Answers to 9192 2005

ANSWER 1

(a)

ANY THREE of:

Explosion

Asphyxiation

Fire

Poisoning

(3 marks)

(b) ANY EIGHT

1 Do not wheel trolleys across, or drop heavy weights on, flexible leads.

2 The plugs and leads must be frequently checked for fractures, and the leads must be seen to be securely fixed to the terminals. Any damaged leads, plugs or switches must not be used until repairs can be carried out by an electrician.

3 Keep flexible leads away from places where they are likely to be damaged by machines, heat or traffic.

4 Electrical equipment and leads must not be allowed to become wet.

5 Blown fuses should not be replaced until the fault has been found and corrected by a person qualified to do so.

6 Do not suspend portable electric appliances by their flexible leads. This practice can cause broken wires, burnt-out terminals and blown fuses. Grip the plug to remove it from a socket - don't pull by the lead. Have the leads checked regularly by an electrician.

7 Be careful with three-phase plug sockets. Never attempt to force a plug into a socket when it's obviously not a good fit. Ensure compatibility of voltage.

8 Avoid leads passing through self-closing doorways.

(1/2 mark each) (4 marks)

Total 7 marks

ANSWER 2

(a) An acceptable test method to meet the minimum requirements of the NZ Building Code 1991 is to:

1 carry out testing before concealing pipework behind interior linings, flooring, under or within concrete and before backfilling trenches.

2 isolate all fixtures, appliances, water tanks and other equipment which may be damaged during testing.

3 subject the pipework or system to a minimum test pressure of 1500 kPa for a period of not less than 15 minutes

4 inspect the system to ensure there are no leaks.

(4 marks)

(b)

1 450 mm
2 600 mm

(2 marks)

Total 6 marks

ANSWER 3

Any person who:

- has been trained in the safe handling of any asbestos products, and
- holds a certificate from Occupational Health and Safety (OSH) to carry out the work.

(2 marks)

Total 2 marks

ANSWER 4

(a) Primary water meters are usually installed at the boundary of a property.
(1 mark)

(b) Primary water meters are usually supplied by the Local Network Utility.
(1 mark)

(c) To prepare a new water main for use it must be:
- Tested for leaks
- Flushed out to remove rubbish
- Flushed again and sterilised with chlorinated water.

(3 marks)

(d) ANY SIX
- Copper
- uPVC
- High density polyethylene
- Cross-linked polyethylene
- Concrete lined steel
- Polybutylene
- ABS
- Polypropylene

(3 marks)

(e) ANY THREE
- Water meter
- Backflow preventer
- A by-pass to provide a 24-hour supply
- Isolating valve.

(3 marks)

Total 11 marks

ANSWER 5

(a) The maximum water pressure to which any component of a water system is to be subjected, expressed in

- metres head of water;
- or expressed in kPa or kPa/m^2 and
  - measured at the lowest point of the said component when installed;
  - **OR** measured vertically from the base to the surface of water.

(3 marks)

(b) Either:

- The temperature at which condensation to the liquid phase takes place
- **OR** A point at which air cannot absorb any more moisture.

If no particular pressure is specified, the dew-point generally refers to conditions under normal atmospheric pressure.

(2 marks)

(c) The mixing of one or more fluids, especially gases, within a space even though there may be no forced circulation of the fluids.

(2 marks)

(d) If two unlike metals are immersed in an electrolyte, an electrical potential will exist between them and an electrical current will flow. The metal which becomes the anode of the cell will corrode and dissolve, while the cathode will be protected from corrosion.

(1/2 mark each) (3 marks)

Total 10 marks

ANSWER 6

(a)

Formula
Capacity = $0.7854 \times D^2 \times H \times 1000$
Where
Capacity = Capacity of cylinder
D = Diameter of the cylinder
H = Height of cylinder
(Working: Diameter = 500 – 50 = 450 mm)

Formula transposed (½ mark)

$$\text{Height} = \frac{\text{Capacity}}{0.7854 \times D^2 \times 1000}$$ (1 mark)

$$= \frac{180}{0.7854 \times 0.450 \times 0.450 \times 1000}$$ (½ mark)

$$= \frac{180}{159.0435}$$ (½ mark)

Height = **<u>1.132 m ANS</u>** (½ mark)

(Total 3 marks)

(b)

Formula
Area = (Circumference + Lap) x H
Circumference = π x D
Where π = *Pi*
D = Diameter of outer sleeve
H = Height of sleeve

Working*: Sleeve diameter = 300+50+50=400*
Circumference = 3.142 x 0.4
= 1.2568 (½ mark)
Circumference + Lap = 1.2568 + 0.020
= 1.2768 (½ mark)
Area = (Circumference + Lap) x H
= 1.2768 x 1.2 (½ mark)
= 1.53216
Area = **<u>1.532 m² ANS</u>** (½ mark)

(Total 2 marks)

Total 5 marks

ANSWER 7

(a) 4000 mm^2

(1 mark)

(b) The sizing of a roof gutter is dependent on:
1 the area of roof discharging to the gutter
2 the pitch of the roof
3 the local rainfall intensity per hour for the locality.

(3 marks)

(c) All internal roof gutters shall be fitted with overflow outlets.

(1 mark)

(d)
1 Overflow outlets shall drain to the exterior of the building.
2 The top of the outlet or the spillage level of any weir shall be set at least 50 mm below the top of the gutter.
3 The cross-sectional area of the outlet shall be no less than the cross-sectional area of the downpipes serving the gutter.
4 An internal gutter overflow should be located so as to give an early and conspicuous warning to the building occupier that maintenance is required

(4 marks)

Total 9 marks

ANSWER 8

(a)

1 Where the water contains temporary hardness or is of a kind which may produce much rust.

(2 marks)

2 Where one boiler is required to heat water for a heating system and also for hot-water supply.

(2 marks)

3 Where stand-by facilities can be provided from boilers connected to a heating system and consequently the need for a separate boiler for hot-water supply can be obviated.

(2 marks)

4 Where steam is already generated for other purposes and it is impracticable to install an additional boiler which would require separate space and firing. Exhaust steam, which might otherwise be wasted, may be used. In buildings such as hospitals, long steam lines are installed for other purposes and steam may then be used to avoid the need for long hot-water pipes.

(2 marks)

(b) Calorifier

(1 mark)

(c) ANY TWO

- Annular Cylinder
- Plate Heat Exchanger
- Pipe Coil

(1 mark)

Total 10 marks

ANSWER 9

(a)

Water seal: The depth of water, which can be retained in a trap.

Fixture pair: Two adjacent waste fixtures of the same type, which have their outlets connected to the same fixture trap.

Vertical pipe: A pipe inclined at an angle of greater than 45^{o} from the horizontal plane.

Ventilating pipe: A pipe provided to limit the pressure fluctuations within the discharge pipe system or to encourage the passage of gases.

Surcharge: Overflow from a sewer system caused by overloading or blockage.

Soil pipe: A pipe which conveys the discharges from one or more soil fixtures.

Floor waste gully trap: A disconnector gully for installation inside a building for use with a floor grating or waste outlet fitting on a riser pipe and with provision, where required, for connection of fixture waste pipes.

Relief vent: A vent installed in a stack below the lower fixture.

Discharge pipe: A pipe for the conveyance of sewage and waste water from any fixture, appliance or floor waste gully trap to a stack or drain.

Graded pipe: A pipe installed at a grade of less than 45^{o} from the horizontal plane.

(10 marks)

(b) A system of sanitary plumbing in which the stack and discharge pipes also serve as vent pipes.

(1 mark)

(c) A system of sanitary plumbing, differing from a single stack system in that additional venting is provided by means of a relief vent, which is connected with the stack at intervals by cross vents.

(2 marks)

Total 13 marks

ANSWER 10

(a)

1 Can the industrial liquid waste be discharged to a sewer either with or without pre-treatment as permitted by the network utility operator?
2 Can the discharge be to a natural waterway with or without pre-treatment?
3 Should the waste be stored on site for treatment (or not, as appropriate), in preparation for later disposal elsewhere as required by legislation?

(3 marks)

(b) Interceptor traps shall be installed at the exit points of areas containing liquid waste and prior to the discharge to the main drain.

(1 mark)

(c) Flammable liquid wastes which are immersible in water, or any other liquid waste or suspended solids that could damage the sewer or the environment.

(2 marks)

Total 6 marks

ANSWER 11

(a) Either ONE

- When the water supply pressure exceeds or is likely to exceed the pressure rating of the storage water heater.
- Any open vented hot water cylinder not served by a supply tank.

(1 mark)

(b) The pipe that is laid between the main and the premises to be supplied.

(1 mark)

(c) By installing the ball cock, the outlet being a minimum of 25 mm above the top of the overflow outlet of the tank or twice the diameter (whichever is greater)

(2 marks)

(d)

Property	Description	Effect
(1) Potability	Water that is fit for human consumption	Can be corrosive or non-corrosive
(2) Turbidity	Water that contains suspended matter and is cloudy	Can over a period of time be the cause of wear on pipework
(3) Softness	Soft water is acidic	Corrosive
(4) Hardness	Hard water is alkaline	Generally non-corrosive, may deposit scale

(1 mark each: 8 marks)

Total 12 marks

ANSWER 12

(a) ANY THREE

1 Apprentice Plumber/Gasfitter
2 Apprentice Gasfitter
3 Any person wishing to do sanitary plumbing
4 Any person wishing to do gasfitting.

(3 marks)

(b) That person must work under the direct supervision and in the presence of a Craftsman Plumber or a Registered Plumber when the holder has not held a limited certificate for a continuous period of at least two years.

(3 marks)

(c) That person has held a limited certificate for a continuous period of 5 years.

(1 mark)

(d) The Craftsman Plumber or Gasfitter, or Registered Plumber or Gasfitter, as may be appropriate for the certificate applied for and in whose employment or under whose supervision the certificate holder intends to work.

(2 mark)

Total 9 marks