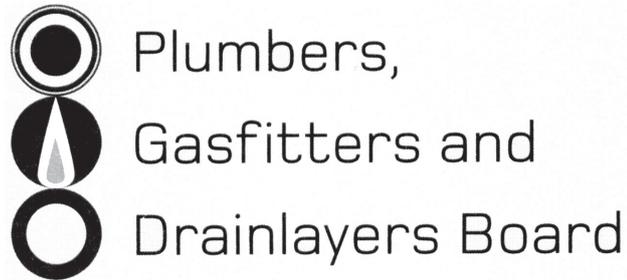


No. 9193



REGISTRATION EXAMINATION, NOVEMBER 2015
LICENSED GASFITTER

ANSWER SCHEDULE

ANSWER 1

- (a) An appliance where the air for, and the products from combustion, do not come from or enter the room in which the appliance is located (1 mark)
- (b) A situation in which combustion takes place outside the combustion chamber of an appliance (1 mark)
- (c) Minimum and maximum concentration of fuel gas in air, which is required for combustion to take place (1 mark)
- (d) A safety system that requires manual reset upon activation (1 mark)
- (e) The pressure at which a regulator remains under a no-flow or no-load condition (1 mark)
- (f) Ventilation provided by openings created specifically for the purpose of allowing air to naturally flow through an area (1 mark)
- (g) Ventilation provided by gaps around doors and windows etc. (1 mark)

Total 7 marks

ANSWER 2

- (a) Drawing to show any FIVE (1 mark each)
- Control board (PCB)
 - Ignition electrode
 - Flame rod over burner, with gap
 - Burner
 - Earth circuit
 - Activation switch
 - Power supply to solenoid valve
 - Solenoid
- (5 marks)
- (b) Any EIGHT (½ mark each)
- Switch is activated
 - Ignition starts
 - An AC current is passed down the high tension lead to the flame rod
 - Solenoid valve opens
 - Flame ignites
 - The AC current passes through the flame to the burner
 - While passing through the flame the AC current is partially converted to DC
 - The DC current passes from the burner through the earth circuit back to the PCB
 - The PCB keeps the solenoid valve open while the DC current is maintained
 - The PCB closes the solenoid valve if the flame goes out the current stops flowing
- (4 marks)

- (c) Any TWO (1 mark each)
- Thermoelectric
 - Mercury vapour expansion
 - UV

(2 marks)

Total 11 marks

ANSWER 3

(a)

Test Pressure	Stabilisation Time	Test Time	Maximum permitted pressure loss
9 kPa (1 mark)	2 mins (½ mark)	5 mins (½ mark)	Nil (1 mark)

(3 marks)

- (b) Any THREE (1 mark each)

- Pipework still cooling.
- Sun or cloud.
- Atmospheric pressure fluctuations.
- Leaking test gear.
- People interfering with the pipework while test is in progress.

(3 marks)

- (c) Leakage test before work begins

Pipework test of any new pipework

Installation leakage test of old and new pipework and appliances

Final connection test after test equipment is removed.

(4 marks)

(d)

Name of Test	Gas tightness test (measuring pressure loss) (1 mark)		
Test pressure	14 kPa (1 mark)		
Stabilisation time	2 mins (½ mark)	Test time	5 mins (½ mark)
Maximum permitted pressure loss	Nil (1 mark)		

(4 marks)

Total 14 marks

ANSWER 4

	Item		Item
A	Manual gas valve	H	Low gas pressure detector
B	Pressure point	I	Slow open fast closing two stage valve
C	Manual reset valve	J	Vent valve
D	Pressure regulator with OP protection	K	Fast open fast closing valve
E	Filter	L	High gas pressure detector
F	Pilot feed line (pipe)	M	Flow rate control valve
G	Pressure regulator	N	Burner (flame)

Total 7 marks

ANSWER 5

(a) Any FIVE (1 mark each)

- The scaffold is firm with braces fitted correctly
- The mobile scaffold is set up on firm level ground
- All wheels on the scaffold are locked with the wheels are turned out
- The decking on the scaffold is fully planked out and secure
- Access is from a ladder within the frames of the scaffold never climb up the outside
- Scaffold does not exceed the height restriction (the scaffold should be no higher than 3 times the width of the base and 1.5 times the length of the base at the narrowest point)
- Check for overhead power lines
- Another means of fall prevention (such as a safety harness) is used where guardrails can't be fitted
- Use kick guards/toe boards

(5 marks)

(b) Any TWO (1 mark each)

- An isolating transformer with a voltage between conductors not exceeding 230 volts
- An earth circuit that is monitored if it is broken or disconnected, the power to the appliance will automatically be disconnected
- A source to earth connection so that the earth voltage does not exceed 55 volts
- A residual current device (RCD)

(2 marks)

(c) Any FOUR (1 mark each):

- Ensure your safety. Do not approach a patient if they may still be connected to electricity
- Turn off power supply
- Call 111 for an ambulance if they are unconscious or are injured or unwell
- If unconscious and not breathing, place on back and start CPR
- If unconscious and breathing place on side
- If conscious, check for injuries or burns (see tips on burns)
- Warn others in the area
- Notify WorkSafe New Zealand if required

(4 marks)

Total 11 marks

ANSWER 6

(a)

Item	Unit
Speed	km/h
Heating value of gas	MJ/m ³
Carbon dioxide in flue gas	parts per million
Thermal expansion	mm/°C
Flame speed	mm/s
Gas appliance energy consumption	MJ/h

(5 marks)

(b) (i) 44.31 MJ/h (1 mark)

(ii) 1.25 kPa (1 mark)

Total 8 marks

ANSWER 7

(a) (i) Carbon monoxide poisoning (1 mark)

(ii) A hole in the heat exchanger (1 mark)

(iii) Any TWO (1 mark each)

- Corrosion due to condensation or flue leakage
- Burner flame not positioned correctly and heat has stressed the heat exchanger
- Overpressure of gas supply has caused excess tension on and cracking of the heat exchanger

(2 marks)

(b) Any TWO (1 mark each)

- The air around the appliance is contaminated
- The area that the appliance is located in has inadequate air volume
- The manufacturer requires it to be done

(2 marks)

Total 6 marks

ANSWER 8

- (a) $6 \times 40 = 240\text{MJ/h}$ (1 mark)
 $240 \div 95 = 2.52 \text{ m}^3/\text{h}$ (1 mark) (2 marks)
- (b) $2.52 \times 25 = 63$ (1 mark)
 $6 \times 10 = 60$ (1 mark)
 $63 - 60 = 3 \text{ m}^3/\text{h}$ (1 mark) (3 marks)
- (c) $240 \times 9 = 2160$ (1 mark)
 $2160 \times 14 = 30240$ (1 mark)
 $30240 \div 2200 = 13.7 (14)$ ($\frac{1}{2}$ mark)
So 14 cylinders ($\frac{1}{2}$ mark) (3 marks)
- Total 8 marks**

ANSWER 9

- (a) There is no flow as the pressure under the diaphragm equals the downward force set by the spring, which in turn pushed the washer fully onto the orifice seat. Lock up pressure. (3 marks)
- (b) There is gas flow as the lack of pressure on the outlet has dropped the diaphragm, due to the downward force of the spring, which in turn pulls the washer away from the orifice seat. (3 marks)
- (c) The washer cannot seal correctly due to a foreign object on the washer. The over-pressure lifts the diaphragm overpowering the force of the spring, allowing the excess gas pressure to exit though the vent. (3 marks)
- Total 9 marks**

QUESTION 10

- (a) (i) Any ONE (1 mark)
- To avoid dissimilar metals being in contact
 - To avoid electrolysis
 - To avoid galvanic cell action (1 mark)
- (ii) The copper will corrode (corrosion) (1 mark)
- (b) The copper can become fatigued/work hardened, causing it to fracture or split (1 mark)
- Total 3 marks**

QUESTION 11

- (a) The boiling point of butane is high (close to ambient temperature) compared with propane (1 mark)
- (b) Natural gas does not have an odour of its own, so it can be readily detected (1 mark)
- (c) The unpleasant smell encourages persons to report a leak (1 mark)
- (d) • Carbon dioxide
• Water vapour (2 marks)
- (e) Any TWO (1 mark each)
• Carbon
• Carbon monoxide
• Water vapour (2 marks)

Total 7 marks

SECTION B

1. E A thermopile is a collection of thermocouples within one probe
2. D Should
3. D Fan interlock
4. A Carbon and hydrogen
5. D Two 15 kg LPG cylinders
6. B 150 mm
7. C 150 mm
8. B 32 mm
9. A 7 kPa
10. E WorkSafe New Zealand

Total 10 marks