No. 9193

Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2012

LICENSED GASFITTER

ANSWER SCHEDULE

ANSWER 1

(a) (i) An integral part of a standard.
(ii) Only for information and guidance. (2 marks)

(b) Any FOUR (½ mark each)
- New pipework.
- New appliances.
- Before work commences (existing).
- Reconnection of a gas supply.
- After work has been done on an installation. (2 marks)

(c) (i) Before carrying out an installation/leakage test if the gas source is not able to be disconnected.
(ii) An appropriate gauge is connected and the gas supply valve is turned fully off the gauge is observed to check that the pressure does not increase. An increase indicates that the gas supply valve is letting by.
(3 marks)

- A test that is carried out to confirm the meter control valve is not letting gas pass into the installation pipe work when in the closed position.

Total 7 marks

ANSWER 2

(a)

Term	Description
Lock up Pressure	The regulator closed with no gas flow.
Chatter	Noise generated by constant pressure fluctuation regulator moving open and closed at a fast rate trying to adjust/compensate for changes or oversized breather hole.
Token relief	A portion of incoming gas to regulator can be released if gas exceeds pre-set pressure.
Full relief	All incoming gas to regulator can be released if gas exceeds pre-set pressure.
Over pressure shut off	Over pressure shut off stops gas supply if pressure exceeds pre-set pressure.
Under pressure shut off	Under pressure shut off stops gas supply if pressure falls below pre-set pressure.

(6 marks)

(b)

Check	Before or after?
Retest the pipework at higher pressure	Before
Check the appliance regulators are rated for the pressure increase	Before
Check the appliance operating pressures/re-commission	After

(3 marks)

Total 9 marks

ANSWER 3

(a) Drawing to include (½ mark each)

- Electrode/flame rod.
- HT leads from electrodes to PCB.
- Ignitor electrode.
- PCB/CPU/Controller.
- Burner.
- Flame.
- Earth or earth circuit.
- Wires from PCB to solenoid valve.
- Solenoid valve.
- Gas Supply. (5 marks)

(b)

- PCB starts Ignition/electrode spark.
- PCB powers gas valve open.
- An electrical current (AC) being sent from a PCB through a HT lead and flame rod.
- Flame lights.
- Flame rod is located in a burner flame.
- The AC current is partially rectified to DC as it passes through the flame.
- The DC current travels through the burner to earth.
- DC current travels back through the earth circuit to the PCB. (4 marks)

(c) Any FOUR (½ mark each)

- Piezo.
- Electronic spark.
- HIS/Glow coil.
- Matches/manual ignition.
- Flash tubes. (2 marks)

(d) A thermistor is a temperature dependant resistor.
A current is passed through the thermistor.
A controller measures the <u>resistance</u>.
As <u>temperature</u> increases so does the resistance of the thermistor. (2 marks)

Total 13 marks

ANSWER 4

(a)

Description	No.	Description	No.
Aeration adjustment	J	Pilot adjustment	F
Thermocouple	K	Burner regulator adjustment	D
Pilot head	L	Thermostat control	G
Pilot Tube	H	Energy cut out	A
Thermal fuse	I	Thermostat probe	B
TEFFD button	C	Gas valve	E

(6 marks)

(b) Any SEVEN (1 mark each)

- Thermostat set too high.
- Relief valve emptying water.
- Hot water pipework leak.
- Gas leakage.
- Calcium deposit build up in tank.
- Baffle has disintegrated.
- Burner incorrectly positioned.
- Blocked burner.
- Instalation pressure changed.
- Primary air restricted. (7 marks)

(c) Once the ECO reaches a predetermined temperature/overheat it opens breaking the circuit of the flame failure thermocouple which causes the electromagnetic valve to shut the gas supply.

(2 marks)

(d) To slow the aero-motive force of the combustion products so more heat can be exchanged into the water jacket raising the efficiency of heat transfer.

(2 marks)

Total 17 marks

ANSWER 5

(a) 7725.621 - 7683.573 = 42.048 (1 mark)
42.048 × 40 = 1681.92 (1 mark)
1681.92 ÷ 6 = 280.32 (1 mark)
280.32 ÷ 3 = 93.44 MJ/hr (1 mark)

(4 marks)

(b) Any TWO (1 mark each)
- Pressure set too high.
- Oversized injector.
- Manufacturer data plate information inaccurate. (2 marks)

Total 6 marks

ANSWER 6

(a) Drawing to show (1 mark each):
- Primary flue.
- Secondary flue.
- Down draught diverter.
- Cowl. (4 marks)

(b) Any TWO (½ mark each)
To remove products of combustion.
To create draught encouraging ventilation airflow.
Dilute the flue gasses.
Prevent downdraught. (1 mark)

Total 5 marks

ANSWER 7

(a) Any THREE (1 mark each)
- POL.
- QCC.
- COSAN/Clip on.
- Camping/ companion/ 3/8”BSP left hand thread.
- CGA555.
- Severt.
- Cadac. (3 marks)

(b) Meter installed at high level.
Barrier provided to avoid impact damage. (2 marks)

Total 5 marks

ANSWER 8

(a) $2 \times 1 \times 2.4 = 4.8$ (1 mark)
$3 \times 2 \times 2.4 = 14.4$ (1 mark)
$14.4 + 4.8 = 19.2\ m^3$ (1 mark)
$19.2 \times 3 = 57.6$ MJ/h (1 mark)

(4 marks)

(b) (i) Carbon Monoxide. (1 mark)

(ii) Any FOUR (1 mark each)
- Headache.
- Dizziness.
- Nausea/vomiting.
- Flu-like symptoms, fatigue /drowsiness.
- Shortness of breath on exertion.
- Chest pain/abdominal pain.
- Confusion/depression /hallucinations /agitation/impaired judgment.
- Fainting.
- Seizure. (4 marks)

Total 9 marks

ANSWER 9

- Type of gas.
- Pressure.
- Environment. **Total 3 marks**

ANSWER 10

Diagram to show:
- Hard pipe brought out from under appliance to higher level.
- Flexible hose.
- Bayonet fitting drawn at high level.
- Bayonet at high level on wall.
- Hose restraint chain.
- Tip over restraint. **Total 6 marks**

SECTION B

1	A	To stop stray currents passing between the gas service pipe and the consumer pipework.
2	E	A thermopile is a collection of thermocouples within one probe.
3	A	Long screw connectors.
4	A	It is only used for vent piping.
5	D	60°C
6	D	Fan interlock.
7	C	On Regulator and Pigtail valve connections.
8	B	It will melt when exposed to extreme heat.
9	B	Carbon & Hydrogen.
10	A	Regulator relief vent.
11	A	Being stored under pressure.
12	E	The latent heat from the metal surface of the cylinder.
13	D	More accurate delivery pressure than a single stage regulator.
14	C	The water vapour contained in the combustion gases cooling.
15	D	Natural draught appliances.
16	E	750
17	B	The hourly gas consumption of the air curtains in the area exceeds 0.2 MJ/ m^3.
18	E	0°C
19	A	25:1
20	C	5 mm

Total 20 marks