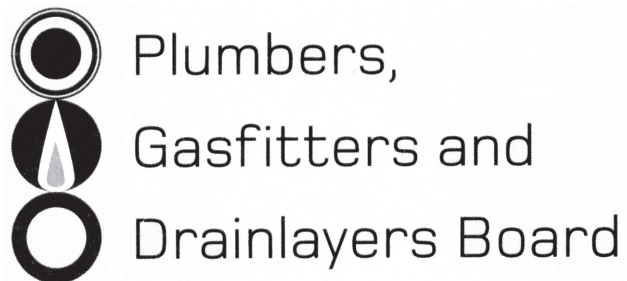


No. 9193



REGISTRATION EXAMINATION, JUNE 2008  
**GASFITTING**

**ANSWER SCHEDULE**



## ANSWER 1

Any TEN:

- 1 Check ventilation – correct size position and not obstructed
- 2 Check down draught diverter – clear of obstructions and pulling
- 3 Check flue – clearances, terminal and general condition
- 4 Check gas pressure- set in accordance with data plate
- 5 Check pilot – size and position relative to main burner
- 6 Check main burner – flame size, shape and colour
- 7 Check and remove any deposits in base of heater
- 8 Check primary air – clear and giving correct flame
- 9 Check flame failure device - senses flame and shuts off gas when flame fails
- 10 Check thermostat – shuts off main burner when set temp reached
- 11 Check no combustibles or flammable materials near heater
- 12 Check that appliance is on a non-combustible and firm base
- 13 Check for seismic restraint and anchoring
- 14 Check for signs of water leaks
- 15 Check water control valves

(ANY 10, ½ mark name of check, ½ mark explanation for each)

**Total 10 marks**

## ANSWER 2

- (a) 1 Meter at high level
- 2 Barrier provided to avoid impact damage (1 mark each) (2 marks)
- (b) (i) Joint is brazed or welded or approved crimp joint
- (ii) Joint is tested before concealment. (½ mark each) (1 mark)
- (c) 1 Facial extremities become red
- 2 Headache and dizziness
- 3 Nausea (3 marks)

**Total 6 marks**

### ANSWER 3

- 1 Available in long lengths (fewer joints)
- 2 Flexible and easy to handle
- 3 Does not suffer from corrosion
- 4 Cost effective

(Any TWO, 1 mark each) (2 marks)

**Total 2 marks**

### ANSWER 4

- (a) (i) Material: Denso and PVC tape (1 mark)
- (ii) Purpose: Denso provides waterproof barrier  
PVC applied over Denso to protect Denso from damage (2 marks)
- (iii) Process: Denso and PVC are both spirally applied to bare pipe, overlapped to ensure double cover (2 marks)
- (b) 1 Pipe subject to higher rate of corrosion due to moisture levels.
- 2 Pipe subject to physical damage. (2 marks)
- (c) Any FOUR:
- 1 Sleeved to prevent shear forces
  - 2 Sealed to prevent leakage into building
  - 3 Sufficient depth to prevent physical damage
  - 4 Avoid imposed load due to differential settlement
  - 5 Protection to stop corrosion
  - 6 Appropriate installation to prevent weakening of structure
  - 7 Labelled for identification purposes.
- (½ mark for each requirement, ½ mark for each reason) (4 marks)
- (d) Any FIVE
- 1 Duct must be ventilated
  - 2 Duct must have openings top and bottom
  - 3 Duct must have access for inspection and maintenance
  - 4 Pipe must be supported and anchored
  - 5 Pipe must be kept away from steam or other hot pipes
  - 6 Allowance must be made for expansion
  - 7 Pipe must be able to be identified
  - 8 Approved separation distance. (Any FIVE, 1 mark each) (5 marks)

- (e) 1 An insulating joint provides electrical separation between buried and above ground pipework corrosion protection systems.
- 2 To protect against stray electrical currents.

(2 marks)

**Total 18 Marks**

**ANSWER 5**

- (a) Index length = 29m

(b)

	Appliance	Input Rating
A	Cooker	53 MJ
B	Clothes drier	16 MJ
D	Continuous flow water heater	
F	Flame effect fire	
I	Continuous flow water heater	
	TOTAL	

(½ mark each 53MJ & 16MJ)

Pipe Run	Length	Gas Flow	Diameter
A-C	5 m	53 MJ	20 mm
B-C	2 m	16 MJ	10 mm
C-E	5 m	53 + 16 = 69 MJ	20 mm
E-D	8 m	199 MJ	25 mm
E-G	10 m	69 + 199 = 268 MJ	25 mm
F-G	8 m	35 MJ	15 mm
G-H	2 m	268 + 35 = 303 MJ	25 mm
I-H	6 m	160 MJ	20 mm
H-J	7 m	303 + 160 = 463 MJ	32 mm

(Each gas flow ½ mark, each diameter ½ mark, total 9 marks)

- (c) Volume of gas in system:

$$\begin{aligned}
 32 \text{ mm pipe (7 m)} &= 0.032 \times 0.032 \times 0.7854 \times 7 = 0.0056 \\
 25 \text{ mm pipe (20 m)} &= 0.025 \times 0.025 \times 0.7854 \times 20 = 0.0098 \\
 20 \text{ mm pipe (16 m)} &= 0.020 \times 0.020 \times 0.7854 \times 16 = 0.0050 \\
 15 \text{ mm pipe (8 m)} &= 0.015 \times 0.015 \times 0.7854 \times 8 = 0.0014 \\
 10 \text{ mm pipe (2 m)} &= 0.010 \times 0.010 \times 0.7854 \times 2 = 0.0002 \\
 \text{TOTAL} &= 0.0220 \text{ m}^3
 \end{aligned}$$

$$0.0220 \times 1000 = 22 \text{ litres}$$

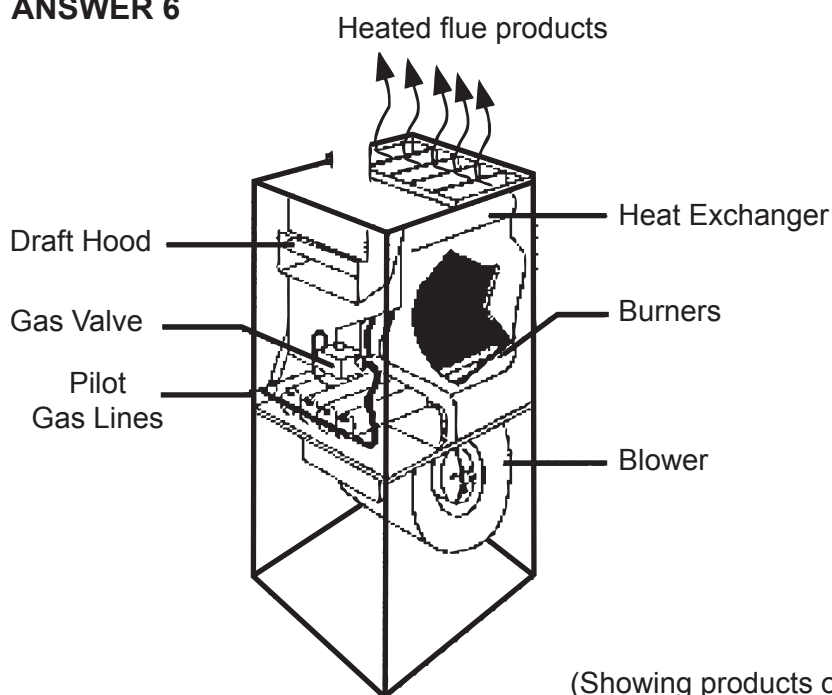
(Each volume ½ mark, final answer ½ mark) (3 marks)

- (d) Amount of gas used:  $463 \text{ MJ} \div 85 = 5.45 \text{ m}^3/\text{hr}$

(1 mark)

**Total 15 Marks**

## ANSWER 6



(Sketch: blower and burner, 1 mark)

(Showing products of combustion into the workspace, 1 mark)

Air from the workshop is blown with a fan across a gas burner. The air is heated as it mixes with and dilutes the products of combustion and then passes back into the workshop.

(3 marks for explanation, 2 marks for sketch)

**Total 5 marks**

## ANSWER 7

(a) Any FOUR:

- 1 Radiant heaters provide heat to a localised area
- 2 They can be placed directly above the work area
- 3 Economy due to not heating air
- 4 Positioned at high level and therefore do not occupy floor-space
- 5 Appliance heats only the persons not the surrounding air
- 6 Appliance is flueless and does not need flueing to the outside

(Any FOUR, 1 mark each) (4 marks)

- |     |   |  |          |
|-----|---|--|----------|
| (b) | 1 | Fresh air                                | (1 mark) |
|     | 2 | A comfortable temperature                | (1 mark) |
|     | 3 | A comfortable level humidity             | (1 mark) |
|     | 4 | Sufficient air movement without draughts | (1 mark) |

**Total 8 marks**

## ANSWER 8

	Control	Type	Purpose
(a)	Flame failure device	Thermoelectric	Monitor pilot flame and shut off pilot and main burner if flame failure occurs
(b)	Thermostat	Snap acting/rod & tube	Senses the temperature of the water and controls the gas burner.
(c)	Pilot adjuster	Needle valve	Adjust the size of the pilot flame.
(d)	Energy cut off device	Bi-metal	Safety shut off for gas if thermostat fails and water overheats.

(½ mark each for type, ½ mark each for purpose)

**Total 4 marks**

## ANSWER 9

- (a) 1      Pipework test      –      Appliances isolated, meter not connected  
Pipework open ends sealed  
The greater of 7kPa 0r 1½ x working      (3 marks)
- 2      Installation test      –      Appliances connected to pipework  
All valves except last ones open  
Greater of 2kPa or woking pressure      (3 marks)
- (b) Any SIX:
- 1      Determine appliance burner pressure from Data plate
  - 2      Add individual burner ratings to determine maximum input
  - 3      Calculate gas rate by dividing input by heating value
  - 4      Turn on and light all burners
  - 5      Check and adjust pressure at test point on outlet of appliance regulator
  - 6      Open oven door fully
  - 7      Check gas flow through meter and compare with calculated gas rate
- (1 mark for each step) (6 marks)
- (c) Flow/hr      =  $0.040\text{m}^3 \times 60 \div 3 = 0.8 \text{ m}^3/\text{hr}$       (1 mark)
- Heat input      =  $0.8 \times 90 = \underline{72.0 \text{ MJ/hr}}$       (1 mark)

**Total 14 marks**

## ANSWER 10

Purpose To stop the flow of gas in the event of too much gas flow through the system. (1 mark)

Explanation It is a normally open valve which closes automatically when a predetermined flow rate in a particular direction is exceeded.

**Total 3 marks**

## ANSWER 11

(a) Biogas is created by an anaerobic microbial decomposition of organic matter (bacteria decomposing the organic matter)

(2 marks)

(b) 1 Methane (CH<sub>4</sub>)

2 Carbon Dioxide (CO<sub>2</sub>)

(1 mark each) (2 marks)

(c) 1 Propane

2 Butane

(2 marks)

(d) A gas which does not react with any other substance

Any ONE: Carbon Dioxide, Nitrogen, Argon, Helium

(2 marks)

**Total 8 marks**

## ANSWER 12

Any SEVEN

1 Evacuate all people to a safe distance

2 Isolate the gas supply

3 Identify and remove or isolate all ignition sources

4 Ventilate all affected areas to disperse gas

5 Notify emergency support services if required

6 Notify any owner or occupier affected

7 Cordon area off/place warning signs

8 Contact service provider

(Any SEVEN, 1 mark each)

**Total 7 marks**









