No. 9196

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2010

CERTIFYING GASFITTER

ANSWER SCHEDULE

ANSWER 1

(a) Any THREE of:

Newly constructed installations
Extensions, additions and replacements to existing installations
Alterations that reposition pipework or change operation
Repairs after a notifiable accident

(3 marks)

(b) 15 working days (1 mark)

(c) Any FOUR of:

Manufacturer
Model Number
Type of gas
Working pressure
Input rating
Standard to which constructed

(½ mark each), (2 marks)

(d) 1 Advise the owner or occupier
2 Advise the Secretary of Energy/Energy Safety Service

(2 marks)

(e) Work is certified by the craftsman gasfitter

(1 mark)

Total 9 Marks

ANSWER 2

(a) 1 Impressed current:– Small electric current applied to wrapped steel pipe to prevent corrosion from occurring at breaks in the wrapping.

2 Sacrificial Anode:– Magnesium or zinc anode in a block or ribbon attached to pipe and buried alongside wrapped steel pipe so that anode corrodes in preference to pipe at breaks in the wrapping.

(2 marks)

(b) (i) Apply pressure correction

(1 mark)

(ii) 1 By automatic correction device
2 Apply pressure factor (2 marks)

(c) Bedrooms
Bathrooms
Saunas
Toilets
Hallways
Residential garages (½ mark each), (3 marks)

(d) Any TWO:

Must be at least 1.5m from a doorway if a space heater is to be used
300mm above ground level if outside
Pointed downwards to avoid ingress of dust, dirt or water

(2 marks)

(e) Any FIVE:

In a lift well
In a clothes chute
In a rubbish chute
In a fire hydrant cabinet
In a fire hose reel cabinet
In a fire exit way or safe path
In a fire control room. (5 marks)

(f) Any FOUR of:

Pipework run externally to the caravan as much as possible
Pipework protected from corrosion and stone chip damage
Continuous runs from regulator to branch point and branch to appliance
Made of annealed copper or stainless steel
Clipped with soft lining clips to reduce vibrations
Fitted with grommets where it passes through floor to appliance.
Refer NZS 5428 (4 marks)

Total 19 marks

ANSWER 3

(a) Room volume = 5.000 × 3.200 × 2.700 = 43.200 m^3 (½ mark)

Heat input = 43.200 × 0.360 = 15.55 MJ/h. (½ mark)

$\frac{15.55}{3.6}$ = 4.32 kW (1 mark)

(2 marks)

(b) Min room volume = $\frac{12}{0.4}$ = 30 m^3 (1 mark)

Min floor area = $\frac{30}{2.400}$ = 12.500 m^2. (1 mark)

(2 marks)

(c) Any FOUR:

Burners and pilots at least 450 mm above floor level
450 mm high bund wall around appliance
Garage provided with high and low level permanent ventilation
Appliance protected against physical damage
Warning notice about flammable vapours affixed

(4 marks)

(d) Isolate the appliance and gas supply
Pressurise the pipework to at least 1½ times working pressure or 7 kPa
Allow time for stabilisation
Monitor pressure loss over time
Re-connect and test connections
Ensure open ends are plugged or capped
Isolate pressure source
(Refer Appendix D4 of NZS 5261) (½ mark each)

(3 marks)

(e) Any FIVE:

Aeration of burner
Pull on flue
Ventilators in place
Appliance clear of combustibles
On a firm base
Seismic restraint fitted
Safety devices operate
Correct type of gas for appliance

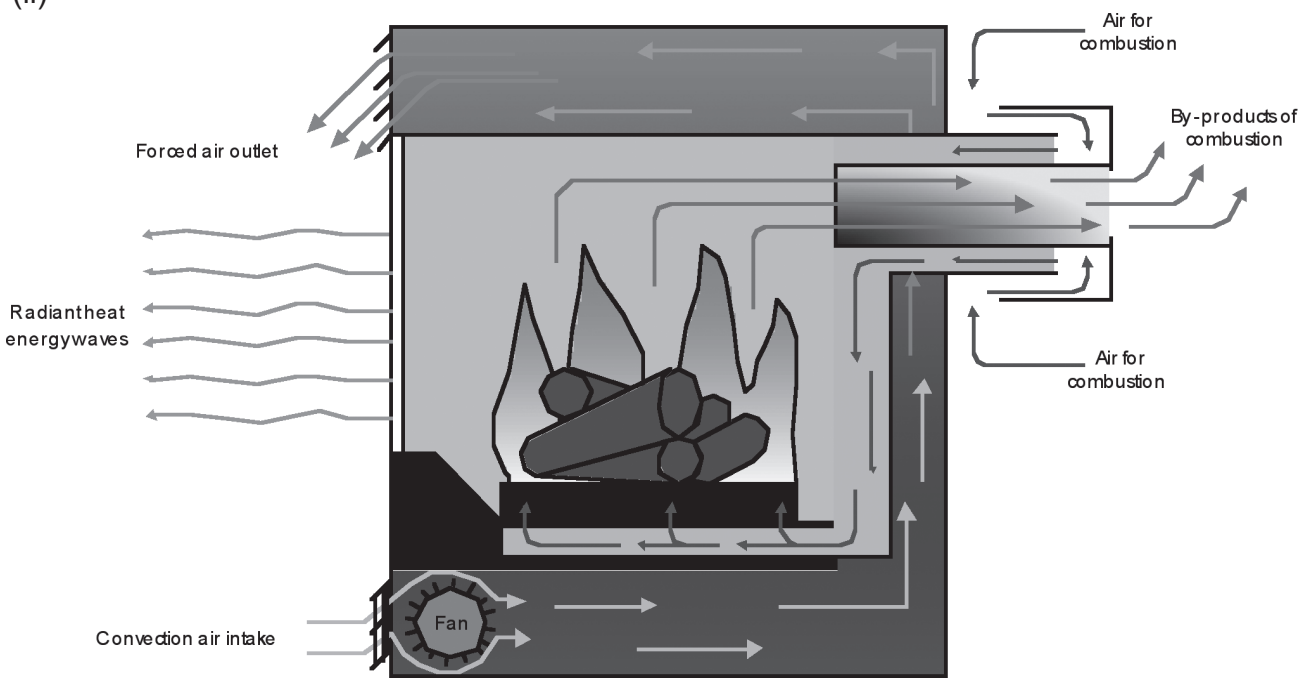
(5 marks)

(f) (i) Any TWO:

Appliance clear of combustibles such as curtains, furniture and others
Avoidance of physical damage to appliance
Positioning of the flue terminal

(2 marks)

(ii)



Any FOUR:

Air for combustion in
Flue products out
Flue spigot extends past inlet for combustion air
Outer flue section for combustion air in
Flue to be graded (NB not shown on diagram)

(4 marks)

Total 22 Marks

ANSWER 4

(a) Any FIVE:

Capacity of heater compared with usage
Insulation around the heater
Insulation of hot water pipe work
Standing heat losses
Climatic conditions/inlet water temperature
Location relative to hot water usage
Pattern of hot water usage
Maintenance and servicing
Flue size and routing
Gas pressure combustion air

(5 marks)

(b) Any EIGHT:

Plan of installation
Pipe work size and supports
Pipe work pressure test results
Installation pressure test results
Gas rate check and burner pressure setting
Checks and tests performed on safety devices
Checks for flue spillage and pull
Combustion checks carried out
Check water flow rate
Insulation installed
Any problems that arose during commissioning
Consumer instructed in operation and provided with documentation
Clearances

(½ mark each), (4 Marks)

Total 9 Marks

ANSWER 5

(a) Any SIX of the following steps, 1 mark each:

1 Prepare a written procedure for the purge, as volume is greater than 30 litres
2 Identify a safe purge area outside
3 Use a hose no larger than 25mm diameter to vent into purge area
4 Keep all potential sources of ignition clear of purge area
5 Purge air from main line with either inert gas or air
6 Purge all individual branches until whole installation is purged
7 Record purging details

(6 marks)

(b) Must only be used in conjunction with a forced extraction ventilation system
All make up air must be drawn from outside
Make Up Air Heater burner must only work when extraction fans are running
Suitable for heating large commercial/industrial areas

(4 marks)

(c) Flue not interconnected with any other type of appliance
Flue material not less durable than 1.26 mm mild steel (thicker than normal)
Flue no closer than 450 mm to unprotected combustible material
Flue to outside atmosphere without risk of downdraught.

(½ mark each), (2 marks)

(d) Isolating valve and union on each appliance
Valve located accessible for service
Main isolation valve for total gas source.

(3 marks)

Total 15 Marks

ANSWER 6

(a) (i) Natural draught radiant burner requires gas at pressure and inspirates the primary air.

(ii) Forced draught nozzle mix burner requires pressurised air and pressurised gas.

(iii) Air blast burner requires pressurised air and the gas is aspirated at zero pressure.

(3 marks)

(b) (i) The two mix in the mixing tube and combustion takes place with secondary air at the burner.

(ii) The two mix in the nozzle of the burner.

(iii) The two mix in the aspirator and no secondary air is needed for complete combustion.

(3 marks)

(c) Any THREE:

Loss of gas supply
Flame failure
Loss of air flow
Back pressure due to flue blockage
Loss of power
Gas over-pressure

(3 marks)

(d) When AC supply is passed to the flame rod electrode positioned in a flame a DC supply passes through the flame to earth. (Rectification).

(1 mark)

When the flame is established the DC flow is detected and passes to the controller which then holds the gas valve open.

(1 mark)

When the flame is extinguished the DC flow stops and the controller shuts the gas off.

(1 mark)

(3 marks)

(e) Orifice – To allow a greater flow for less differential pressure

Spring – To provide greater resistance to valve movement (4 marks)

Total 16 Marks

ANSWER 7

(a) Any SIX:

Shape of flue – circular or non circular
Input rating of appliance
Length of the flue allowing for lateral runs
Material of construction – heat loss
Position – heat loss
Size of flue spigot on appliance
Any recommendations of appliance manufacturer
Termination point

(½ mark each), (3 marks)

(b) Any FOUR:

Insulate flue
Protect flue from exposed area,
Select shortest route to atmosphere
Avoid Offsets/ Avoid lateral runs
Increase flow with greater dilution
Material the flue is made of

(4 marks)

(c) Any TWO:

Should be direct to outside air
Low level one located to avoid blockage (flooding)
High level one near as possible to ceiling
If only high level then duct to low level
For exposed locations located away from strong winds

(½ mark each), (1 mark)

(d) Gas consumption T = 1050 × 3.6 = 3780 MJ/h (½ mark)

F = 150 (½ mark)

Free ventilation area A = F × T = 150 × 3780
= 567,000mm^2 (1 mark)

(2 marks)

Total 10 Marks