No. 9196

Plumbers,
Gasfitters and
Drainlayers Board

CRAFTSMAN EXAMINATION, NOVEMBER 2009

GASFITTING

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

(1 mark each), (3 marks)

(b) All appliances and fittings worked on are safe and in accordance with the Gas Act and Gas Regs

The work done does not make other parts unsafe or non compliant with the Act and Regs

The work does/does not include work on an appliance or fitting imported or manufactured by a person for their own use.

(2 marks for each statement)

Total 9 Marks

ANSWER 2

(a) Any five of the following, 1 mark each

- Capacity of heater compared with water demand
- Insulation around the heater
- Insulation of hot water pipe work
- Standing heat losses
- Climatic conditions/inlet water temperature
- Location of appliance relative to hot water usage
- Pattern of hot water usage
- Maintenance and servicing of appliance
- Insufficient gas supply

(5 marks)

(b)
- Input rating not exceed 0.4MJ/h per m3 of room volume
- Not fitted under shelves or cupboards
- Flue outlet not less than 600mm below ceiling
- Side clearances not less than 150mm

(One mark for each correct statement), (4 Marks)

Total 9 Marks

ANSWER 3

- Must be piping layout plan on site showing emergency manual shut of valve locations
- Must have manual shut off valve for each riser
- Must have manual shut off valve at each lateral branch close to riser
- Must have allowance for expansion and contraction of riser
- Sleeved where riser passes through floor/ceiling slabs
- Strain minimised at lateral/riser junctions

(Any five, 1 mark each)

Total 5 Marks

ANSWER 4

(a) The longest run of pipework is: H-B at 12.25 meters

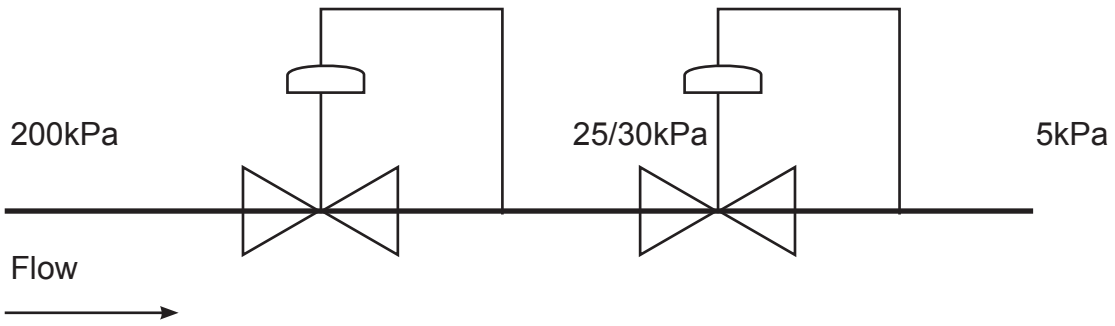
The allowable pressure drop is: 0.33 ÷ 12.25 = 0.0269 kPa/m

(b) Table 2

Pipe Run	Length (m)	Gas Rate (MJ/hr)	Pipe Size (mm)
A-C	1	28.08	10
B-C	3.5	75.6	15
C-D	2	28.08 + 75.6 = 103.68	20
E-D	1.75	88.2	20
D-F	5	103.68 + 88.2 = 191.88	20
G-F	2.5	201.6	20
F-H	1.75	191.88 + 201.6 = 393.48	25

(½ marks per correct answer), (8 marks)

ANSWER 5



(1 mark for layout, 1 mark for symbols, 1 mark for flow, 1mark for 200 and 5, I mark for 25/30)

Total 5 Marks

ANSWER 6

(a) Any EIGHT of:

- Ensure all appliances connected.
- Ensure pipework disconnected from meter or cylinder
- Open all valves on pipework and appliances, leaving only final ones closed
- Determine working pressure for installation
- Attach pressure gauge and pressurise with air to working pressure or 2 kPa whichever is greater
- Allow a pressure stabilisation period of at least 2 minutes
- Measure system pressure and note time
- Allow five minutes and then check pressure
- Measure pressure loss.
- Record test details on Certificate.

(½ mark each), (4 marks)

(b)
- Quarter turn shut off
- Fire safe seats
- Pipe connection type
- Pipe size
- Pressure rating
- Durability
- Compatibility with pipework

(Any six, ½ marks each), (3 marks)

Total 7 Marks

ANSWER 7

(a)
- Check the appliance pressure and adjust
- Check aeration and adjust
- Check consumption on test dial of meter
- Check for smooth ignition and adjust
- Check that the flame failure shuts appliance down
- Check any other controls such as thermostat or tilt switch
- Check for products spillage

(Any six, ½ mark for each)

(b)
- The operating manual
- Use of appliance
- Any hazards such as items close to appliance
- Maintenance requirements
- Safety controls
- Where to turn off the gas at the meter
- Identify the smell of gas for the consumer

(Any six, ½ mark each)

Total 6 Marks

ANSWER 8

(a) (i) 200mm (1 mark)

(ii) Periphery of nearest burner (1 mark)

(b) (Any two of the following, 2 marks each)

- 5 mm Ceramic tiles, backed by 10mm gib or 6mm fibre cement board
- 5 mm Toughened glass, backed by 10mm gib or 6mm fibre cement board
- Sheet metal 0.4mm thick, backed by 12mm fibre cement board or 6 mm fibre cement board over 10mm gib.

(4 marks)

(c) 150mm (1 mark)

Total 7 Marks

ANSWER 9

(a) Any THREE of:

- Discharge product to outside atmosphere
- Metal or other smooth internal surface
- Flue not used by any other appliance
- If over 900 mm in length, has access near appliance for lint removal

(1 mark each), (3 marks)

(b) Efficiency = $\frac{\text{output}}{\text{input}}$

Heat input = $\frac{5000 \times 100}{60}$ = 8333 MJ/h (1 mark)

Gas input flow rate = $\frac{8333}{42}$ = 198 m^3/h (1 mark)

(2 marks)

Total 5 Marks

ANSWER 10

- Located outside
- Not under the building
- Away from openings into building
- So that any leak does not collect under building
- 2m clear from an ignition source
- 3m clear from flammable materials
- Located to avoid flooding
- Clear of impact damage
- Restraint for bottles
- At or above ground level
- Subject to any conditions imposed under the dangerous goods licence
- 1m from a drain

(Any eight – ½ mark each)

Total 4 Marks

ANSWER 11

(a)
- Grille facing downward,
- 2m above floor level,
- 75mm clearance from combustible surfaces
- 150 mm clearance between air intake and a neighbouring structure

(1 mark each, 3 marks)

(b)
- Clearance to ensure surfaces and wiring etc does not reach 65ºC above ambient
- Clear of sprinkler system overhead crane or any other equipment likely to cause interference

(1 mark each, 2 marks)

Total 5 Marks

ANSWER 12

(a) (i)
- Fan faulty,
- Electrode setting incorrect,
- Cracked electrode porcelain,
- High tension lead disconnected or damaged,
- Transformer faulty,
- Gas supply interrupted.
- Power supply interrupted. (Any three), (3 marks)

(ii)
- Gas supply interrupted,
- Pilot valve fails to open,
- Pilot isolating valve closed,
- Power supply interrupted.
- Insufficient gas supply (Any three), (3 marks)

(b) 1. Avoids the need for a long flue.
2. Ensures products of combustion are dispersed rapidly avoiding spillage

(2 marks)

Total 8 Marks

ANSWER 13

(a) Pre-purge – Air supply proved and combustion chamber purged (2 marks)

(b) Start gas ignition – Pilot gas valve open and igniter energised (2 marks)

(c) Start flame proving – Pilot flame sensed and igniter de-energised (2 marks)

(d) Main flame ignition – Main burner valve open, pilot flame valve open, main flame ignited (2 marks)

(e) Main burner run – Pilot valve closed, and main flame sensed (2 marks)

Total 10 Marks

ANSWER 14

(a) Any SIX of:
- 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
- Appliance manufacturer's specifications

(½ mark each), (3 marks)

(b)
- Flue should be sleeved, or twin walled
- Flue made of corrosion resistant material
- Spaced clear of combustible materials - 10mm
- Cavity shall be ventilated to allow movement of air

(4 marks)

(c) Any five, 1 mark each
- Positioned to provide fresh air and to dispose of products
- 1500 mm clearance from openings (doors and windows)
- 500mm clearance from ignition sources (electric meter/fuse box)
- 300 mm clearance below eaves
- 300mmm clearance from corners
- Well clear of vegetation
- 1000mm from LPG cylinders

(5 marks)

Total 12 marks