



8202-525 JUNE 2018

Level 2 Technical Certificate in Plumbing

Level 2 Plumbing – Theory exam

Thursday 21 June 2018
09:30 – 11:30

**You should have the
following for this examination**

- a multiple-choice answer sheet
- a pen with black or blue ink
- non-programmable calculator

This question paper is the property of the City and Guilds of London Institute and is to be returned after the examination.

Read the following notes before you answer any questions

- You **must** use a pen with black or blue ink to complete **all** parts of the answer sheet.
- Check that you have the correct answer sheet for the examination.
- Check that your name and candidate details are printed correctly at the top of your answer sheet.
- Inform the invigilator if your name or examination details are not correct.
- Each question shows **four** possible answers (lettered 'a', 'b', 'c' and 'd'); only **one** is correct.
- Decide which **one** is correct and mark your answer on the **answer sheet** with your pen.

For example if you decide 'a' is correct, mark your answer like this

101	<input checked="" type="radio"/>	<input type="radio"/> (b)	<input type="radio"/> (c)	<input type="radio"/> (d)
	Cancel	Cancel	Cancel	Cancel

If you want to change your answer, cancel your first choice by filling in the 'cancel' box below the circle like this

101	<input checked="" type="radio"/>	<input type="radio"/> (b)	<input type="radio"/> (c)	<input type="radio"/> (d)
	Cancel	Cancel	Cancel	

Then mark the answer which you have now decided is correct. For example if you now decide 'c' is correct, mark your answer like this

101	<input checked="" type="radio"/>	<input type="radio"/> (b)	<input checked="" type="radio"/>	<input type="radio"/> (d)
	Cancel	Cancel	Cancel	

Any other marks on the form may invalidate some of your answers.

- Any calculations or rough working can be done on the question paper.
- Attempt all questions. If you find a question difficult, leave it and return to it later.

This paper contains 60 questions. Answer them using the 'boxes' numbered 1 to 60 on the answer sheet.

- 1 What primary legislation governs an employee's safety at work?
 - a ACOP.
 - b HASAWA.
 - c COSHH.
 - d HSAWR.
- 2 Why **must** gloves be worn when handling lead?
 - a It improves grip.
 - b It prevents lead from damages.
 - c It prevents absorption of lead through the skin.
 - d It prevents long term corrosion of the sheet lead.
- 3 What colour coding indicates 110 V for electrical equipment on site?
 - a Blue.
 - b Red.
 - c Yellow.
 - d White.
- 4 What substance can lead to the development of Mesothelioma?
 - a Asbestos.
 - b Flux.
 - c Lead.
 - d LPG.
- 5 Which are the duties of operatives on a construction site?
 - a Check own competence, cooperate with others and report obvious risks.
 - b Order materials, report obvious risks and check competence of all appointees.
 - c Secure the site, supply PPE and report obvious risks.
 - d Check own competence, supply PPE and welfare facilities.
- 6 What is the correct method for electrical isolation of a shower?
 - a Isolate at the consumer unit or remove the fuse, place a warning notice and inform the customer.
 - b Identify the correct circuit, check circuit is dead using a voltage indicator, inform the customer and place a notice.
 - c Identify the correct circuit, check for continuity, lock off the isolator and place a notice.
 - d Isolate at the consumer unit or remove the fuse, check circuit is dead using a voltage indicator, lock off the isolator and place a notice.
- 7 What type of fire extinguisher is suitable for all of the items listed 1, 2, 3, 4 and 5?
 - 1 Wood.
 - 2 Oil.
 - 3 Propane.
 - 4 Aluminium.
 - 5 Electrics.
 - a Foam.
 - b CO₂.
 - c Water.
 - d Powder.
- 8 What would be a safe step to take once an Asbestos exposed material is dismantled?
 - a Take it to the recycle centre ensuring prior notification.
 - b Take it to the recycle centre ensuring it is single bagged.
 - c Take it to the recycle centre ensuring it is double bagged.
 - d Take it to the recycle centre to be disposed as landfill.
- 9 Due to the operative incorrectly applying safe isolation procedure, a fire has started in a boiler. Why should a 'cream' labelled fire extinguisher **not** be used to tackle the fire?
 - a Moisture content from the fire extinguisher can lead to electric shock.
 - b Excessive inhalation of gas suppressant from the fire extinguisher.
 - c Excessive contact of powder from the fire extinguisher will cause Dermatitis.
 - d Contents from the fire extinguisher will react with the boiler flue gases.



Figure 1

10 Identify the component shown in Figure 1?

- a Expanding metal cavity fixing.
- b Spring toggle fixing.
- c Self-cutting fixing.
- d Rawl bolt.

11 What is the correct diameter for copper pipework that has to be clipped horizontally every 1.2 m and vertically every 1.8 m?

- a 10 mm
- b 15 mm
- c 22 mm
- d 28 mm

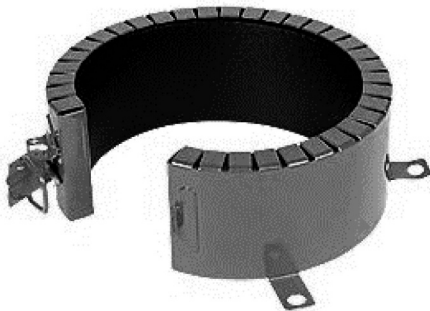


Figure 2

12 Why is the component shown in Figure 2 installed on soil pipework?

- a To comply with Building Regulation F.
- b To stop the ingress of vermin.
- c To reduce the risk of a fire.
- d To prevent fire leaving the room it originated.

13 What risk would occur when installing a plastic float operated valve (part 3) in a CWSC within a loft space?

- a Increased pressure at the inlet.
- b Freezing temperatures would split the plastic.
- c Higher air temperatures will distort the plastic.
- d Water hammer at the tap outlets.



Figure 3

14 Identify the fitting shown in Figure 3?

- a Press fit elbow.
- b Push fit elbow.
- c Integral solder elbow.
- d Compression elbow.

15 What enables solder to be drawn into a copper fitting during the soldering process?

- a Gravity attraction.
- b Oxidisation.
- c Capillary attraction.
- d Dezincification.

16 Which metal is known to be ferrous?

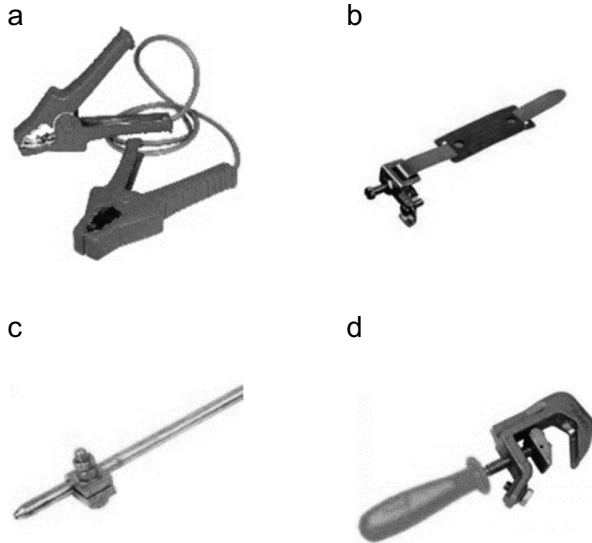
- a Copper.
- b Iron.
- c Zinc.
- d Lead.

17 What would be a sign that a brass fitting is subject to dezincification?

- a The fitting becomes black.
- b It becomes noisy when used.
- c A pitting occurs on the surface of the fitting.
- d A white powdery coating is visible on the surface of the fitting.

- 18 Calculate the amount of energy required to heat 140 litres of water from 4 °C to 80 °C? Using specific heat capacity of 4.186 kJ/ kg °C.
- 44,539.04 kJ
 - 46,883.2 kJ
 - 4,166.4 kJ
 - 45,768.02 kJ
- 19 What is the expansion rate of water when it turns from liquid to gas?
- 160 times.
 - 1600 times.
 - 16,000 times.
 - 160,000 times.
- 20 Which pipework fabrication, each measuring 6 m in length, will offer the **greatest** resistance to the flow of water?
- 15 mm pipe with four elbows.
 - 15 mm pipe with four machine bends.
 - 15 mm pipe with two machine bends and two elbows.
 - 22 mm pipe reducing to 15 mm halfway along its length.
- 21 An indirect cold water system is to be commissioned in a domestic property. It has been identified that there is no insulation on the cold water storage cistern. What can this **most** likely lead to?
- Increased risk of bacterial growth during hot temperatures.
 - Fluid Category 1 at the outlets during hot temperatures.
 - Increased risk of Legionella during cold temperatures.
 - Water changing to PH7 during cold temperatures.
- 22 A crack in a plaster has developed close to where pipework is passing through a wall. What is the cause of the crack and damage to the plaster?
- The incorrect type of plaster was used.
 - The pipework was not painted.
 - No sleeve on the pipework to allow for heat movement.
 - No pipe covers were used to prevent cracking.
- 23 What would cause a 10 year old PVCu guttering system to become brittle or weak?
- Deterioration of plastic from exposure to wind and rain.
 - Degradation of plastic from exposure to ultraviolet rays.
 - Corrosion due to air pollution.
 - Conduction from a flue outlet.
- 24 A 3 m length of copper pipework is raised from 15 °C to 60 °C. Coefficient of linear expansion of copper is 0.000017 m/ m °C.
- What length would the pipework increase by?
- 0.2295 mm
 - 0.459 mm
 - 2.295 mm
 - 45.9 mm
- 25 What is the correct definition of the term 'Direct Current'?
- A circuit that reverses its direction of travel intermittently through the circuit.
 - A circuit where the electrons always flow from the positive pole towards the negative.
 - A current that reverses its direction of travel constantly through the circuit.
 - A circuit where the electrons always flow from the negative pole towards the positive.
- 26 An over-current protection device of 5 A is installed on a 230 V supply. What is the **maximum** load allowed on the circuit?
- 0.5 W
 - 115 W
 - 1.15 kW
 - 11.5 kW

27 What item is used for temporary continuity bonding when cutting into existing copper pipework?



28 Which statement **best** describes a borehole?

- a A well drilled directly to a below-ground water source.
- b Water that rises from underground water bearing rock layers.
- c A hand dug well that penetrates the first water bearing strata.
- d A machine dug well that draws water from below the shallow impervious strata.

29 What statement describes grey water harvesting?

- a Water that is collected when a boiler is condensing which is filtered and cleaned and used to flush WC cisterns.
- b Water that is collected from a borehole that is filtered and cleaned and used to flush WC cisterns.
- c Water collected from wash hand basins which is filtered and cleaned before being used to flush WC cisterns.
- d Water collected from guttering which is filtered and cleaned before being used to flush WC cisterns.

30 On what method of water treatment can a schmutzdecke be found?

- a Sedimentation.
- b Reverse osmosis.
- c Slow sand filtration.
- d Rapid sand filtration.

31 What do Water Supply Regulations 1999 prevent?

- a Contamination of water.
- b Condensation in bathrooms.
- c Poor efficiency of stored water.
- d Boiler cycling when it's not required.

32 Why **must** the visibility of MDPE pipework be limited?

- a It will decompose when exposed to ultraviolet light present in daylight.
- b It is less ductile than other materials.
- c It will become toxic when exposed to ultraviolet light present in daylight.
- d It is less malleable than other materials.

33 What is an **advantage** of an indirect cold water system?

- a Less risk of backflow.
- b Less pipework.
- c Smaller pipe sizes.
- d Cheaper to install.

- 34 Water is discharging from pipework penetrating the fascia of a property. What is the **most** likely fault?
- Siphon washer is split.
 - Tap washer not sealed correctly.
 - Split diaphragm washer on float operated valve.
 - Blocked bath trap due to excessive hair.
- 35 A water undertaker's main bursts in the road. Downstream a shower head from an electric shower is left submerged under water which creates back siphonage to the main. How could the wholesome water be protected if the above occurs again?
- The shower must be fed via a shock arrestor.
 - The shower must have a double check valve installed.
 - The shower must have a RPZ valve installed.
 - The shower must be fed via a cold water booster pump.

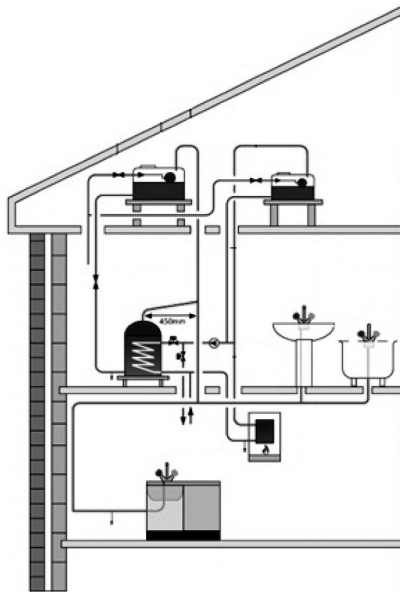


Figure 4

- 36 What hot water system is shown in Figure 4?

- Single feed indirect.
- Direct open vented.
- Double feed indirect.
- Unvented.

- 37 What circumstance would eliminate the need for an expansion vessel when fitting an under sink storage water heater?
- Where the correct discharge pipework is used.
 - Where an expansion relief valve is installed.
 - Where a pressure reducing valve is installed.
 - Where the water heater has an open vented tap.
- 38 What is the **maximum** temperature allowed at the outlets for baths in new build dwellings as stated in Document G?
- 38 °C
 - 43 °C
 - 48 °C
 - 65 °C
- 39 What type of materials can a circulator be manufactured from to be used on a secondary return circuit?
- Bronze and stainless steel.
 - Iron and stainless steel.
 - Tin and copper.
 - Iron and copper.
- 40 Why **must** the hot and cold supply be balanced when installing a shower mixer valve?
- To reduce maintenance and installation time to reduce costs.
 - To ensure the system does not inherit dead legs to prevent bacterial growth.
 - To reduce flow rates to prevent undue consumption.
 - To ensure an equal flow rate and pressure to prevent scalding.
- 41 What is the recommended test pressure and duration for rigid pipework according to British Standards?
- 1.5 times working pressure for 3 hours.
 - 2 times working pressure for 1 hour.
 - 2 times working pressure for 3 hours.
 - 1.5 times working pressure for 1 hour.

- 42 When replacing a set of taps in a bathroom suite the appliance isolation valve fails to isolate the supply. What action **must** be taken?
- Isolate at the mains stop cock.
 - Isolate at the open vent.
 - Isolate at the filling loop.
 - Isolate at the primary flow pipework.
- 43 Tenants of a small flat with no loft space have complained of poor hot water pressure. What system has **most** likely been installed in the flat?
- Sealed solar thermal hot water system.
 - Unvented hot water system.
 - Combination boiler.
 - Fortic combination cylinder.
- 44 A plumber is soundness testing a 1st fix installation of copper pipework in a new build property. After 30 mins the pressure dropped 0.2 bar but there is no leak. What could be the cause?
- System is stabilising.
 - Test pressure is too high.
 - Test pressure is too low.
 - The system pipework is blocked.

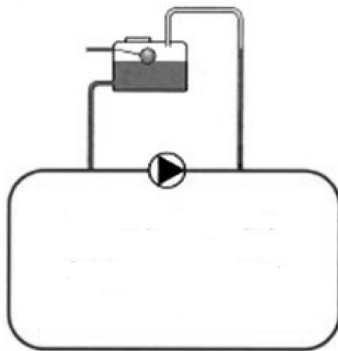


Figure 5

- 45 Which statement describes the system shown in Figure 5?
- System is installed correctly with correct location of feed and expansion pipework.
 - System is installed incorrectly as negative pressure is pushing into the cistern.
 - System is installed incorrectly as it is under positive pressure pumping over the vent.
 - System is installed correctly with correct distance from pump to feed and expansion pipework.



Figure 6

- 46 What component is shown in Figure 6?
- Shock arrestor.
 - Expansion vessel.
 - Anti-gravity valve.
 - Magnetic filter.

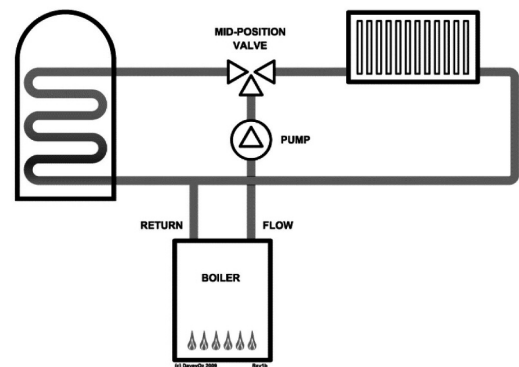


Figure 7

- 47 What type of heating system is shown in Figure 7?
- S Plan.
 - S Plan Plus.
 - Y Plan.
 - C Plan.
- 48 What is an **advantage** of a combination boiler?
- It provides instantaneous hot water.
 - There is capacity to store over 50 L of hot water.
 - It is compliant with Regulation F.
 - There is no requirement for condensed pipework.

49 What is an **advantage** of using natural gas as a fuel instead of LPG within a domestic property?

- a It has a higher pressure.
- b It costs less to purchase.
- c It has no smell.
- d It is carbon neutral.

50 What is the correct procedure for decommissioning a central heating system?

- a Notify manufacturers, drain the system, isolate water and electrics and cap open ended pipework.
- b Isolate water, drain the system, notify manufacturers and cap open ended pipework.
- c Notify customer, isolate water and electrics, drain system and cap open ended pipework.
- d Cap open ended pipework, drain the system, isolate water and electrics and notify customer.

51 A plumber is commissioning a heating system that has recently been installed and discovers that all the radiators in the dwelling, except one, are heating up.

What is the **first** action to take?

- a Turn off the system immediately.
- b Add more inhibitor.
- c Replace the radiator.
- d Check for air in the radiator.

52 What is the **maximum** distance allowable between each fascia bracket to support PVCu guttering?

- a 0.6 m
- b 0.8 m
- c 1.0 m
- d 1.2 m



Figure 8

53 What type of guttering system is shown in Figure 8?

- a Half round.
- b High capacity.
- c Square.
- d Ogee.

54 What is the correct method of maintaining a leaking PVCu guttering joint?

- a Remove the defective fitting, clean and silicone the joint.
- b Replace the defective fitting like for like.
- c Remove the defective fitting, clean and apply plumbers putty.
- d Replace the section of down pipe.

55 A plumber changes a tap washer on a basin but the tap continues to drip after re-instating the supply. What action may the plumber have failed to carry out?

- a Replace the diaphragm washer.
- b Re-seat the tap.
- c Replace the tap.
- d Remove the fibre washer.

56 A plumber has recommended that a central heating system should be 'power flushed'. What fault has led to this recommendation?

- a Radiators are getting hot when the boiler is operating for hot water only.
- b A number of radiators on the downstairs circuit are lukewarm only.
- c Boiler interlock prevents the boiler from operating when manually controlled.
- d Dis-coloured water appearing at hot water taps.

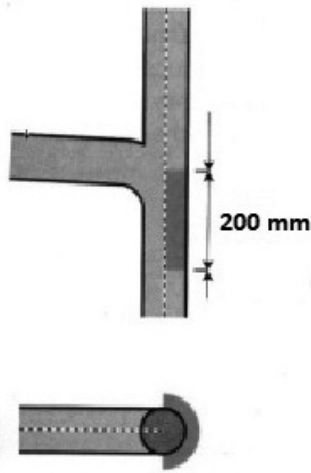


Figure 9

- 59 What is the **maximum** length a 32 mm waste pipe can be installed at before it **must** be increased in diameter?
- a 1.2 m
 - b 1.7 m
 - c 4.0 m
 - d 6.0 m

- 57 Why is connection to the shaded area in Figure 9 prohibited on a primary ventilation stack?
- a It would cause the system to corrode on the opposite connection.
 - b It would cause compression in the stack.
 - c It would cause trap seal loss up the opposite connection.
 - d It would cause leakage over prolonged use.
- 58 Water is discharged from a basin which forms a plug of water in the waste pipe creating a vacuum which pulls the water from the trap.

What does the above statement describe?

- a Self-siphonage.
- b Capillary action.
- c Wavering out.
- d Evaporation.



Figure 10

- 60 What type of trap is shown in Figure 10?
- a P trap.
 - b S trap.
 - c Running trap.
 - d Bottle trap.

NOW GO BACK AND CHECK YOUR WORK

- **IMPORTANT -**
Are the details at the top of the answer sheet correct?
Have you filled in your answers in INK in the appropriate boxes on the answer sheet?