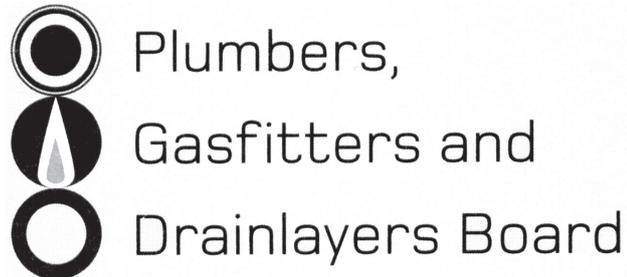


No. 9193



REGISTRATION EXAMINATION, NOVEMBER 2009
GASFITTING

ANSWER SCHEDULE

ANSWER 1

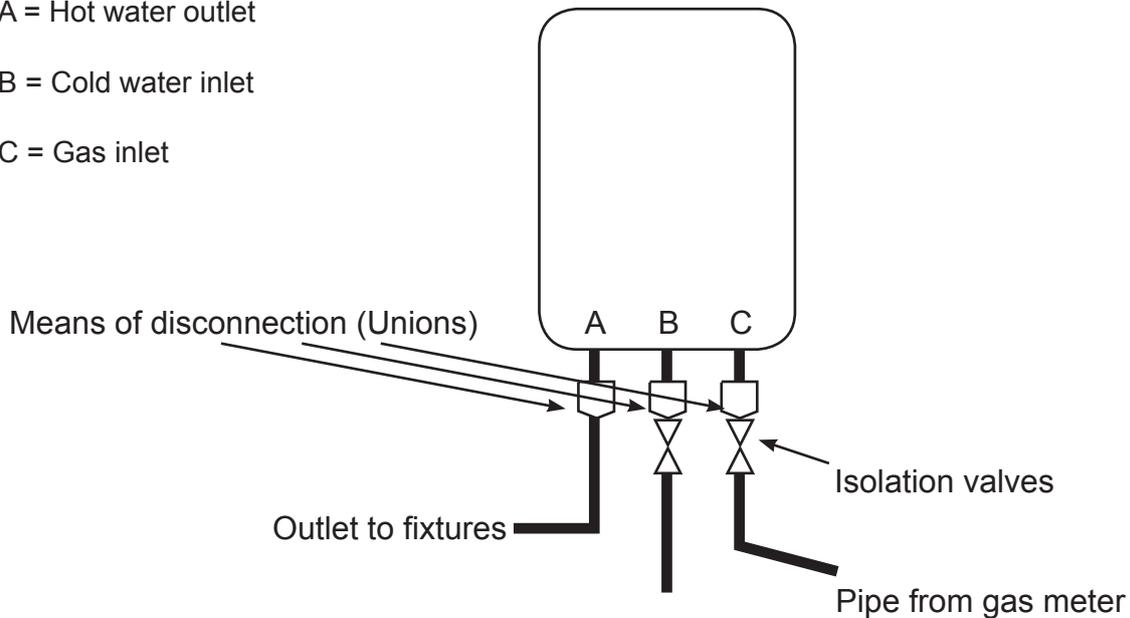
- (a)
- Heater is smaller and takes up less space
 - It is wall hung and avoids need for heavy duty base
 - Higher overall efficiency due to reduced heat losses
 - Provides continuous supply of hot water
 - Some are able to provide different water temperatures at different outlets
 - Less control valves required in HW line

(ANY FOUR, 1 mark each)

(b) A = Hot water outlet

B = Cold water inlet

C = Gas inlet



(1 mark for the fittings on each line, and 1 mark for correct sequence)

Total 8 marks

ANSWER 2

- (a) (i)
- Depressurise the system
 - Disconnect from the incoming supply and cap off
 - Ensure all appliances' valves are open
 - Attach a suitable pressure gauge
 - Pressurise with air to 2 kPa or operating pressure
 - Isolate the pressure source and allow to stabilise for 2 minutes
 - Measure the loss of pressure during a 5 minute period
 - The pressure will drop if there is a leak.

(4 marks, ½ mark each)

- (ii)
- Pressurise system with air
 - Use a soap solution, or leak fluid, on joints to look for bubbles

(1 mark each, 2 marks)

(b) Any FOUR, 1 mark each

- Judgement is affected
- Drowsiness
- Unconsciousness
- Loss of oxygen to body tissue and brain causing damage
- Death.

(1 mark each, 4 marks)

Total 10 marks

ANSWER 3

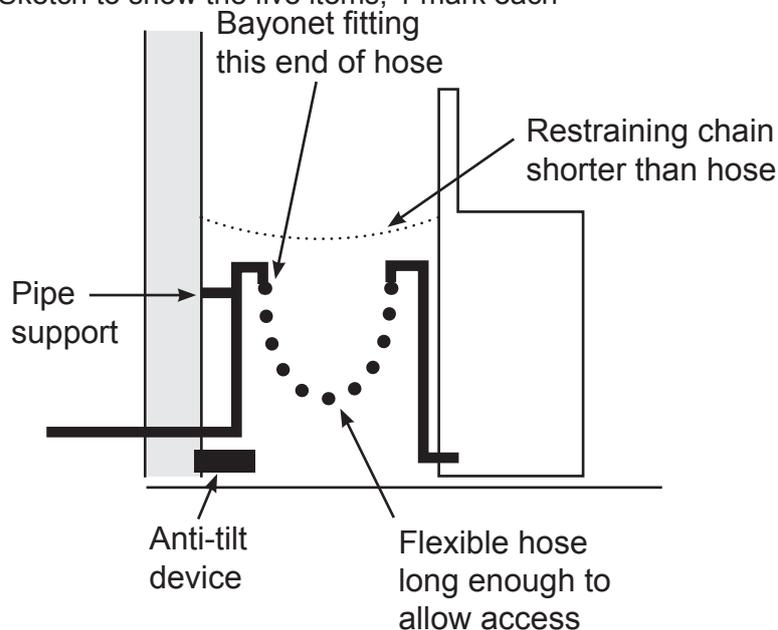
- (a) Provide a high rate of heat input to vaporise the liquid LPG, and ensure only gas is supplied into the consumer's installation. (2 marks)
- (b) To provide a constant flow/pressure through the burner injector (1 mark)
- (c) To maximise heat transfer (by increasing the surface area of contact for heat transference). (1 mark)
- (d) Temperature: 15°C
Pressure: 1 atmosphere. (101.3kPa at mean sea level) (2 marks)

Total 6 marks

ANSWER 4

- (a)
- Flame is non-luminous
 - It has a blue appearance
 - It has three well-defined cones
 - It is steady and almost silent in operation
 - Even in shape
- (½ mark each, 2 marks)

- (b) Sketch to show the five items, 1 mark each



(5 marks)

ANSWER 5

- (a) 275 kPa = 27.5mm or 11 inches (1 mark for either answer)
- (b) The concentration of gas in air below which a mixture will not ignite (2 marks)
- (c) The boiling point of butane is close to atmospheric temperatures (1 mark)
- (d) Adventitious ventilation is the natural air flow provided by openings around a building,
Forced ventilation is air flow that provided by a fan.
(1 mark each, 2 marks)

Total 6 marks

ANSWER 6

- (a) (i) Commissioning is to ensure safe start up and operation and to check the safety and operating controls.
(2 marks)
- (ii) Ignite burner and inspect flame. Adjust aeration slide or screw to give a good flame picture. Allow burner to warm up to full operating temperature and then check the flame and finally adjust the aeration if necessary.
(2 marks)
- (b) Any 2, 1 mark each
- (i) Products of combustion can mix with the circulating air
- (ii) Carbon monoxide can be produced
- (iii) Overheating and a fire can occur (2 marks)

Total 6 marks

ANSWER 7

1 mark each (½ mark for the material, ½ mark for the limitation)

- Black Steel/Iron – Not in any location unless protected against corrosion
- Copper – Not below ground unless protected with proprietary wrapping
- Galvanised Steel /Iron – Not below ground unless protected against corrosion
- Macro- composite (PE/Al) – Not exposed to UV in any location
- Polyethylene – Not above ground unless shielded against UV exposure

Total 5 marks

ANSWER 8

- (a) A = Inlet gas filter
B = Main burner pressure regulator
C = Auto safety shut off valve, slow opening, fast closing
D = Main burner flow rate control valve
E = pilot manual gas valve (5 marks)
- (b) • Igniter or pilot too far from burner ports
• Pilot flame too small
• Air intake blocked or incorrectly adjusted
• Main burner ports partially blocked
• Gas leak in appliance (ANY 3, 1 mark each), (3 marks)

Total 8 marks

ANSWER 9

- (a) Output = Input x efficiency
Output = $35 \times 75/100$
= 26.25MJ/h
= 26.25/3.6
= 7.3 kW (½ mark each line, total 2 marks)
- (b) Rate = 35/90
= 0.389 m³ (1 mark)
- (c) Area = 600 × 35
= 21,000mm² for each opening
= 42,000mm² total area (2 marks)
- (d) Dimensions = $\sqrt{21,000} = \underline{145 \text{ mm} \times 145 \text{ mm}}$ (1 mark)

Total 6 marks

ANSWER 10

- (a) (i) Name: Radiant panel or tube heater.
Reason: Heats only the people and equipment in direct line and not the surrounding air. (2 marks)
- (ii) Location: Suspended above work area and radiating downwards. (1 marks)
- (b) Gas pressure, orifice size and type of gas (discharge coefficient of gas). (1 mark each, 3 marks)

Total 6 marks

ANSWER 11

- (a) The pressure in the system when the system is at rest with no appliances operating.
Test at any point between the service regulator and the appliance control valve (2 marks)
- (b) The pressure in the pipe-work when at least one appliance is operating.
Test at any point between the service regulator and the appliance control valve. (2 marks)
- (c) The operating pressure of the appliance when the appliance is in use.
Test at the appliance. (Tested at the outlet side of the appliance regulator, provided it is not on a bottle system). (2 marks)

Total 6 marks

ANSWER 12

Any 10 items, ½ mark each

- Check gas pressure at heater
- Light pilot
- Check that FFD keeps pilot alight
- Adjust pilot size if necessary
- Turn on main burner
- Check flame pattern
- Check gas pressure with main burner in operation and other appliance on
- Check flue is drawing products away
- Check ventilators are clear
- Monitor flame while water temp is rising
- Monitor that main burner cuts off but pilot stays alight when water up to temperature.
- Run off some hot water to bring main burner on again

Total 5 marks

ANSWER 13

Any 3, 1 mark each

- Less exposure to weather and corrosion
- Less risk of chilling causing condensation
- Less flow restriction by use of gradual bends
- Only one envelope penetration reducing weather-tightness issues

Total 3 marks

ANSWER 14

- (a) Natural gas does not have an odour of its own. Ans to be readily detected. (1 mark)
- (b) The unpleasant smell encourages persons to report a leak. (1 mark)
- (c) (i) Other means of detection such as audible or visual alarms are available.
(ii) Gas suppliers (retailers). (2 marks)

Total 4 marks

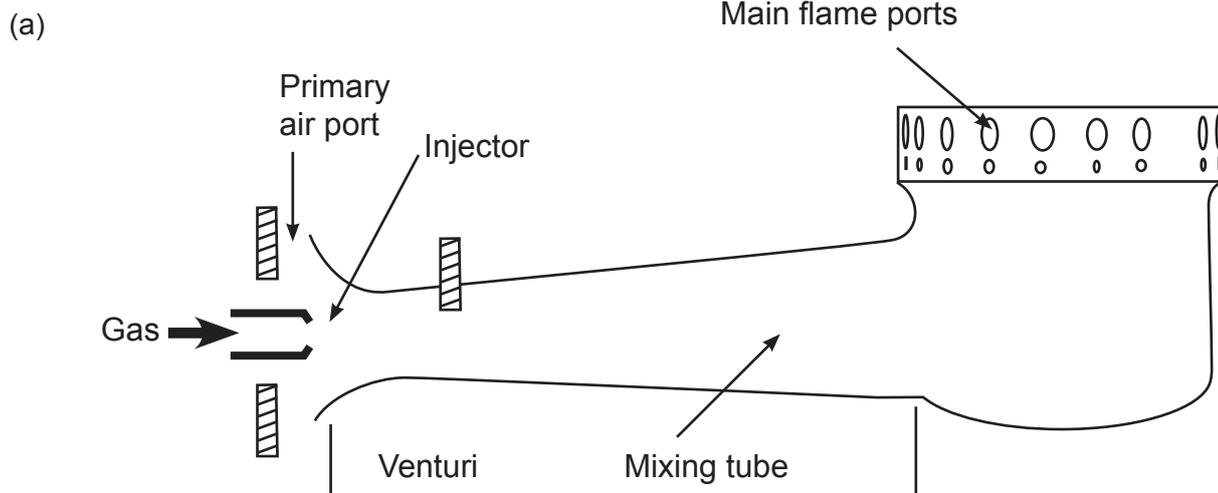
ANSWER 15

- (a) Hold a current gasfitting licence (1 mark)
Work under direction of a craftsman gasfitter (1 mark)
Hold an exemption for water work associated with a gas appliance
OR be a currently licensed registered or craftsman plumber (1 mark)
- (b) Suitable and safe for the appliances and fittings (1 mark)
Available at an adequate flow rate to meet anticipated load (1 mark)
- (c)
- To avoid corrosive or dust effects
 - To avoid physical damage
 - To permit safe operation and maintenance
 - To avoid hazard to building
 - To avoid undue restriction on movement of persons
 - To minimise risks from nearby hazardous materials
 - To minimise risk of harm to persons

(Any four, 1 mark each)

Total 6 marks

ANSWER 16



(½ mark for each of Gas inlet, injector, primary air inlet, venturi, mixing tube, main burner ports and 2 marks for drawing.)

Total 5 marks

