No. 9192

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2017

TRADESMAN PLUMBER

ANSWER SCHEDULE

ANSWER 1

Any FIVE (1 mark each)
Temperature.
Friction / flow rate / velocity.
Ultraviolet light.
Pressure of fluid.
Not making allowance for expansion/contraction – incorrect support.
Chemicals in the water supply.
Amount of copper in the system.

Total 5 marks

ANSWER 2

Condition	Diagram
No fault with water flowing	b
Back pressure with faulty second check valve	c
Back syphonage	a
No fault in static situation	e

(1 mark each), (4 marks)

(b) Back pressure back flow is back flow that occurs due to a higher water pressure being achieved downstream (e.g. installation of a pump) causing the water to be forced back against the normal flow direction and into the supply line.

(2 marks)

(c) Back syphonage back flow is back flow that occurs when the water supply pressure drops (e.g. from water main being cut/damaged) and siphons water back from the downstream water pipe installation.

(2 marks)

(d) RPZD can be used in a toxic environment. (1 mark)

Total 9 marks

ANSWER 3

Oscillation

Description Air movement in the pipe changes the pressure within the vent pipe and causes the water in the trap to move, this can cause the water to spill over the weir and the trap seal to be lost.

(2 marks)

Remedy Change the location of the vent terminal OR shelter the terminal from wind eddies.

(1 mark)

Induced siphonage

Description Two fixtures connected to one discharge pipe. When one fixture discharges at full bore it can reduce the pressure in the discharge pipe and suction the seal out of the other fixture.

Remedy Run the fixtures with two separate discharge pipes OR install a vent on the combined discharge pipe.

Compression

Description When a fixture upstream is discharged the pressure in front of the discharged water can be increased, this increase in pressure can push foul gases through the water in the downstream trap and enter the room.

Remedy Run the discharge pipes separately OR avoid restricted zones when connecting two discharge pipes together OR install a vent in the correct location to relieve the pressure.

Momentum

Description When a trap is installed with a vertical drop between the fixture outlet and the trap the water can gain too much speed and travel through the trap, leaving no or little water behind to maintain the seal.

Remedy Install the trap directly on to the fixture outlet.

(12 marks)

(b) Any FIVE (1 mark each)

s trap
p trap
Adjustable inlet trap
Supplementary trap
Bottle trap
Grease trap.
Floor waste gully trap.
Deep seal trap.
Resealing trap.
Easy clean trap.

(5 marks)

Total 17 marks

ANSWER 4

(a) The underwater/outlet valve washer or seat is damaged. (1 mark)

(b) Any TWO (1 mark each)
The seat of the valve is damaged.
The float/arm is not adjusted correctly.
The ball is water-logged. (2 marks)

(c) Any THREE (1 mark each)
Pressure reducing valve faulty (washer or seat).
Higher pressure cold back feeding through mixer tap.
HWC thermostat faulty and cylinder boiling.
Pressure reducing valve spring adjusted incorrectly. (3 marks)

Total 6 marks

ANSWER 5

A	Discharge Stack Vent	E	Relief vent
B	Fixture vent pipe	F	Discharge stack
C	Fixture discharge pipe	G	Branch discharge pipe
D	Branch vent	H	Waste pipe

Total 7 marks

ANSWER 6

Vol = $\pi \times R^2 \times H$
= $\pi \times 3.7^2 \times 4.7$ (3 marks)
= 202.03 m^3 (2 marks)

Total 5 marks

ANSWER 7

(a) (i) Any FOUR (1 mark each)
300 mm from the front of the WC pan.
800 – 850 mm above floor height to top of basin.
More than 675 mm above floor to bottom of basin.
Shroud fitted to protect pipework 200 – 300 mm above floor.
Basin can protrude maximum of 400 mm into the room. (4 marks)

(ii) 450 mm (1 mark)

(b) (i) 600 mm (1 mark)

(ii) 1.3 metres (1 mark)

(iii) Any THREE (1 mark each)
Syphonic cistern with electronic sensor and solenoid valve.
Electronic/automatic flushing valve – solenoid with timer (no cistern).
Solenoid with infra-red sensor.
Water flow sensing valve.
Syphonic cistern with needle valve. (3 marks)

Total 10 marks

ANSWER 8

(a) 3.6 metres above the pressure reducing valve (1 mark)

(b) 1.5 metres = 15 kPa (14.7 kPa) (1 mark)

(c) (i) Tempering valve located before shower mixer and after branch to open vent. (1 mark)

(ii) 1 m (1 mark)

(iii) Where the vent pipe is likely to be subjected to freezing, it must be insulated between the top of the storage water heater, and a point no less than 300 mm above the normal standing water level in the vent pipe.

(2 marks)

Total 6 marks

ANSWER 9

(a) 10.3 m (1 mark)

(b) Any SIX (½ mark each)
Bends.
Pipe material.
Fittings (bends, valves etc).
Pipe diameter.
Reduction of pump speed.
Insufficient water supply.
The wear on the seals or impellors/vanes of the pump.
The atmospheric pressure at the installation site.
The flow rate required at the outlet.
Variable suction head/lift. (3 marks)

(c) Diagram to show:
Outlet
Impellors/vanes
Inlet/suction eye (3 marks)

(d) Any ONE (1 mark)
Can deliver better flow rates.
Non-pulsating flow. (1 mark)

(e) Any ONE (1 mark)
Can deliver higher pressures.
Self-priming. (1 mark)

Total 8 marks

ANSWER 10

(a) Any FIVE (1 mark each)
The scaffold is firm with braces fitted correctly.
The mobile scaffold is on firm level ground.
All wheels on the scaffold are locked with the wheels turned out.
The decking on the scaffold is secure.
Access ladders are fitted within the frames of the scaffold.
Check for overhead power lines.
Another means of fall prevention (such as a safety harness) is used where guardrails can't be fitted.
Kick guards/toe boards are still in place.
Safety tag is in place and is current. (5 marks)

(b) (i) Any THREE (1 mark each)
Weather – wet soil, dry soil.
Soil type.
Vibration/ground movement.
Water table level. (3 marks)

(ii) Any FOUR (½ mark each)
Ensure the face of the excavated trench is cut back and battered to a safe slope.
Provide adequate shoring appropriate to the ground conditions.
Provide an approved and appropriate mobile safety cage or box. (While this may not prevent the trench collapsing, it will protect the workers inside the cage or box from the collapse.)
Provide adequate steps to the side or end of the trench as appropriate which would reduce the likelihood of a collapse (benching).
Remove excess ground water.
Avoid conditions that overload the edge of the trench (eg depositing spoil. near the edge or allowing vehicles near the edge). (2 marks)

Total 10 marks

SECTION B

1	D	1:80
2	C	1.65%
3	A	25 mm.
4	E	150
5	D	1:60
6	B	The diameter of the pipe and the total discharge loading.
7	B	To prevent a thermosiphon current from forming.
8	E	Boiling.
9	E	Heat that is circulated through air or liquid due to differing densities.
10	D	Heat that can travel through a vacuum.
11	A	Heat that is transferred molecule to molecule by direct contact.
12	D	Raises the boiling point.
13	C	1000.
14	B	A system where the water is circulated by a pump.
15	C	45°C.

Total 15 marks