



**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.**

<b>1st PROOF</b>	
DATE	
COMMENTS	
PASSED	
SIGNED .....	

- 1 What primary legislation governs an employee's safety at work?
- ACOP.
  - HASAWA.
  - COSHH.
  - HSAWR.
- 2 Why **must** gloves be worn when handling lead?
- It improves grip.
  - It prevents lead from damages.
  - It prevents absorption of lead through the skin.
  - It prevents long term corrosion of the sheet lead.
- 3 What colour coding indicates 110 V for electrical equipment on site?
- Blue.
  - Red.
  - Yellow.
  - White.
- 4 What substance can lead to the development of Mesothelioma?
- Asbestos.
  - Flux.
  - Lead.
  - LPG.
- 5 Which are the duties of operatives on a construction site?
- Check own competence, cooperate with others and report obvious risks.
  - Order materials, report obvious risks and check competence of all appointees.
  - Secure the site, supply PPE and report obvious risks.
  - Check own competence, supply PPE and welfare facilities.
- 6 What is the correct method for electrical isolation of a shower?
- Isolate at the consumer unit or remove the fuse, place a warning notice and inform the customer.
  - Identify the correct circuit, check circuit is dead using a voltage indicator, inform the customer and place a notice.
  - Identify the correct circuit, check for continuity, lock off the isolator and place a notice.
  - 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?
- Wood.
  - Oil.
  - Propane.
  - Aluminium.
  - Electrics.
- Foam.
  - CO<sub>2</sub>.
  - Water.
  - Powder.
- 8 What would be a safe step to take once an Asbestos exposed material is dismantled?
- Take it to the recycle centre ensuring prior notification.
  - Take it to the recycle centre ensuring it is single bagged.
  - Take it to the recycle centre ensuring it is double bagged.
  - 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?
- Moisture content from the fire extinguisher can lead to electric shock.
  - Excessive inhalation of gas suppressant from the fire extinguisher.
  - Excessive contact of powder from the fire extinguisher will cause Dermatitis.
  - Contents from the fire extinguisher will react with the boiler flue gases.



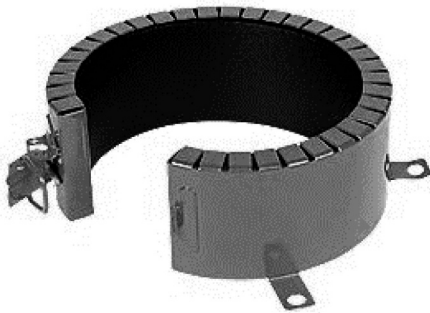
**Figure 1**

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?

a



b



c



d



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?

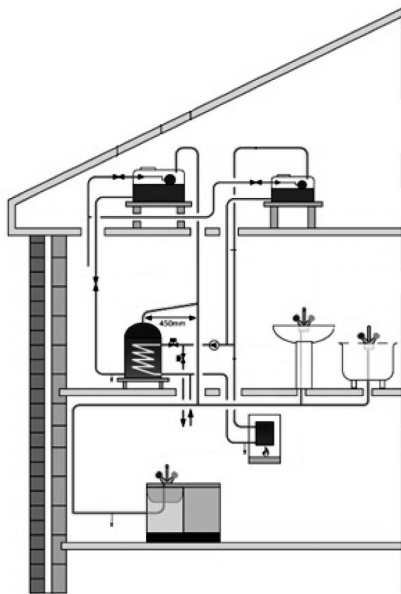
- a It will decompose when exposed to ultraviolet light present in daylight.
- b It is less ductile than other materials.
- c It will become toxic when exposed to ultraviolet light present in daylight.
- d It is less malleable than other materials.

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.

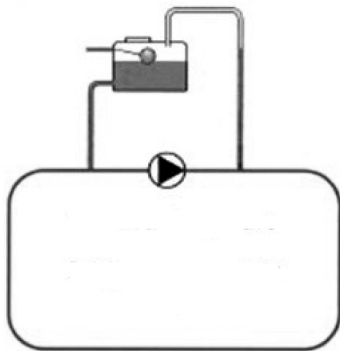


Figure 5

- 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 arrester.
  - Expansion vessel.
  - Anti-gravity valve.
  - Magnetic filter.

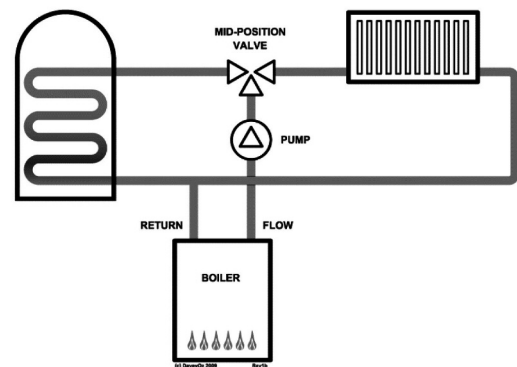


Figure 7

- 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.

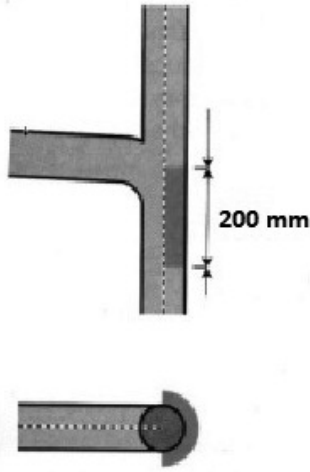
55 A plumber changes a tap washer on a basin but the tap continues to drip after re-instating the supply. What action may the plumber have failed to carry out?

- 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?