

Qualification title: Level 2 Technical Certificate in Automotive (4292-21)

Exam title: Externally set, externally marked

Version: Past Paper

Base mark: 65

1	
	<p>a) Not complying with the requirements of the Health and Safety at Work Act can have serious consequences.</p> <p>i) State who is responsible for enforcing the Health and Safety at Work Act in the workplace.</p> <p>ii) State one possible consequence to an employer if they do not follow the Health and Safety at Work Act. (2 marks)</p> <p>Answer <i>a i) Health & Safety Executive</i></p> <p><i>ii) Employers might face the following consequences</i></p> <ul style="list-style-type: none"> • <i>Fines</i> • <i>Imprisonment</i> • <i>Disqualification of trading/ unable to trade</i> • <i>Accidents occurring in the workplace (possible loss of life/injury)</i> • <i>Any other appropriate answer.</i> <p>b) Accidents can occur due to poor behaviour and incorrect clothing.</p> <p>i) Give one example of how poor behaviour can cause accidents.</p> <p>ii) Give one example of how wearing inappropriate clothing can cause accidents. (2 marks)</p> <p>Answer <i>Any two relevant answers, examples are:</i></p> <p><i>i)</i></p> <ul style="list-style-type: none"> • <i>Running in workshops causing falls and tripping</i> • <i>Incorrect precautions being taken when using equipment</i> • <i>Acting foolishly in the workshop area (airlines etc)</i> • <i>Any other appropriate answer.</i> <p><i>ii)</i></p> <ul style="list-style-type: none"> • <i>Loose clothing caught in rotating parts</i> • <i>Long hair caught in rotating parts</i> • <i>Watches, rings, etc., contacting electrical circuits</i> • <i>Any other appropriate answer.</i>
Test spec reference: 201 LO1 1.1 LO2 2.1	Total marks: 4 marks

2

a) Briefly explain what is meant by the term 'flexi hours' with regards to a contract of employment. (2 marks)

Answer

a) A variable working contract where employees do not have to work between standard working times (eg 8.00 – 5.00), with possible reason given for why this is beneficial, ie child care.

Providing employees work the appropriate number of hours they can choose, by arrangement, the actual work pattern, with possible reason given for why this is beneficial ie flexibility around illness or work/life balance.

(2 marks if both points are covered, or one point with a reasonable explanation.)

(1 mark if one point is covered without a further explanation.)

b) Most employers have in place an employee appraisal scheme. State **two** of the benefits to an **employee** of an appraisal scheme. (2 marks)

Answer

Any two suitable responses, examples are:

Allows the employee the opportunity to:

- Discuss any issues they may have (ie personal life affecting work life)
- Discuss how the employer views their progress (ie constructive feedback)
- Identify any further training required (ie career development).

For each point raised learner should make mention of the benefits.

Test spec reference: 202 LO3 3.1 & 3.2

Total marks: 4 marks

3

A tyre has the following markings on the sidewall: '**205 55 R16 91 W**'.

Which letters or numbers identify the

- a) tyre speed rating
b) tyre load index.

(2 marks)

Answer

a) 'W'

b) '91'

Test spec reference: 204 LO1 1.1

Total marks: 2 marks

- a) i) Explain how a hydraulic braking system causes a vehicle to stop.
 ii) Explain how a mechanical parking brake holds a vehicle stationary (4 marks)

Answer

i) The driver operates the pedal or lever and fluid is forced through the master cylinder via pipes and hoses to operate calipers/wheel cylinders, to make contact with friction surfaces to bring the vehicle to a stop.

(For full marks a learner's response must cover the following: pressing the pedal, hydraulic action and friction. 1 mark can be awarded for stating the concept more simplistically but not covering hydraulic and friction.)

ii) The driver operates a lever which applies force which is increased through mechanical linkage to make contact with friction surfaces after the vehicle has come to a stop.

(For full marks a learner's response must cover the following: Lever, increased force, mechanical effort, friction. 1 mark can be awarded for stating the concept more simplistically ie not covering lever and increased force. A basic answer such as 'press the pedal' or 'pull lever' should incur no marks.)

- b) Figure 1 shows a view of three wheels looking from the front of the vehicle towards the back, labelled A, B and C.

Identify which wheel demonstrates

- i) negative camber
 ii) positive camber

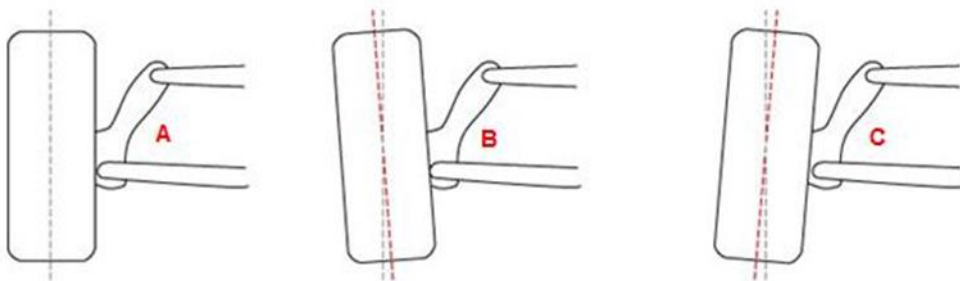


Figure 1

- iii) State the effect of negative camber on the steering of a vehicle. (3 marks)

Answer

- i) 'C'
 ii) 'B'
 iii) Makes the vehicle more difficult to manoeuvre at low speeds, such as when parking.

- c) i) Identify the suspension system shown in Figure 2.
 ii) Briefly describe its operating principle.

(2 marks)



Figure 2

Answer

i) Coil spring.

ii) Any one from the following:

- Torsion bar
- Rubber block
- Pneumatic
- Leaf
- Hydraulic.

Test spec reference: 205 L01 1.2
 L02 2.3
 L03 3.4

Total marks: 9 marks

5

State **three** pieces of legal information that must appear on an invoice.

(3 marks)

Answer

Any three from the following

- Unique serial number
- Dates of supply
- VAT registration number,
- Rate of VAT
- Amount of VAT
- Total invoice amount.

(1 mark for each correct answer.)

Test spec reference: 206 L02 2.2

Total marks: 3 marks

6

A technician has been asked to make a steel component that requires marking out.

Briefly explain the use of **two** marking out tools or equipment that may be needed.

(2 marks)

Answer

Explanation of the use of two appropriate tools, examples are:

- Scribe – to show marking and datum lines
- Punch – to assist with use of callipers, to mark drilling point
- Square – to check for alignment
- Engineers blue – to make marking visible
- Callipers – mark circles, parallel lines.

Test spec reference: 207 L01 1.1

Total marks: 2 marks

a) Vehicles can have engines located in various positions.

Explain the reasons for using a front engine location in a vehicle.

(3 marks)

Answer

Explanation should cover the following points and can relate to any type of vehicle, ie light, heavy, motorcycle

- Allows compact drive train design
- More efficient cooling
- Weight distribution
- Increased passenger compartment / payload space if front wheel drive used.

b) Describe the main advantages of using a Vee multi-cylinder engine rather than an in-line multi-cylinder engine.

(4 marks)

Answer

4 marks

In comparison to an inline engine, the V engine allows the use of a shorter engine block providing more space, allowing transmission and other components to be accommodated. Handling is improved as centre of gravity is lower. If motorcycles are used in the answer it should include aerodynamic efficiencies.

3 marks

An inline engine is larger in size reducing space, and a V engine is more compact which improves handling.

2 marks

The V engine is smaller but provides more space to be able to be worked upon.

1 mark

A basic understanding of the concepts is shown eg 'A V engine is smaller'.

c) i) State what is meant by the term 'Top Dead Centre'.

ii) State what is meant by the term 'cylinder bore'.

(2 marks)

Answer

i) When the piston is at the top of its stroke.

ii) The maximum diameter of the cylinder that the piston travels in.

d) i) Identify the component shown in Figure 3.

ii) Name **all three** parts of the component labelled **A, B** and **C**.

(4 marks)

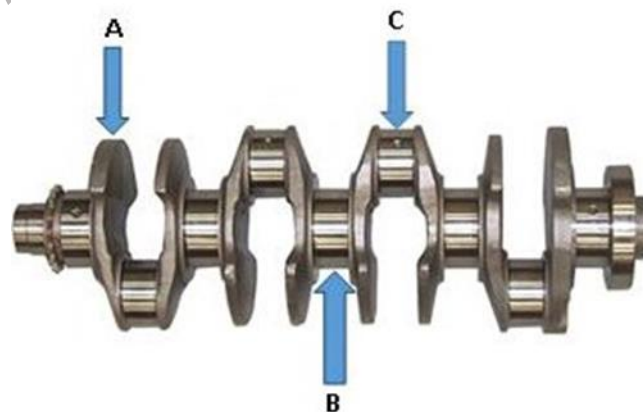


Figure 3

Answer

- i) Crankshaft
- ii) **A** = Crankshaft web.
B = Main bearing journal.
C = Big end journal / crankpin.

Test spec reference: 208 L01 1.2
L02 2.1
L03 3.2 & 3.3

Total marks: 13 marks

8

- a) Briefly explain the purpose of an electrical relay. (2 marks)

Answer

2 marks

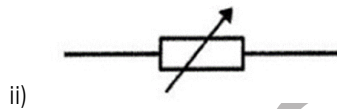
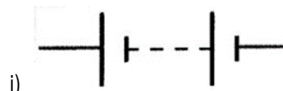
The learner has given the purpose eg 'Allows a small current to control a higher current'.

1 mark

The learner has given a basic description eg 'It is a switch'.

(The use of a lower current to operate a larger one must be mentioned to obtain the 2 marks.
If a suitable explanation is given but no mention is made of this then only 1 mark should be awarded.)

- b) Identify the components represented by the following symbols. (2 marks)



Answer

- i) Battery.
- ii) Variable resistor.

Test spec reference: 209 L01 1.2 & 1.4

Total marks: 4 marks

a) Figure 4 shows a tool that is used when replacing a clutch assembly.

i) Name the tool shown.

ii) State why it is necessary to use this tool.

(3 marks)



Figure 4

Answer

i) Clutch alignment tool.

ii) 2 marks - To align the clutch centre plate with the crankshaft spigot.

1 mark - To align the clutch centre plate.

b) State **two** purposes of a transmission system.

(2 marks)

Answer

Any two relevant purposes, examples are to:

- Provide a smooth take up of drive
- Allow permanent and temporary breaks in the drive
- Provide an increase in torque
- Allow a range of vehicle speeds
- Transmit the drive through various angles.

c) Figure 5 shows a clutch plate.

State the purpose of the components labelled **A** and **D**.

(2 marks)

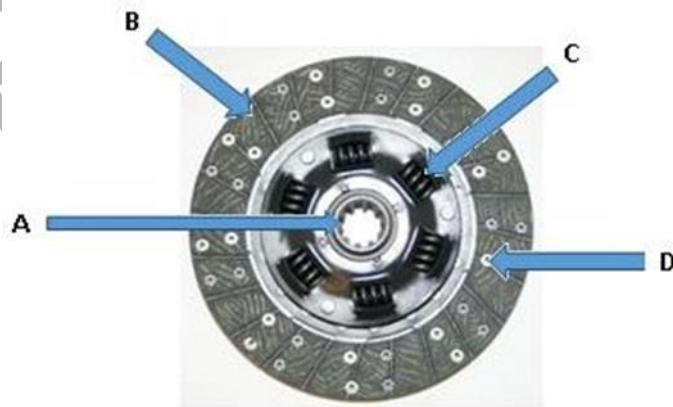


Figure 5

Answer

A = Splined centre hub - to connect to gearbox input shaft

D = Rivets – to fix the lining to the plate

Test spec reference: 210 LO1 1.1
LO2 2.1 & 2.2

Total marks: 7 marks

10

Describe how to restore faded paintwork on a vehicle following correct workshop procedures.

(4 marks)

Answer

4 marks

The learner must understand the full process including workshop and environmental considerations eg 'Wash and dry the vehicle, apply cutting compound, remove cutting compound, apply wax and then polish off. Store chemicals correctly, and dispose of used materials in accordance with workshop policies and environment regulations.'

3 marks

The learner must understand the full process but has not included the workshop or environmental considerations eg 'Wash and dry the vehicle, apply cutting compound, remove cutting compound, apply wax and then polish off'.

2 marks

The learner must apply basic clean and polish concepts eg 'Wash, apply cutting compound and then polish the vehicle'.

1 mark

The learner has not fully covered the basic concepts of restoring faded paint but has met the minimum requirements eg 'Wash the vehicle and apply cutting compound'.

Test spec reference: 211 LO1 1.1

Total marks: 4 marks

11

a) Briefly describe the difference between a **business partnership** and a **sole trader**. (2 marks)

Answer

A partnership is where two or more people manage and operate the business, all owners are equally responsible. A sole trader is the exclusive owner of the business.

b) Briefly explain the term 'independent trader' with regards to the automotive repair industry. (2 marks)

Answer

2 marks

A repair business that operates independently of a manufacturer and generally will carry out repairs to any make of vehicle.

1 mark

A repair business that operates independently.

Test spec reference: 212 LO1 1.1

Total marks: 4 marks

A customer has recently purchased a vehicle that has no service history. They have therefore asked the garage to carry out a major service and to report any problems.

The technician has positioned the vehicle on the ramp.

Explain how the service should be carried out.

(9 marks)

Answer

Indicative content

Vehicle preparation

- that interior vehicle protection equipment has been fitted and any additional required, eg wing cover.
- that vehicle is correctly positioned and secure on ramp.
- all parts are available
- all documentation is available
- all appropriate technical data is available.

Health and safety procedures and precautions

- correct PPE is available and worn
- all tools checked prior to use
- if any tools need calibrating and why
- full awareness of all relevant safety precautions described.

Workshop practices

- correct use of tools and equipment
- service carried out to manufacturers requirements using approved procedures
- disposal of waste
- correct disposal of waste fluids used and any consumables eg air filters, oil filters, rags and paper.

10 marks

All practices and procedures explained, including a full explanation of services carried out to manufacturers' requirements. Learner has clearly understood how all practices relate to one another, including environmental impacts with waste disposal. Shows an overall holistic understanding of service procedures and covered concepts in their logical order.

7 – 9 marks

The majority of tasks covered with only a few minor inaccuracies and points missed. Tasks correctly matched to the vehicle systems. Showed a good depth of understanding of the process carried out. All information has been presented in a logical order

4 – 6 marks

The learner has identified some of the checks but not covered fully the relevant vehicles systems. Correctly described the checks for the systems they have identified. Learner may have knowledge of 3 or 4 key areas, and has attempted to present them logically.

1 – 3 marks

The learner has identified some of the items to be checked but shows limited knowledge and understanding of what would be expected. Learner may have knowledge of 1 or 2 key areas, but not been able to describe them in a logical order. Is random in their approach.

0 marks

No rewardable material 1).

Test spec reference: Stretch and challenge

Total marks: 9 marks