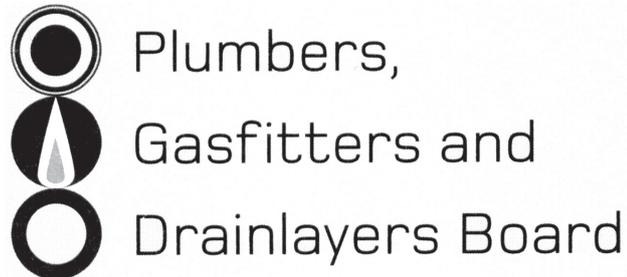


No. 9193



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:

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

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

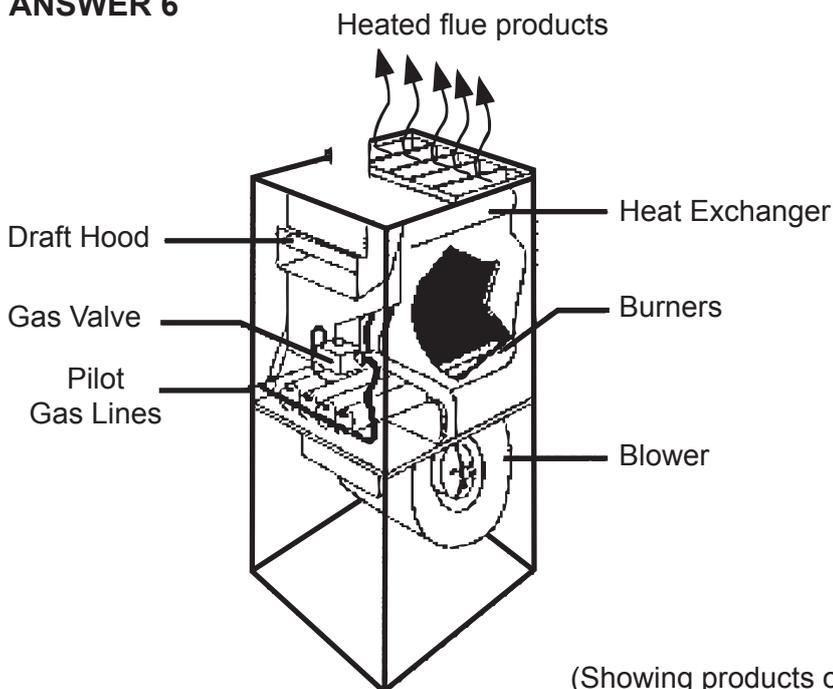
(Each volume ½ mark, final answer ½ mark) (3 marks)

- (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 Or 1½ x working (3 marks)
- 2 Installation test – Appliances connected to pipework
All valves except last ones open
Greater of 2kPa or working 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 (CH₄)
2 Carbon Dioxide (CO₂) (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

