

No. 9194



Plumbers,  
Gasfitters and  
Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2011  
**CERTIFYING COMMON**

ANSWER SCHEDULE



## ANSWER 1

Conduction.

Heat is transferred from one object to another or from one molecule to another through the process of conduction. As one molecule is heated it passes some of its heat energy to other molecules around it. (1 mark)

Convection.

Convection is the flow of heat from a hot region to a cool region. As air heats, the molecules spread out, causing this region to become less dense than the surrounding, unheated air. Being less dense than the surrounding cooler air, the hot air will subsequently rise or be displaced by the more dense cooler air. (1 mark)

Radiation.

Radiant heat is heat which radiates out from one point or source, warming objects rather than the air. Radiant heat travels in straight lines and can be located for use as spot heating as wind does not impact on the lines of heat. (1 mark)

## ANSWER 2

(a) Any TWO (½ mark each):

- Use materials that resist corrosion or wrap to prevent corrosion.
- The use of a sacrificial anode.
- Avoiding the use of dissimilar metals.
- Provide a neutral separation barrier.
- Electronic corrosion protection.

(1 mark)

(b) Any TWO (½ mark each):

- Use an approved anchor and expansion installation system.
- Wrapping.
- Sleeving.
- Approved granular material.

(1 mark)

**Total 5 marks**

### ANSWER 3

(a) Any FOUR (½ mark each):

- be securely supported and anchored
- be easily accessible 600 mm above or below the working level
- have guardrails to prevent a fall
- be able to carry the required loads.
- have appropriate harnessing available
- training
- compliance certification (tagging).

(2 marks)

(b) Any FOUR (½ mark each):

- Sunlight.
- Heat.
- Moisture.
- Chemicals.
- Sharp edges and abrasives.
- Incorrect storage (not hung up etc)
- Amount of use
- Incorrect use.

(2 marks)

(c) Any TWO:

- Debris or splinters blown into eyes or skin.
- Contact with compressed air on bare skin can lead to air embolisms, i.e. a bubble of air entering the bloodstream – often causing death.
- Incorrect or faulty fittings on air hoses which can fail under pressure. This can lead to air hoses moving wildly and coming into contact with workers.
- Hearing.

(2 marks)

**Total 6 marks**

#### ANSWER 4

- (a)
- Diagonal orientation.
  - Must be fixed down with rivets or similar.
  - Sealed.
  - Appropriate drawing.

(4 marks)

- (b) Any FOUR:
- Wind zone.
  - To cover minimum of two crests.
  - Suitable for pipes from 60 mm to 500 mm diameter.
  - Suitable only for roof pitches of 10° or higher.
  - Material of roof and/or flashing.

(2 marks)

(c)

Wind Zone	Maximum Wind Speed
Low Wind Zone	32 m/s
Medium Wind Zone	37 m/s
High Wind Zone	44 m/s
Very High Wind Zone	50 m/s

(2 marks)

- (d)
- Steel galvanized (unpainted).
  - Zinc.

(2 marks)

- (e) Any THREE:
- The upper surface of elements that penetrate external walls must be sloped downwards to the exterior.
  - Penetrations should be located where they are sheltered from wind-driven rain.
  - Penetrations more than 200mm wide must be anchored.
  - Where the depth of the penetration is more than 1/3 of the wall depth, the penetration must incorporate head, jamb and sill details similar to those required for windows.

(3 marks)

**13 marks**

## ANSWER 5

- (a)
- The inspector believes on reasonable grounds that the person is committing, or has committed, an infringement offence; and
  - The person has had prior warning of the infringement offence under section 56C; and
  - An inspector or another person has not taken enforcement action against the same defendant in respect of the same matter.

(3 marks)

- (b) Any FOUR:
- A written warning from an inspector.
  - An improvement notice.
  - A prohibition notice.
  - An infringement notice.
  - A conviction for an offence under this Act.
  - A hazard notice.
  - A compliance order.

(4 marks)

- (c)
- Whether or not harm resulted from the offence.
  - If harm resulted from the offence, the extent of the harm.
  - What potential harm could have resulted from the offence.
  - In the case of an employer, principal, or contractor, the size of the business of the employer, principal, or contractor.
  - The financial circumstances of the person.
  - The safety record of the person.

(3 marks)

- (d) An employee may refuse to do work if the employee believes that the work that the employee is required to perform is likely to cause serious harm to him or her.

(1 mark)

**Total 11 marks**

## ANSWER 6

- (a) A certifying plumber/gasfitter must ensure that, during the first year of holding a limited certificate, a trainee plumber/gasfitter is at all times working in the presence of the supervising certifying plumber/gasfitter or a licensed plumber/gasfitter that is supervised by the same certifying plumber/gasfitter.

(1 mark)

- (b) Must be responsible for any supervision, testing and verification of the plumbing undertaken by:
- (i) licensed plumbers;
  - (ii) holders of provisional licences ("provisional licensees");
  - (iii) trainee plumbers who hold limited certificates to undertake plumbing ("trainee plumbers"); and
  - (iv) persons carrying out plumbing pursuant to section 19 of the Act ("exempt persons").

(4 marks)

**Total 5 marks**

## ANSWER 7

- (a) Functional Requirement

C4.2 Buildings shall be constructed to maintain structural stability during fire to:

- Allow people adequate time to evacuate safely.
- Allow fire service personnel adequate time to undertake rescue and fire-fighting operations.
- Avoid collapse and consequential damage to adjacent household units or other property.

(3 marks)

- (b) Drawing to show:

- wall with penetration.
- sleeve.
- both sides of the wall protected.
- collar/plastic/sealant.

(4 marks)

**Total 7 marks**

## ANSWER 8

- (a) (i) **Extract Ventilation.** This type of ventilation ensures that a definite volume of air is removed outside the building, but the air entering to replace it is not controlled. This system functions irrespective of wind or temperature and is positive in action. It causes an internal negative pressure thus providing a facility for external air to be sucked in through appropriate openings. (3 marks)
- (ii) **Positive pressure or forced air ventilation systems** works by blowing air into the house from the roof space above the ceiling or, in some types, from outside. (3 marks)
- (iii) **Mechanical heat recovery ventilation systems** Ventilation systems consisting of two fans – one to draw air in from outside and one to remove stale internal air. An air-to-air heat exchanger, generally installed in a roof space, recovers heat from the internal air and then warms the incoming air with the recovered heat, before it discharges the air to the outside. (3 marks)
- (b) Positive pressure/forced air ventilation system/ Mechanical inlet natural exhaust. (1 mark)

**Total 10 marks**

## ANSWER 9

Ducting Lengths	Quantity	Branch Take Offs	Quantity
150 mm × 3 m	9 (1 mark)	200 × 150 × 150	4 (½ mark)
200 mm × 3 m	4 (1 mark)	250 × 200 × 200	1 (½ mark)
250 mm × 3 m	2 (1 mark)	250 × 200 × 150	1 (½ mark)
300 mm × 3 m	3 (1 mark)	250 × 250 × 250	0 (½ mark)
350 mm × 3 m	0 (1 mark)	300 × 250 × 250	1 (½ mark)
Rolls of Tape	8 (½ mark)	300 × 300 × 200	1 (½ mark)
		300 × 250 × 200	0 (½ mark)
		350 × 300 × 250	0 (½ mark)
		350 × 300 × 200	0 (½ mark)

**Total 10 marks**

## ANSWER 10

(a) Any TWO:

- Smaller pipework.
- Higher temperatures.
- Less space required (no makeup tank required).

(2 marks)

(b) Any FOUR:

- Tight bends.
- Sagging incorrectly supported.
- Tears/punctures.
- Crushed ducts/kinked.
- Badly taped joints.
- Excessive length.

(4 marks)

**Total 6 marks**

## ANSWER 11

$$(6.4 + 8.6) \times 10 \times 4.5 = 675$$

$$10.4 \times 8.6 \times 4.5 = 402.48$$

$$675 + 402.48 = 1077.48 \text{ m}^3$$

Or

$$20.4 \times 8.6 \times 4.5 = 789.48$$

$$6.4 \times 10 \times 4.5 = 288$$

$$789.48 + 288 = 1077.48 \text{ m}^3 \quad (3 \text{ marks})$$

$$1077.48 \times 5 = 5387.4 \text{ m}^3/\text{hr} \quad (1 \text{ mark})$$

$$\frac{5387.4}{60 \times 60} = 1.4965 \text{ m}^3/\text{sec} \quad (\frac{1}{2} \text{ mark})$$

$$= 1.4965 \times 1000 \quad (\frac{1}{2} \text{ mark})$$

$$= 1496.5 \text{ litres per second} \quad (1 \text{ mark})$$

**Total 6 marks**

## ANSWER 12

- (a) Significant Hazard. (1 mark)
- (b)
- Drawing showing joist and penetration.
  - Be no larger in diameter than one fifth depth of the joist or 32mm whichever is the smaller.
  - Be no more than three times the depth of the joist from the face of the support.
  - Be within the middle third of the depth of the joist.
- (4 marks)
- Total 5 marks**

## SECTION B

1. B The erection or dismantling of scaffolds from which a person could fall 3 m or more.
2. D Department of Labour.
3. C 15 years.
4. D 3 months.
5. A \$500.
6. C Department of Building and Housing.
7. B 2 days.
8. C 17.
9. D 10a.
10. A There is only 1 candidate for a position.
11. A Employer.
12. C Their employer must pay them for the first week to compensate them for lost earnings, at 80% of what they would have earned that week.
13. B A custom designed method that is not included in the Building Code but will fulfil the requirements of the code.
14. A A pre-approved method of compliance that is included in the Building Code.
15. B The speed at which the substance flows in pipework.
16. C 2.0 m.

**Total 16 marks**



