $1001

40. (a) 0.08mm and 0.12mm (b) 0.08mm and 0.015mm

41. 50 km/hr

42. 3

43. F= PxA

44. 18 litres

45. 2.5:1

46. 7 minutes

47. 100km

48. 500km

49. 0.4 litres

50. 30 seconds

51. 30km/l

52. 19200m³

53. 22cm

54. 4:5

55. a) 1.364 amps

b) 327.27 W

or 327.48 W (rounded)
Contributions

This practice aptitude quiz would not have been possible without the support of the State Government of South Australia, Group Training Australia (SA) Inc and its members.

This Practice Aptitude Quiz was developed by:

Group Training South Australia – www.gtasa.com.au
Group Training Australia (SA) (GTA SA) is a network of independent not for profit organisations located in metropolitan Adelaide and all major population centres throughout the state. These organisations operate on either an industry or regional basis and collectively they provide employment for in excess of 4,000 apprentices and trainees.

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The Motor Trade Association employs over 520 automotive apprentices making it Australia’s largest automotive industry Group Training Scheme. MTA-GTS also operates as a registered training provider delivering Certificate I, II and III automotive training across a number of automotive trades. MTA-GTS is located at Royal Park, employing apprentices/trainees in various retail motor industry trades. MTA-GTS commenced operation in September 1982 with a group of 10 automotive technician apprentices. Since these humble beginnings more than 2000 apprentices have graduated to full time employment as skilled, qualified tradespeople.

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