

Student name: _____



TOWER CLIMBING EXAM

Time limit = 1.5 hours

For unit: ICTTCR203

Link: <https://training.gov.au/Training/Details/ICTTCR203>

This exam is designed to cover the knowledge requirements for climbing and working on tower structures. Poor performance indicates that you have gaps in your underpinning knowledge and shouldn't be climbing tower structures. Each missed exam question must be thoroughly reviewed until competency is achieved.

Carefully read each question then choose the *most* correct answer. This exam should be completed without the assistance or advice of others. You may refer to your own notes.

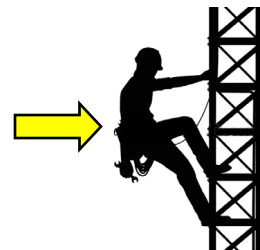
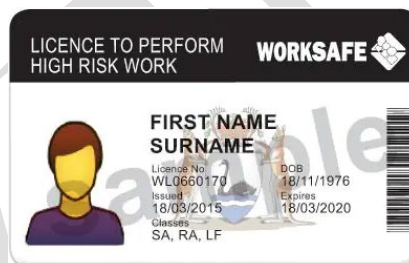
Competency can be demonstrated by initially scoring 100%

LEGISLATION & THE LAW

Q1. If you climb and work on tower structures, do you have to be a licenced rigger (eg advanced rigger)? In other words, is it illegal to climb and work on a tower if you don't have a high-risk work licence as a rigger?

☐ Yes

☐ No



Q2. True or False

The following question is about **high risk construction work**. High risk construction work has a special meaning in all OHS / Work Health Safety Regulations in Australia.

NSW WHS Regulation: <https://legislation.nsw.gov.au/view/html/inforce/current/sl-2017-0404>
(Refer to Section 291 for definition of high risk construction work.)

QLD WHS Regulation: <https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2011-0240>
(Refer to Section 291 for definition of high risk construction work.)

When performing work at height on a tower structure (eg a telecommunications tower), that work is defined as high risk construction work.

☐ True

☐ False

If you answered 'True' – does that also mean you *must* complete a **Safe Work Method Statement** (SWMS) before climbing and working on the tower structure?

☐ Yes

☐ No (an SWMS is not a legal requirement).

FALL PROTECTION SYSTEMS

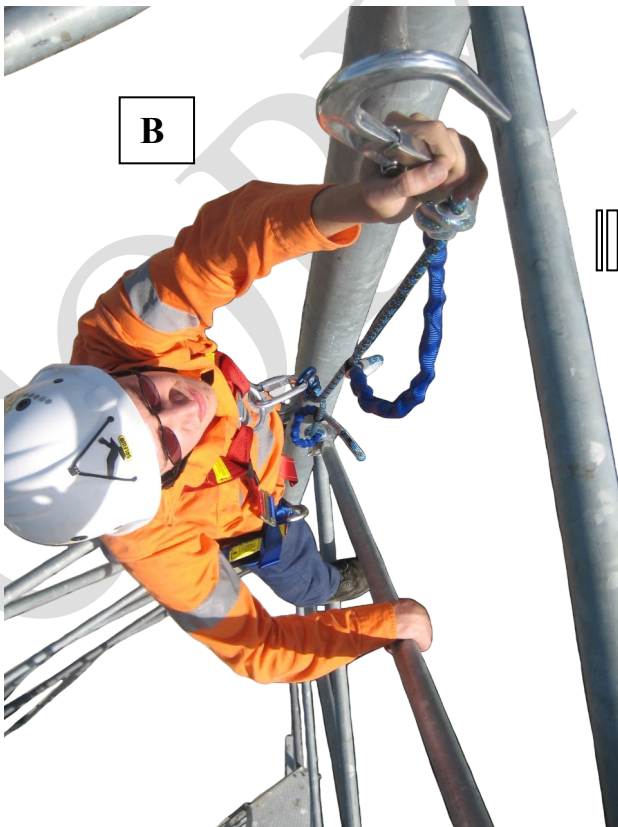
Q3. Study the photos carefully, then answer the questions...



What type of fall protection is this worker using?

- ☐ Positioning
- ☐ Travel restraint
- ☐ Fall-arrest
- ☐ None of the above

Explain your answer:



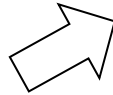
What type of fall protection is this worker using?

- ☐ Positioning
- ☐ Travel restraint
- ☐ Fall-arrest
- ☐ None of the above

Explain your answer:

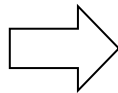
PPE

Q4. Answer each of the questions where indicated...



4.1 According to Australian Standards, at what intervals must a *competent person* inspect a harness and lanyard (for attaching inspection tags and recording in a PPE register)?

Months



4.2 According to Australian Standards, what is the *maximum* theoretical lifespan of a harness and lanyard?

Years



4.3 Can you use PPE that is made in another nation (other than Australia)?
(ie is it legal to use PPE if it doesn't have an Australian Standards conformance marking?).

- ☐ Yes
- ☐ No
- ☐ I don't know...

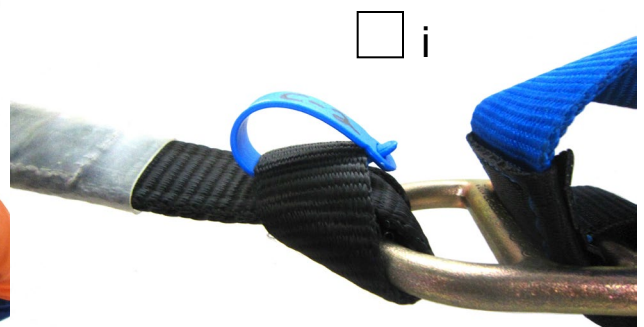
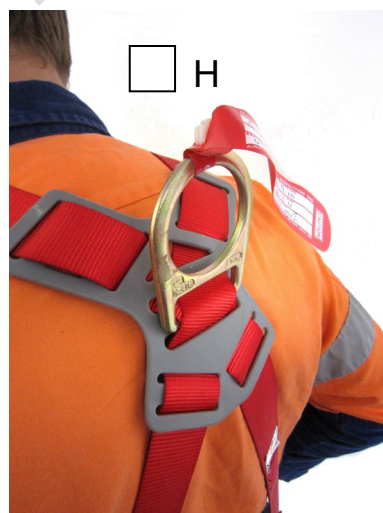
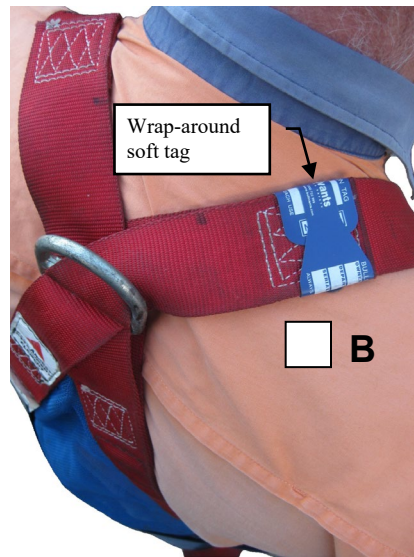
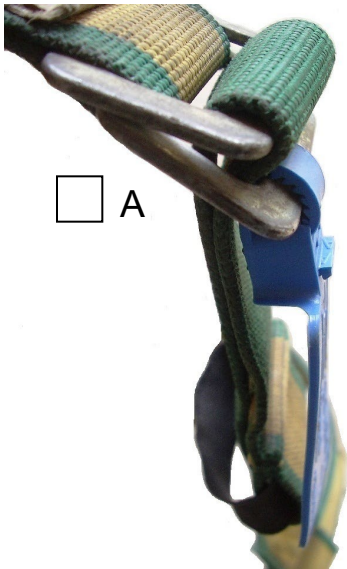


This harness is made in France.
Is it legal to use a French harness in Australia?



Example of a label with European PPE markings

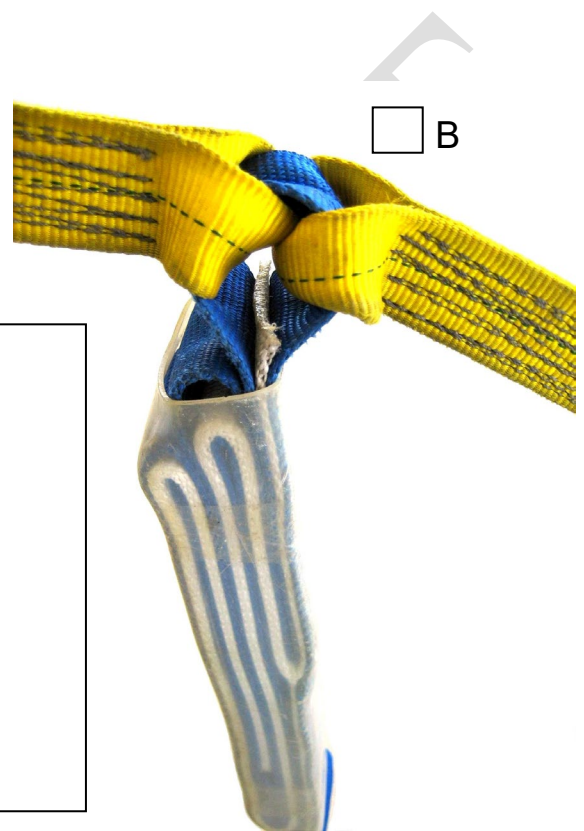
Q5. Study the photos carefully. Each photo shows an inspection tag placed on a harness. Choose the photo you believe indicates an appropriate (ie safe) position for a tag (there may be more than one answer). Your instructor will ask you to explain your answer.



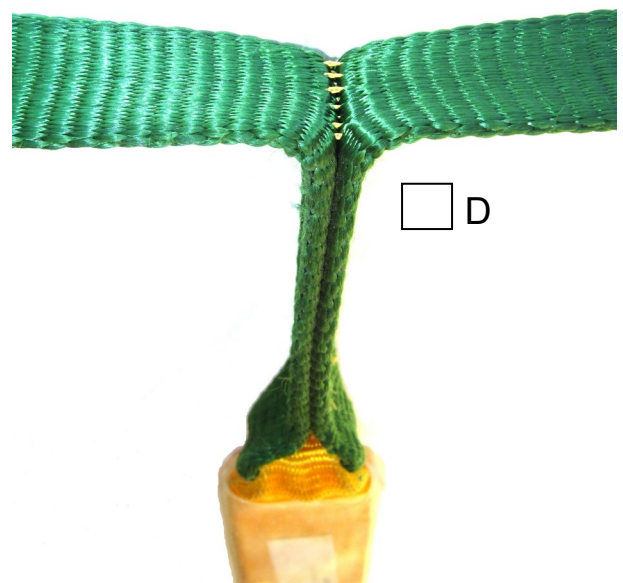
Q6. Study the photos carefully. Indicate the harness you believe is most suited for tower climbing/work. Your instructor will ask you to explain your answer.



Q7. Study the photos of the dual-leg (ie twin-tail) lanyards carefully. In 2004, an Australian tower worker fell to his death due to catastrophic lanyard failure. Choose the lanyard design that you think might be susceptible to catastrophic failure under certain loading profiles. There may be more than one answer. Your instructor will ask you why you chose a particular answer.



Explain your answer...



Q8. Choose the dual leg-lanyard design you believe is **optimal for tower climbing**. Explain your answer...

☐ A



☐ B



☐ C



☐ D



☐ E



☐ F



Explain your answer:

Q9. Study the photos carefully. What type of lanyard is this? What is it used for?
Choose the lanyard design you think is **optimal for tower work**? Explain your answer...

☐ A



☐ B



☐ C



What type of lanyard is this? Describe...

Explain your answer... (what is this type of lanyard used for and why is it useful for tower work?)

Q10. Study the images carefully. Can an unused leg of a dual lanyard be attached (or parked) to a hard point on your harness? Explain your answer...

☐ Yes

☐ No



Explain your answer:

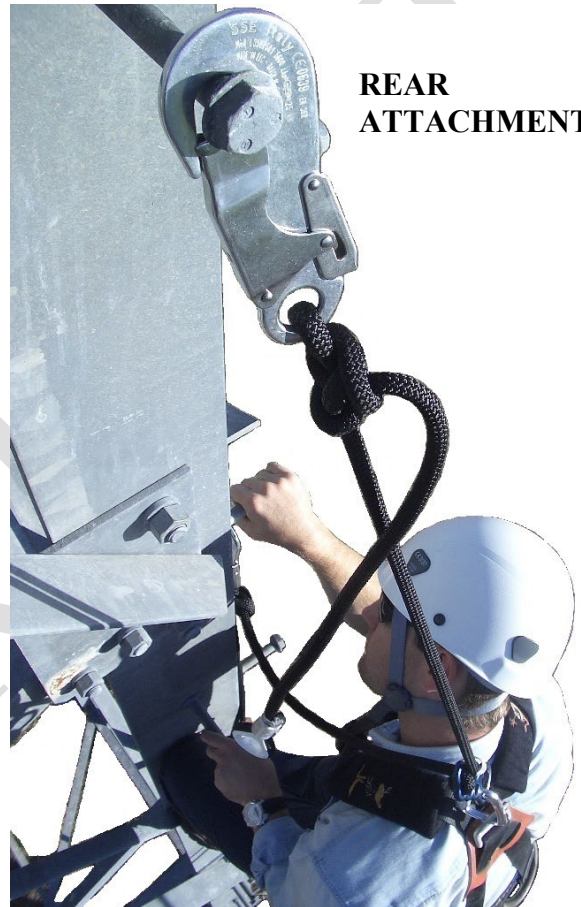
Q11. Study the photos carefully. Should you attach your lanyard to the front or the rear of your harness? Choose the attachment method you think is better/safer. Explain your answer...

☐ A



FRONT ATTACHMENT

☐ B



REAR ATTACHMENT

Explain your answer... (does it make any difference in terms of safety?)

Q12. This question is about synthetic fibre ropes used in tower climbing and rescue applications.



Q12.1 What is the maximum *theoretical* lifespan of a synthetic fibre rope used in rescue or abseiling at a workplace?

Years

Q12.2 List at least 3 reasons for retiring a rescue rope.

1.
2.
3.

Q12.3 What is the rope diameter *recommended* for use in vertical rope rescue and rope access applications?

mm

Q12.4 According to industry codes of practice, what is the *minimum breaking strength* (MBS) for low-stretch abseil ropes used in rope access and vertical rope rescue applications (eg EN1891 Type A ropes?).

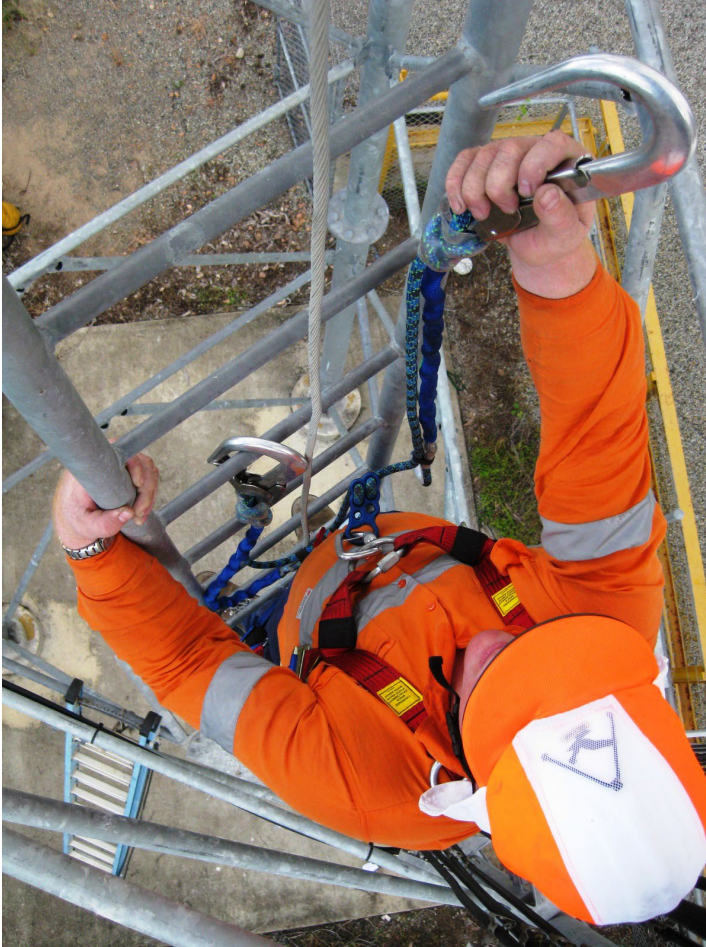
kN (Kilonewtons)



Q12.5 What part of the rope is now exposed? What action should you take if you discover this situation? Explain your answer...

CLIMBING TECHNIQUES

- Q13. Study the photo carefully. List at least two advantages & potential risks associated with climbing using a dual-leg lanyard.



Advantages?

(List as many advantages you can think of)

1.

2.

3.

Potential risks?

(List as many risks you can think of)

1.

2.

3.

CLIMBING TECHNIQUES

Q14. Study the photo carefully. List at least two advantages & potential risks associated with climbing using a guided type fall-arrest device (for steel wire rope).

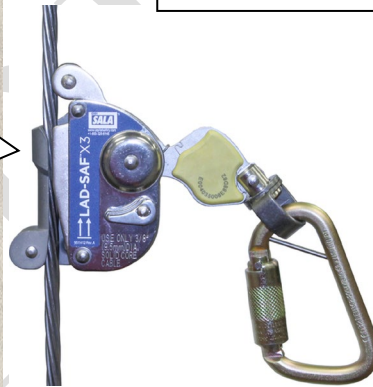
Advantages?

(List as many advantages you can think of)

1.

2.

3.



Potential risks?

(List as many risks you can think of)

1.

2.

3.

Q15. Study the photos carefully, then answer the questions.



15.1 What are the devices 'A' and 'B'? (what are they?) Explain:

15.2 How do these devices work, and do they require constant tending while climbing the tower structure?

15.3 What advantages does a fixed rope provide? (why set one up – is it worth the effort?)

Q16. Why is the tower worker in this photo pausing near the ground before climbing up the fixed ladder with a guided type fall-arrest device?



What is the worker doing? Why? (explain):

CONNECTORS

Q17. Study the photos carefully. Answer the questions where indicated.



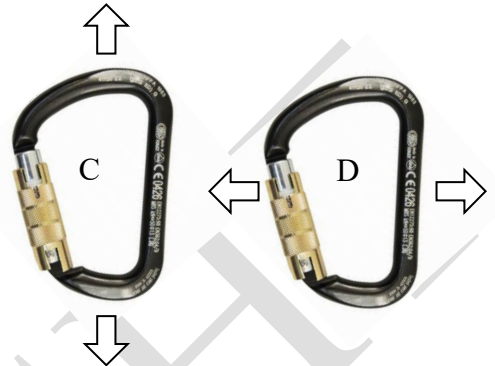
A

17.1 What *type of locking mechanism* does carabiner 'A' have?



B

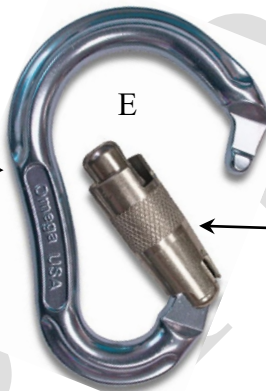
17.2 What *type of locking mechanism* does carabiner 'B' have?



17.3 Which diagram indicates the correct loading profile (C or D)?

☐ C
☐ D

17.4 What is this part called?



E

17.5 What is this part called?

17.6 What is this part called?

17.7 What is the strongest part of a carabiner?



F



G

17.8 What is the difference between connector F and G?

17.9 Are these connectors useful to tower climbers? Explain your answer...

☐ No ☐ Yes

RESCUE TECHNIQUES

Q18. Study the photo carefully. Write your answers in the spaces provided.



18.1 What is this device and what is its purpose?

18.2 What is this device and what is its purpose?

18.3 What is this device and what is its purpose?

18.4 What is this and what is its purpose?

RESCUE TECHNIQUES

Q19. Study the photo carefully. A cutaway procedure is being carried out. Answer the questions in the space provided: (Keep in mind that all rescues from height involve some form of risk!)



Advantages?

(List as many advantages you can think of)

1.

2.

3.

Potential risks?

(List as many risks you can think of)

1.

2.

3.

Does your employer allow the use of a knife in tower rescue?

☐ Yes

☐ No

RESCUE TECHNIQUES

Q20. Study the photo carefully. An accompanied abseil descent procedure is being carried out. Answer the questions in the space provided.

NOTE: Assume that you have no help or assistance – you are performing the rescue on your own.



Advantages?

(List as many advantages you can think of)

1.

2.

3.

Potential risks?

(List as many risks you can think of)

1.

2.

3.

RESCUE TECHNIQUES

Q21. Study the photo carefully. The worker is performing an abseil descent with a patient – using a ‘Petzl ID’ device. The combined weight of the rescuer + patient = 200kg. Why has the rescuer re-routed the abseil rope through a carabiner? Explain your answer.



Petzl ID

Why has the rescuer re-directed the abseil rope through a carabiner?

100 kg patient

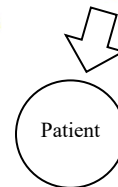
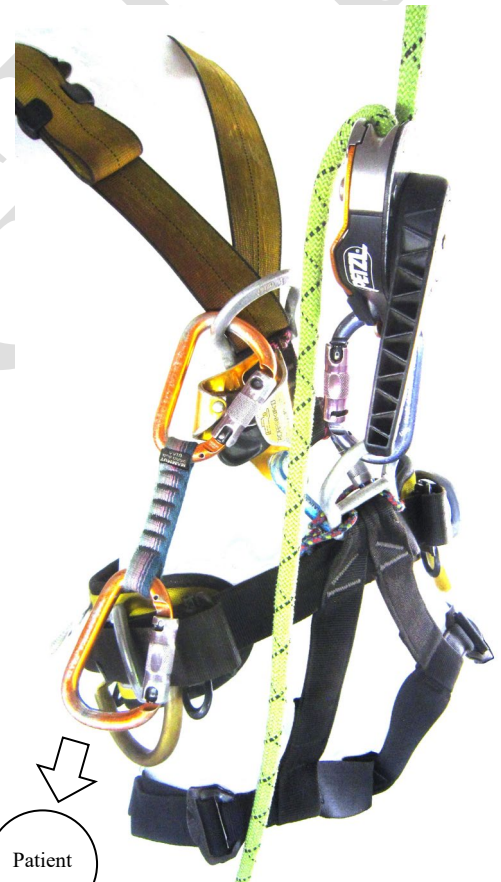
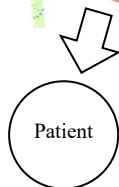
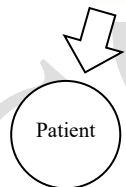
Why has the rescuer re-directed the abseil rope through a carabiner? (explain):

- Q22. Study the photos carefully. The worker is performing an accompanied abseil descent with a patient. Choose the photo you believe is showing the optimal method of attaching the patient to the rescuer. You will be required to explain your answer.

☐ A

☐ B

☐ C



Explain your answer:

Q23. Study the photo carefully. The photo depicts a rescue scenario on a tower structure. Assume there is an anti-climbing barrier surrounding the base of the tower structure (eg 'crown-of-thorns' or a security fence). Answer the questions were indicated.



23.1 Can this rescue procedure be setup and carried out by a single (one) person acting alone?

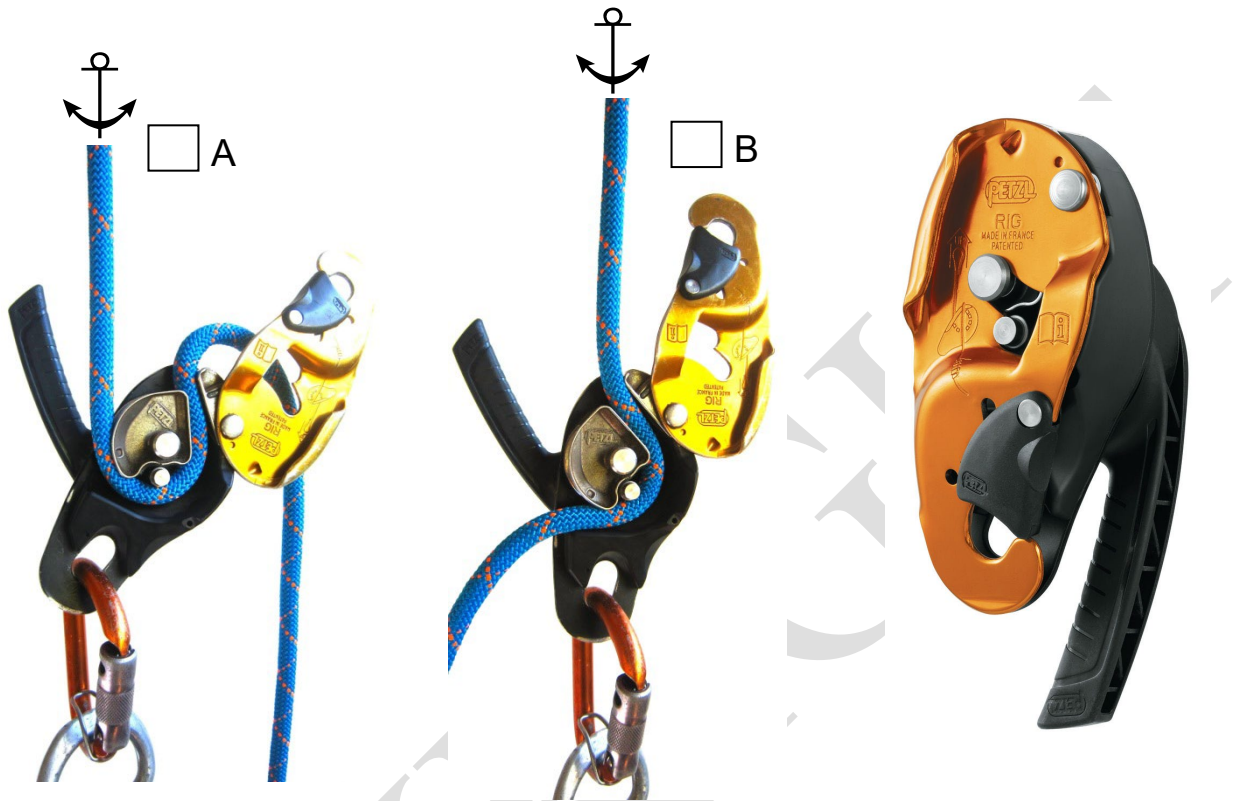
☐ Yes

☐ No

23.2 What is the minimum number of people required to setup and carry out this type of rescue procedure?

23.3 What type of rescue procedure is this? What are the advantages (explain)?

- Q24. Study the photos carefully. Choose the photo you believe indicates the correct way to reeve the rope in a Petzl Rig / ID descending device.



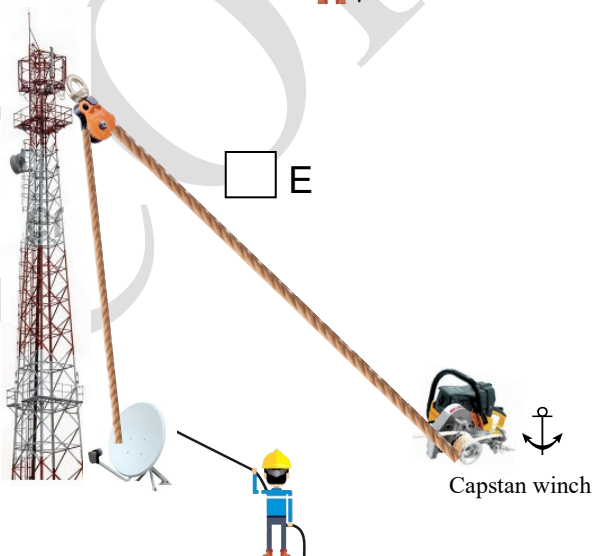
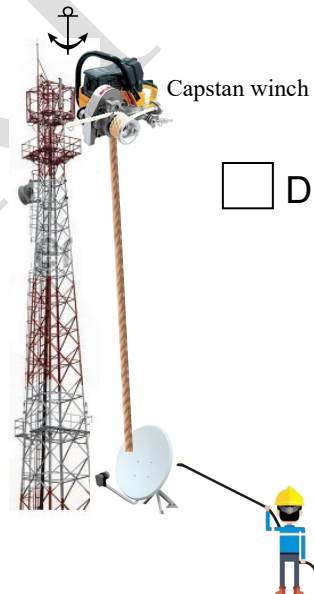
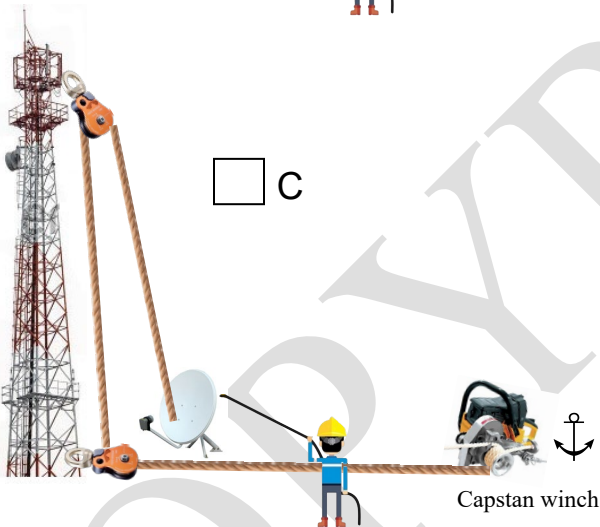
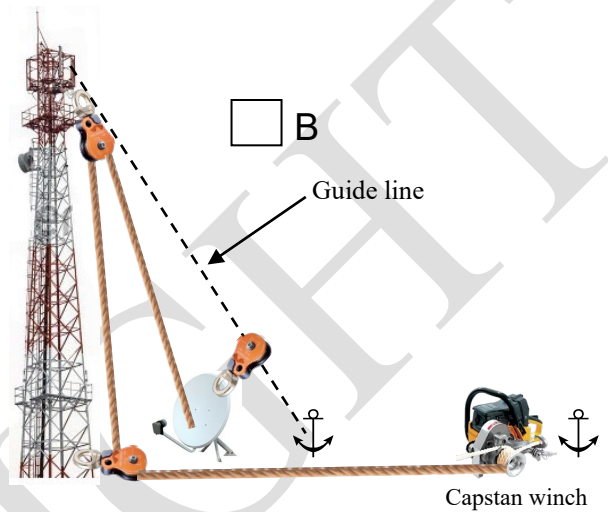
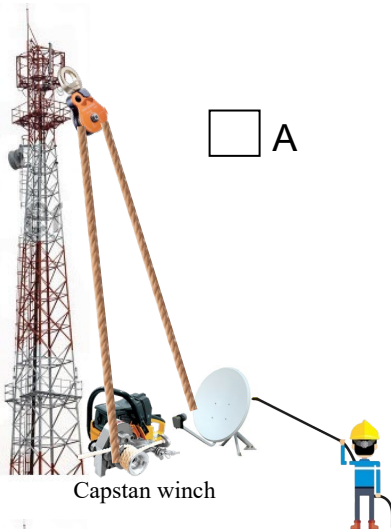
- Q25. Which of the following descending devices are rated for two (2) person payload and are optimal for tower rescue? Indicate your answer(s). Note: There may be more than one suitable device.



Explain your answer:

WORKING ON SITE: Installing a microwave dish on the tower

Q26. Study the images carefully. Choose the configuration you think is optimal for hoisting and installing a dish to a tower structure. Justify your answer (below).



Explain your answer: (Provide justification for your choice)

KNOT TYING

- Q27. Some employers only permit the use of permanently formed rope terminations (ie sewn terminations). That is, they don't allow workers to use hand tied knots. Why?



Sewn termination



Sewn termination

Why do some employers forbid the use of hand tied knots?

Explain:

Q28. The ability to correctly and accurately hand tie a knot can be very useful in an emergency situation.

Does your employer allow the use of hand tied knots?

☐

Yes

☐

No

Indicate which of the knot images is depicting correct geometry and dressing of a Figure 8 eye knot (A, B, C, or D?).

Is it important to properly dress and set the F8 knot?

☐

Yes

☐

No

Why? (Explain):

☐ A



☐ B



☐ C



☐ D



RF HAZARDS

Q29. TRUE or FALSE

Owners (carriers) of cell phone towers are required to maintain comprehensive EME (electromagnetic energy) data that can be accessed via the RFNSA website.

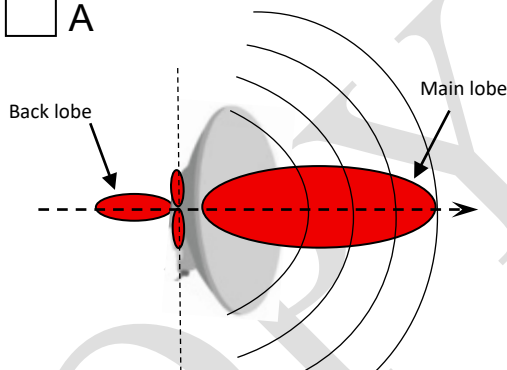
☐ A True

☐ B False



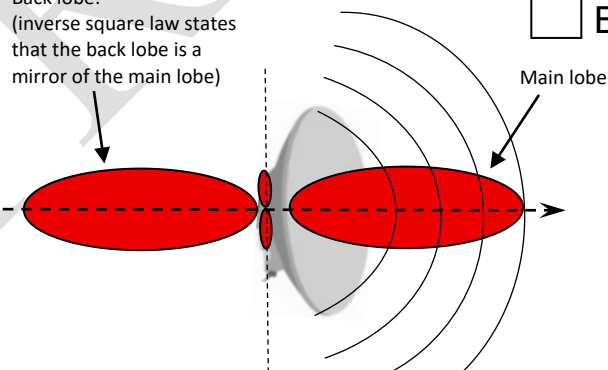
Q30. Indicate the diagram that best shows the typical radiation pattern of a microwave dish antenna on a cell phone tower (Note: The dish is pointed to the right).

☐ A



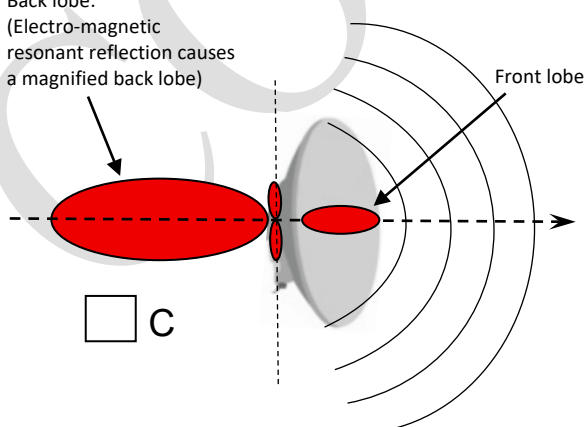
Back lobe:
(inverse square law states
that the back lobe is a
mirror of the main lobe)

☐ B



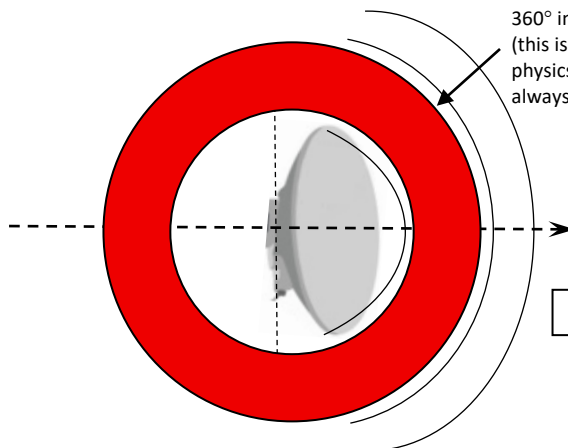
Back lobe:
(Electro-magnetic
resonant reflection causes
a magnified back lobe)

☐ C



Radiation is emitted
360° in all directions
(this is due to the quantum
physics law that energy is
always conserved)

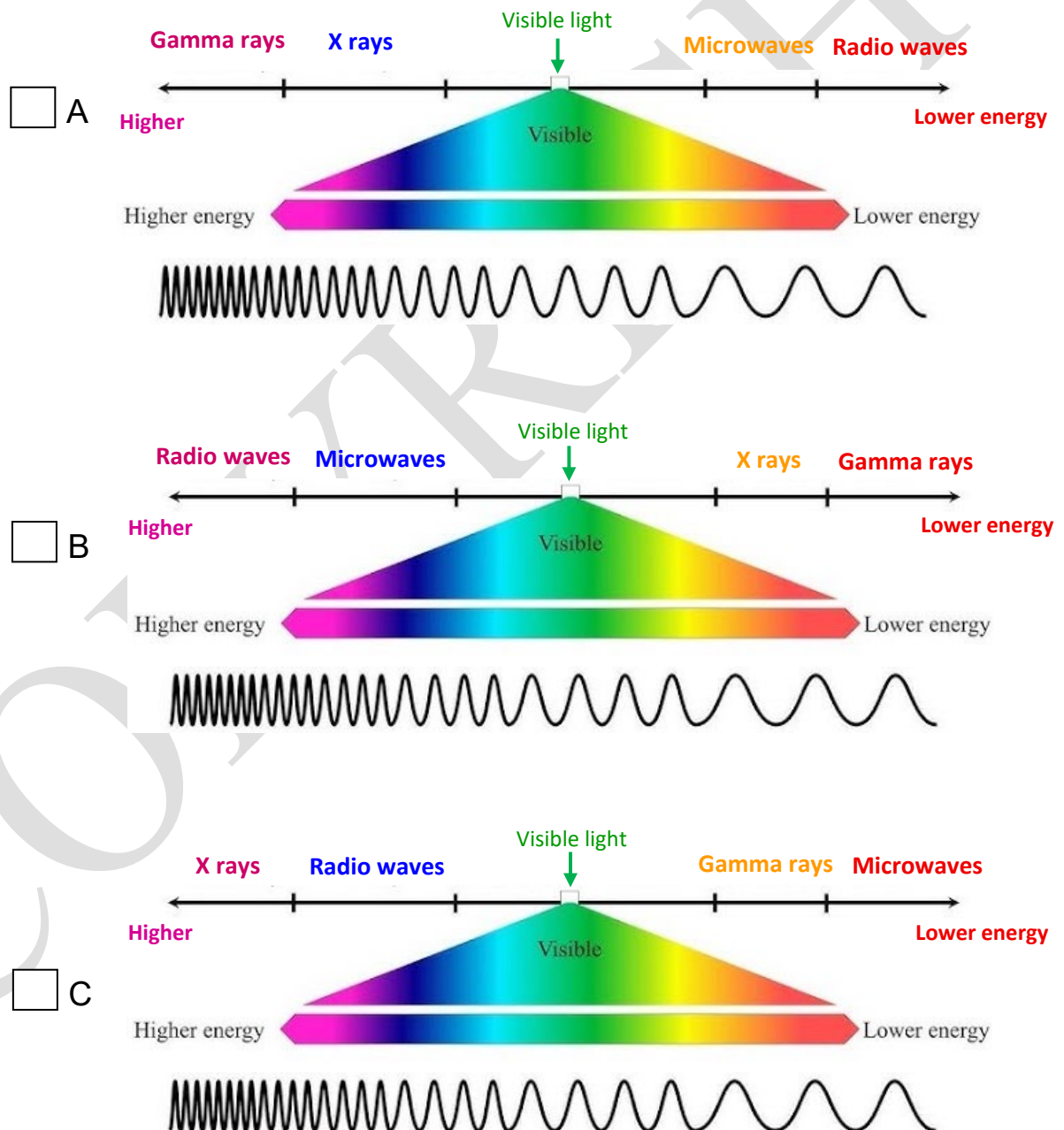
☐ D



Q31. This question refers to electromagnetic radiation emitted from cell phone towers.
Choose the statement that is correct:

- ☐ A Electromagnetic radiation emitted from cell tower antennas is ionizing.
- ☐ B Electromagnetic radiation emitted from cell tower antennas is non-ionizing.

Q32. Choose the diagram which correctly shows where radio waves and microwaves appear on the electromagnetic spectrum.



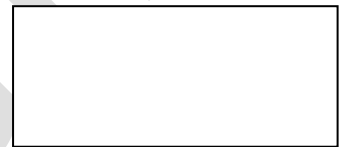
Final score _____ %

Student statement: *I declare that I completed this exam paper without the assistance of others. My answers represent my own work and not the work of someone else. I realise that I owe a duty of care to other workers on site and that my knowledge and skills may be critical for working safely on towers. I further acknowledge and accept that I must comply with Work Health and Safety legislation (sometimes referred to as 'OHS') at my workplace and there are severe penalties for non-compliance.*

Note: 'Safely' is defined as the lowest achievable level of risk for the task

Student signature: _____

Date: _____



**LOCK THIS DOCUMENT
WHEN COMPLETED.**

Warning!

Once you lock this document,
it can no longer be edited or
changed.