Student:_____ Date: _____

CHALLENGE ROPES COURSE EXAM **Time limit = 1 hour 30 min**

This exam is designed to identify any gaps that may exist in your knowledge. Missed exam questions may indicate that you require specific refresher training. Poor performance indicates that you are not yet ready to work as a guide/leader. 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%

Q1. You are conducting organised activities on a challenge ropes course structure for a group of participants. Could the activity and the challenge ropes course structure be regarded as a **workplace** according to the harmonised WHS legislation in Australia?

☐ Yes ☐ No

Explain:

Q2. According to Standards for building challenge ropes course structures, how often is a permanent challenge ropes course structure required to be inspected and re-certified as fit for intended purpose (by an authorised competent person)?

☐ Every 6 months

☐ Annually (once per year)

☐ Every 2 years

☐ Every time it is used

☐ None of the above are correct.

Q3. This question is about PPE (personal protective equipment). ☐ Yes ☐ No
Is a climbing harness PPE?
If you answered 'yes', according to Australian Standards, how often (ie at what intervals) must a harness be checked by a *competent person* to ensure it is fit for use?

☐ Months

Q4. True or False.
All category 3 PPE (eg carabiners, harnesses, ropes, etc) must have an Australian Standards label. If an item of PPE doesn't have an Australian Standards label, it is illegal to use it at Australian workplaces.

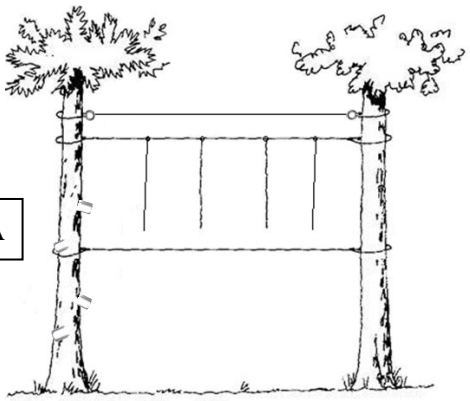
☐ True ☐ False

Q5. True or False.
Participants must never be allowed to belay other participants on challenge ropes course high elements. Only qualified staff should be allowed to perform belay duties.

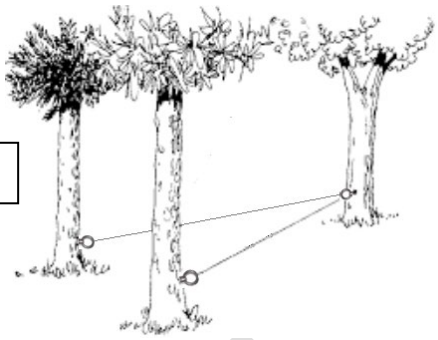
☐ True ☐ False

Q6. Study the images carefully. Indicate what type of element each image is representing.

A



B



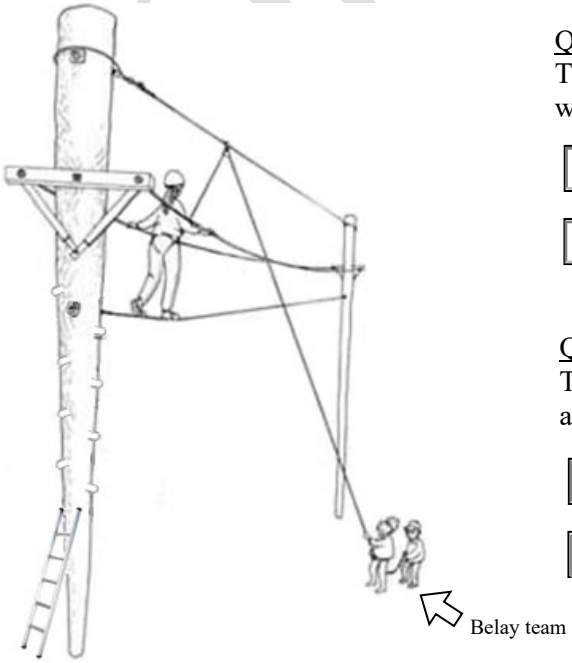
Explain your answer

Conceptual question: What is the legal *definition* of a high element? If you are making the claim that one of the images is a high element, what are you basing your claim on (ie what is it that makes an element 'high')?

Q6a. At what height above the ground does an element transition from 'low' to 'high'?
Conceptual question: Is there a precise height above the Earth's surface which *legally* defines the transition from 'low element' to 'high element'?

- ☐ YES – there is a precise height, which can be determined with a tape measure.
- ☐ NO – there is no precise height. The delineation between 'low' and 'high' is based on when the risk of injury from a fall becomes *reasonably likely*.

Q7. Study the image carefully. Answer the questions where indicated.



Q7a. True or False:
The belay team must remain in a fixed (static) position while the climber is progressing through the element.

- ☐ True
- ☐ False

Q7b. True or False:
The belay team must be anchored to the ground (ie attached to a physical ground anchor point).

- ☐ True
- ☐ False

Q8. The following question refers to belay devices. Choose the device/system you believe would be best suited for participants belaying other participants on a challenge ropes course high element. Assume that team building and trust underpins the reason for allowing participants to belay each other.
You may select more than one device/system – but you must be able to justify your choices.

Note: Challenge ropes course participants typically have widely varying skill levels…

Manual braking devices (EN 15151-2)

A ☐

Edelrid Megajul Sport

B ☐

ATC 'Guide'

C ☐

ATC

D ☐

Pilot

E ☐

Figure 8

Cam assisted self-locking devices (EN 15151-1)

F ☐

GriGri Ver 3.0

G ☐

GriGri +

H ☐

Eddy

i ☐

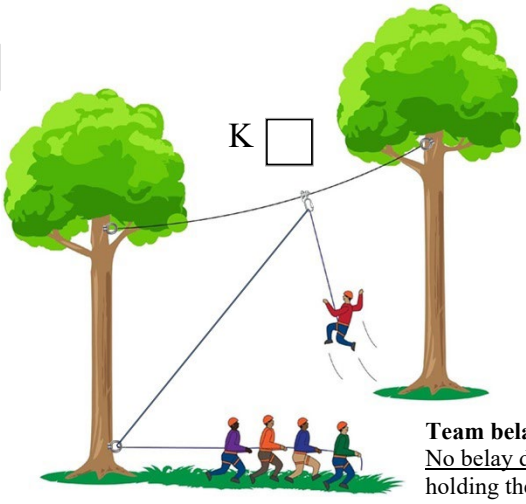
Wild Country Revo

Improvised systems

J ☐

Munter / Italian hitch

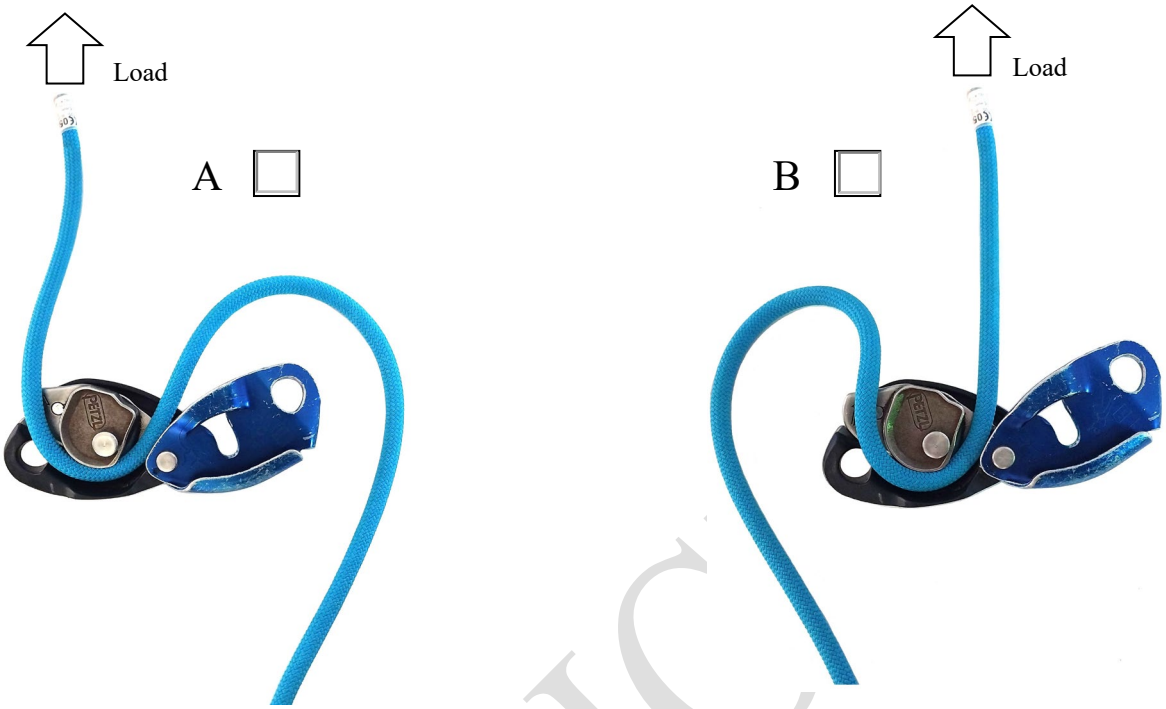
K ☐



Team belay
No belay device (several people holding the rope in their hands).

Explain your answer. You must justify why you chose a particular belay device/system.
Note: Please name the device/system you selected. Explain your answer:

Q9. Study the photos of the GriGri belay device. Choose the photo you believe indicates the correct way to thread/reeve the rope into the device.



Q10. Study the photos carefully. Choose the photo you believe provides the best combination of security, stability, and reduction of human error, in terms of belaying a person. Assume both belay devices are identical.

Explain:

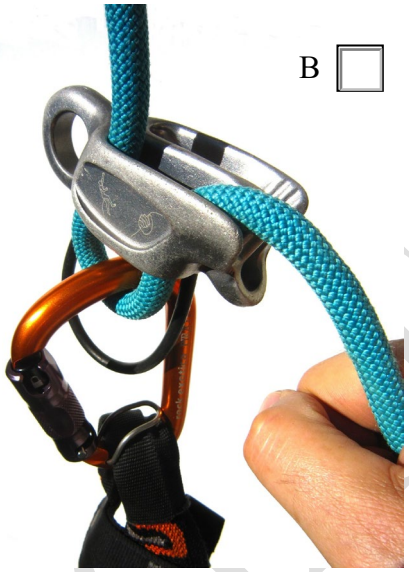
Q11. Study the photos carefully. Choose the photo you believe shows the correct way to thread a rope through the belay device in order to gain *increased* (maximum) brake power.

To climber

A ☐

To climber

B ☐



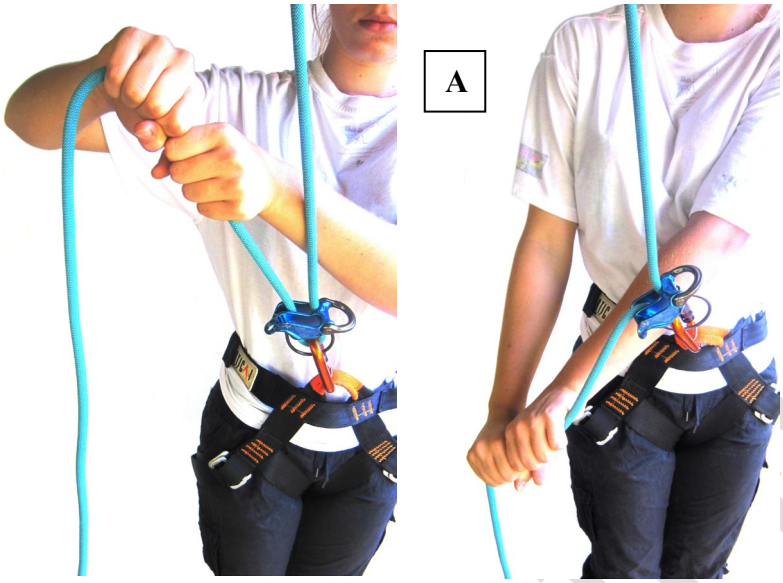
Explain:

Q12. Study the photo carefully. Some challenge ropes courses have posts similar to this setup. What are these posts used for? Upon what math/science principle does this particular system rely upon?

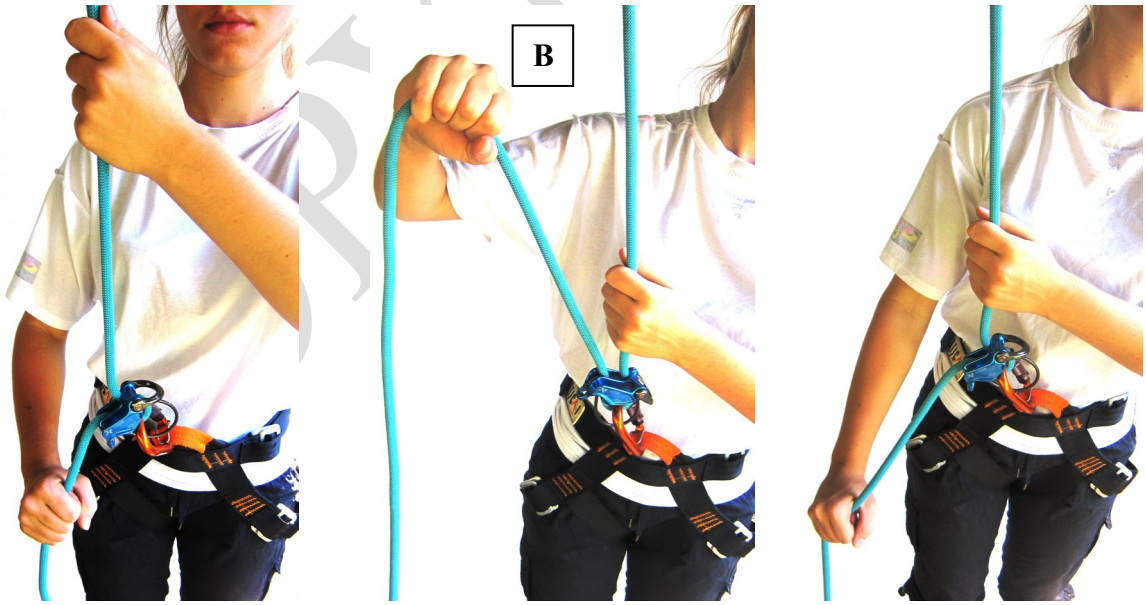
Explain:

Q13. Study the photos A and B carefully. Each photo is showing a different belay technique. Identify which type of belay technique is being depicted. You will also need to identify which method you would teach participants.

13a



13b



Q13c Which belay technique would you teach to your participants (consider that the participants will not have any significant experience)? Choose A or B. Explain your answer in the space provided.

A ☐ B ☐

Q14. Study the photos carefully. Each photo (A and B) is showing a different approach to a safety belay system (ie fall protection). List <u>at least</u> 2 advantages and disadvantages for each system.

Advantages of system A:		Disadvantages of system A:
1.		1.
2.		2.
3.		3.

Advantages of system B:		Disadvantages of system B:
1.		1.
2.		2.
3.		3.

CONNECTORS

Q15. Study the photos of the connectors carefully. Match the descriptor to its corresponding connector. Enter a number from 1 – 6 in each box.

A

'A' corresponds to: ☐

3. Carabiner: EN12275 (type T)
[ ] Auto-locking gate (triple-action)
[ ] Resistant to misalignment
[ ] Gate resistant to vibrations
[ ] Fixed captive eye

B

'B' corresponds to: ☐

4. Carabiner: EN12275 (type B)
[ ] Screw gate locking mechanism
[ ] Susceptible to misalignment
[ ] Gate can rattle loose due to vibrational energy

6. Connector (EN 17109):
[ ] No hinged gate
[ ] High resistance to misalignment
[ ] Not possible to remove from anchorage
[ ] Requires special key to remove from anchorage (staff use only)

C

'C' corresponds to: ☐

5. Snap hook carabiner: EN12275 (type K)
[ ] Double action gate
[ ] Resistant to misalignment
[ ] Gate resistant to vibrations
[ ] Fixed captive eye
[ ] Easy one-handed operation

D

'D' corresponds to: ☐

1. Connector: EN12275 (type Q)
[ ] Minimum diameter 8.0mm
[ ] No hinged gate
[ ] Highly resistant to vibrations
[ ] Robust
[ ] Strong in multiple loading profiles

E

'E' corresponds to: ☐

2. Carabiner: EN12275 (type T)
[ ] Auto-locking gate (triple-action)
[ ] Swivel
[ ] High resistance to misalignment
[ ] High resistant to roll-out
[ ] Gate resistant to vibrations

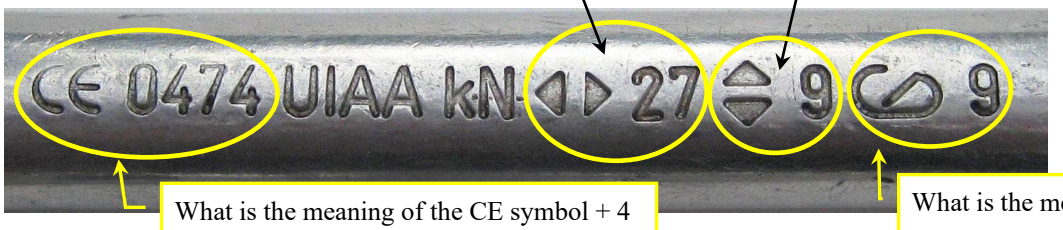
F

'F' corresponds to: ☐

Q16. Explain the meaning of the markings found on a carabiner.

What is the meaning of this symbol?

What is the meaning of this symbol?



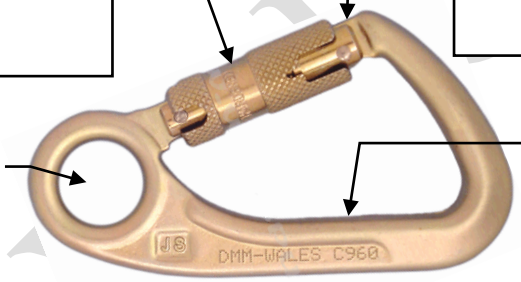
What is the meaning of the CE symbol + 4 numerals?

What is the meaning of this symbol?

Q17. Identify each of the parts of the carabiner. Write your answers in the space provided.

What is the name of this part?

What is the name of this part?



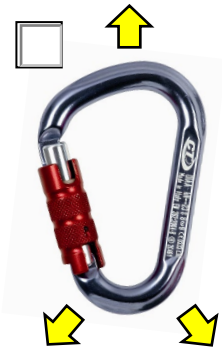
What is the name of this part?

What is the name of this part?

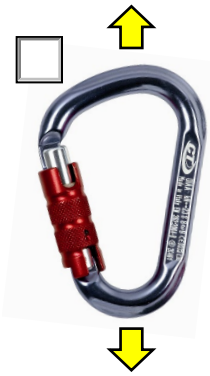
Q18. Study the diagrams carefully. Which of the diagrams indicates the correct loading profile for a carabiner?

A ☐

B ☐



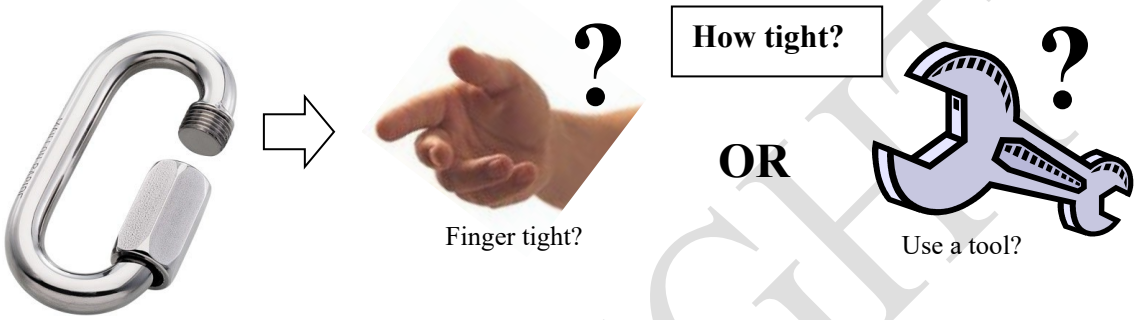
C ☐



Explain:

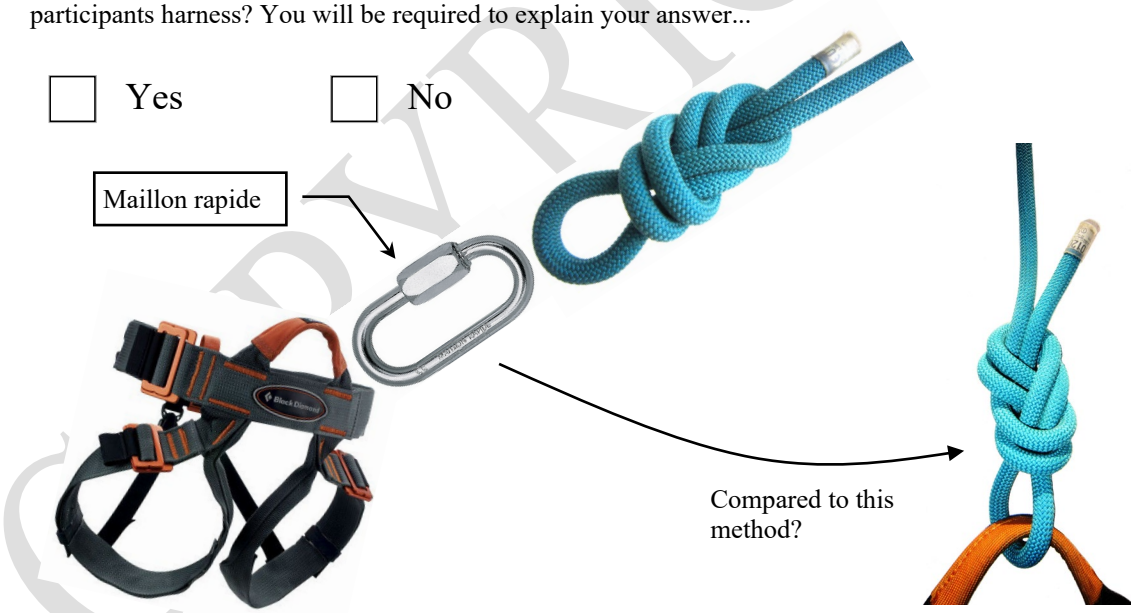
Q19. This question refers to Maillon Rapides (also know as 'quick links'). When using maillon rapides, they must be tightened in what manner? (choose the correct response)

- ☐ A By hand only – screwing all the way as hard as you can.
- ☐ B With a torque wrench to a specified tension (Nm). (if it is to be part of a permanent assembly)
- ☐ C By hand and then backed off a quarter-turn so it can't jam.
- ☐ D With a tool (eg a spanner) – 'nipped up firmly'
- ☐ E B and D are both correct depending on the situation.



Q20. Study the image carefully. Would a Maillon rapide be a suitable method for attaching a rope to a participants harness? You will be required to explain your answer...

☐ Yes ☐ No



Explain:

Q21. Study the photos carefully. Choose the photo you believe shows the optimal mobile attachment anchorage for safety belay ropes. You will be required to explain your answer below (including why you thought the alternative choice was unsuitable).

A ☐

B ☐

Explain:

Q22. Study the photos carefully. Each photo is showing a different method of attaching a draw-cord to a safety belay rope. Choose the photo(s) you believe will cause the draw cord to either fall-off or, cause a jam in the overhead anchorage (eg pulley/ shear reduction block). There may be more than one answer. Explain your answer below…

A ☐

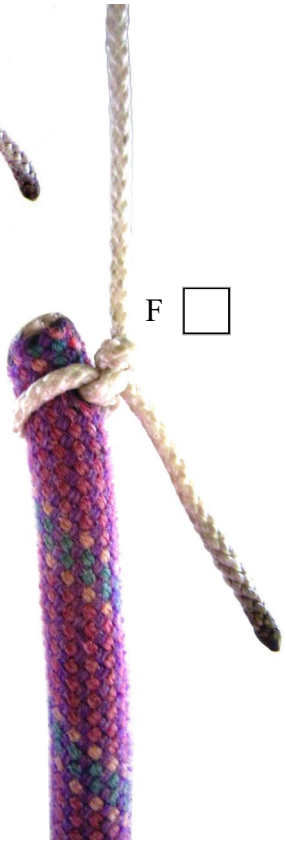
B ☐

C ☐

D ☐

E ☐

F ☐

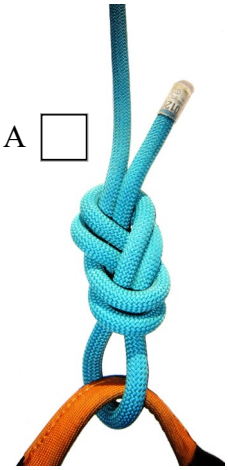


G ☐

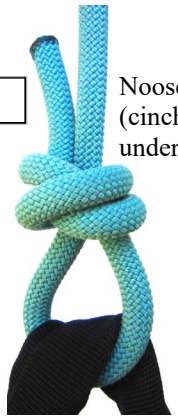
Explain your answer (including why you think some methods are unsuitable):

Q23. Study the photos carefully. This question deals with rope attachment to a participants harness for climbing through high elements on a challenge ropes course. Choose the attachment system you believe will provide the best combination of security and stability and also reduce the risk of human error factors. You will be required to explain your answer…

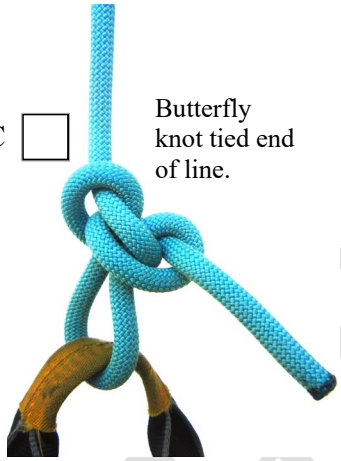
A ☐



B ☐ Noose (cinches tight under load)

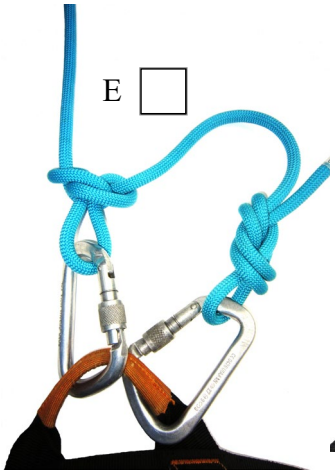


C ☐ Butterfly knot tied end of line.

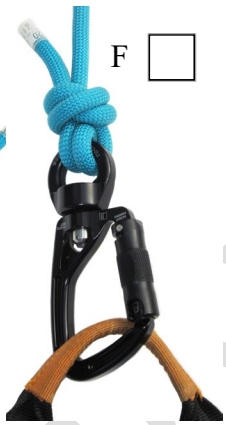


D ☐

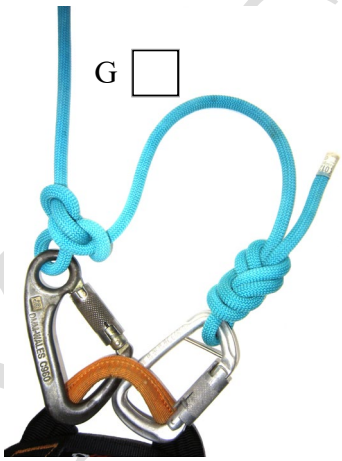
E ☐



F ☐



G ☐



H ☐

i ☐

J ☐

K ☐

L ☐

M ☐

Explain your answer:

ROPE

Q24. The following questions refer to human rated ropes.

Q24a What action should you take if you discover this anomaly on your rope?

Q24b What is this part of the rope called?

Q24c What is this part of the rope called?

Q24d. Indicate the type of rope that matches the EN standard:

EN STANDARD		
EN 892	☐ Dynamic rope	☐ Low stretch rope
EN 1891	☐ Dynamic rope	☐ Low stretch rope

Q24e. What is the maximum *theoretical* lifespan of a human rated rope?

- ☐ 1 year
- ☐ 3 years
- ☐ 5 years
- ☐ 10 years
- ☐ There is no maximum lifespan.

Q24f. What type of rope would be best suited for manual (ie human operated) braking devices on challenge ropes course structures?

☐ Dynamic rope ☐ Low stretch rope

Why (explain)?

LANYARDS

Q25. Study the photos ABCD carefully. Each photo is showing a different type of commercially fabricated dual leg lanyard system. What are the key differences between each of these lanyards? List as many attributes of each lanyard as you can in the box's provided.

Lanyard A:	**Lanyard B:**	**Lanyard C:**	**Lanyard D:**
1. _____	1. _____	1. _____	1. _____
2. _____	2. _____	2. _____	2. _____
3. _____	3. _____	3. _____	3. _____
4. _____	4. _____	4. _____	4. _____

Q26. Which of the above lanyards are primarily intended for **client use**? There may be more than one correct answer. Are there risks with having both legs of the lanyard the exact same length? Explain your answer…

A ☐ B ☐ C ☐ D ☐

Explain your answer:

Q27. Study the photos carefully. This question refers to dual leg ('Y') lanyards assembled from components. Answer each of questions…

27a. Are you legally allowed to assemble your own custom-built staff lanyard from individual components? Or is it against the law in your State to do so?

☐ Yes ☐ No – it is not legally allowed. You must purchase and use a commercial dual leg ('Y') lanyard.

27b. Does your employer at your challenge ropes course site permit the use of custom built lanyards?

☐ Yes ☐ No

27c. What are the key differences between lanyard 'A' and 'B'? Note: Both use dynamic rope.

Explain:

A

B

Q27d. What is this device and are there any benefits?

Explain:

Q28. Study the photos carefully. Each photo is showing a different type of custom-built double (Y) lanyard system. Choose the photo that you believe is the preferred configuration/design (assume that each leg of the lanyard is a different length).

Explain your answer:

A ☐

Dynamic rope

B ☐

Tape / webbing

Q29. Study the photo carefully. What is the <u>root cause</u> of this type of head entrapment within the legs of a lanyard? You are required to explain your answer.

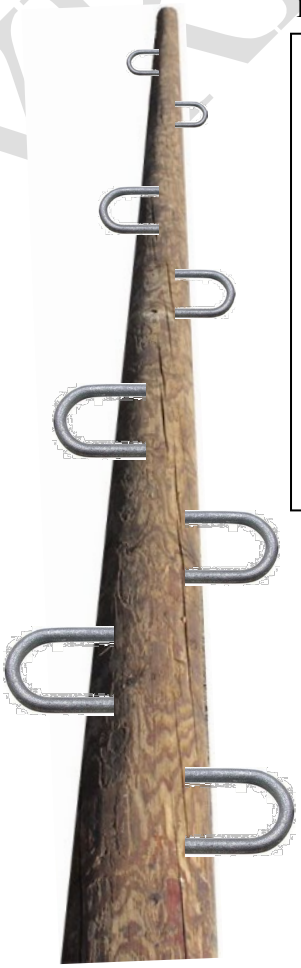
Explain your answer:

Q30. Study the photo carefully. The staff member is climbing a pole using a dual leg lanyard (aka 'lobster claw'). Can you clip into the staples (U bolts) that are driven into the poles? That is, can you use the staples as fall protection? You will be asked to explain your answer…

☐ Yes ☐ No ☐ It depends...

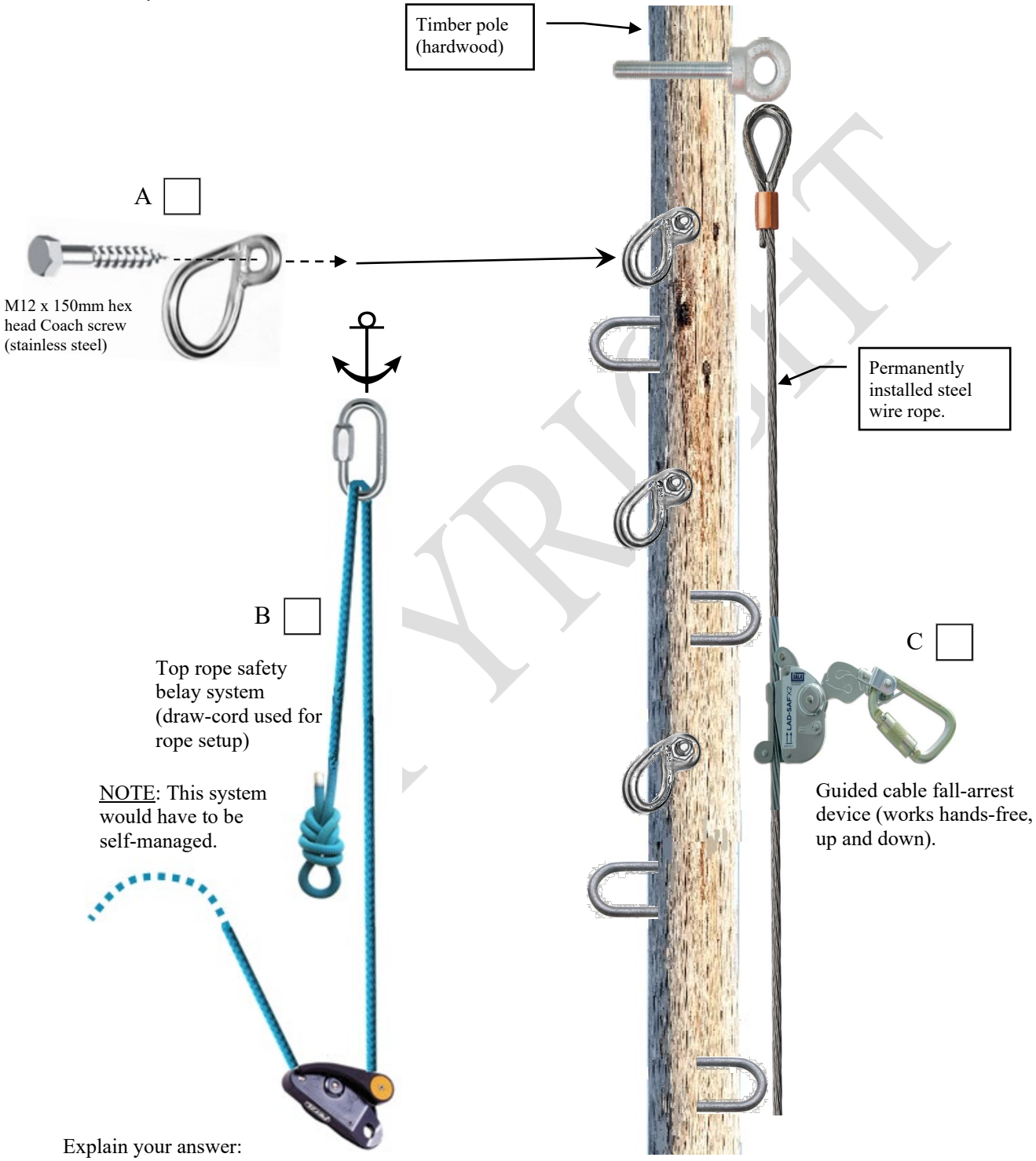
Explain your answer:

U staples are normally driven in with hammer blows into the timber. Holes are pre-drilled. The embedment depth is normally 120-150mm.



Q31. This question relates to the previous question above. Study the images carefully.

Assume that the U staples are not actually rated for free-fall arrest. What type of alternative fall protection system would be <u>practicable</u>? Consider that the alternative system <u>must</u> be capable of being used by a <u>single staff member</u> and be capable of reliably arresting a fall. Choose from the options A, B and C.
Explain why you chose a particular fall protection system – and why you rejected the alternative systems.



Explain your answer:

Q32. Study the photos carefully. A staff member is traversing out along a cable in order to fix a problem with an element. Photo ‘A’ is showing one system and photo ‘B’ is showing a different system.

Choose the system (A or B) that you believe provides the staff member with the best options for mobility and escape in the unlikely event of an emergency or unplanned situation.

You will be required to explain your answer…

Explain your answer:

Q33. Study the photos carefully. Choose the type of harness you believe will be most suitable for use with a pole-rope. What is the purpose of a '**pole rope**'? How could it be useful in the context of challenge ropes courses?

Explain your answer:

A ☐

B ☐

Pole rope
(Petzl Grillon)

C ☐

D ☐

E ☐

Q34. Study the photo carefully then answer all of the questions in the space provided.

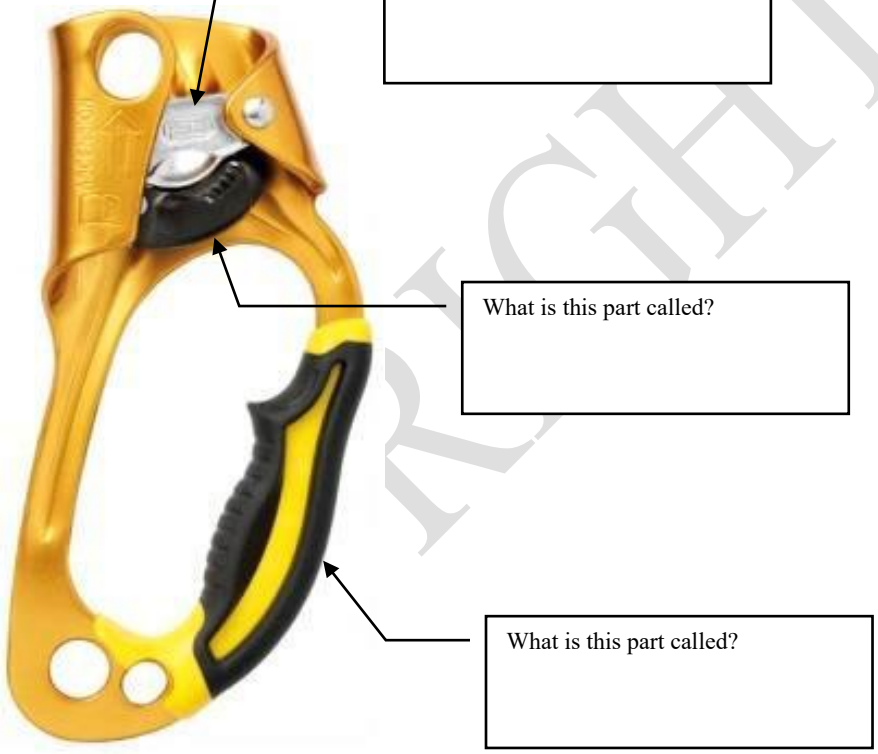
What is the name of this device? _____

What is the device designed to do? _____

List at least 2 uses for the device in the context of challenge ropes courses.

1. _____

2. _____



Q35. This question refers to the maximum lifespan of PPE used in challenge ropes course applications.

All climbing/abseiling equipment can be broadly divided into 2 categories; '<u>software</u>' (eg harnesses, ropes, slings, etc) and '<u>hardware</u>' (eg carabiners, chains, maillon rapides, etc).

Write the *maximum* theoretical lifespan for each product category below:

- Software: _____ years
- Hardware: _____ years

Q36. Explain the meaning of the following climbing safety calls:

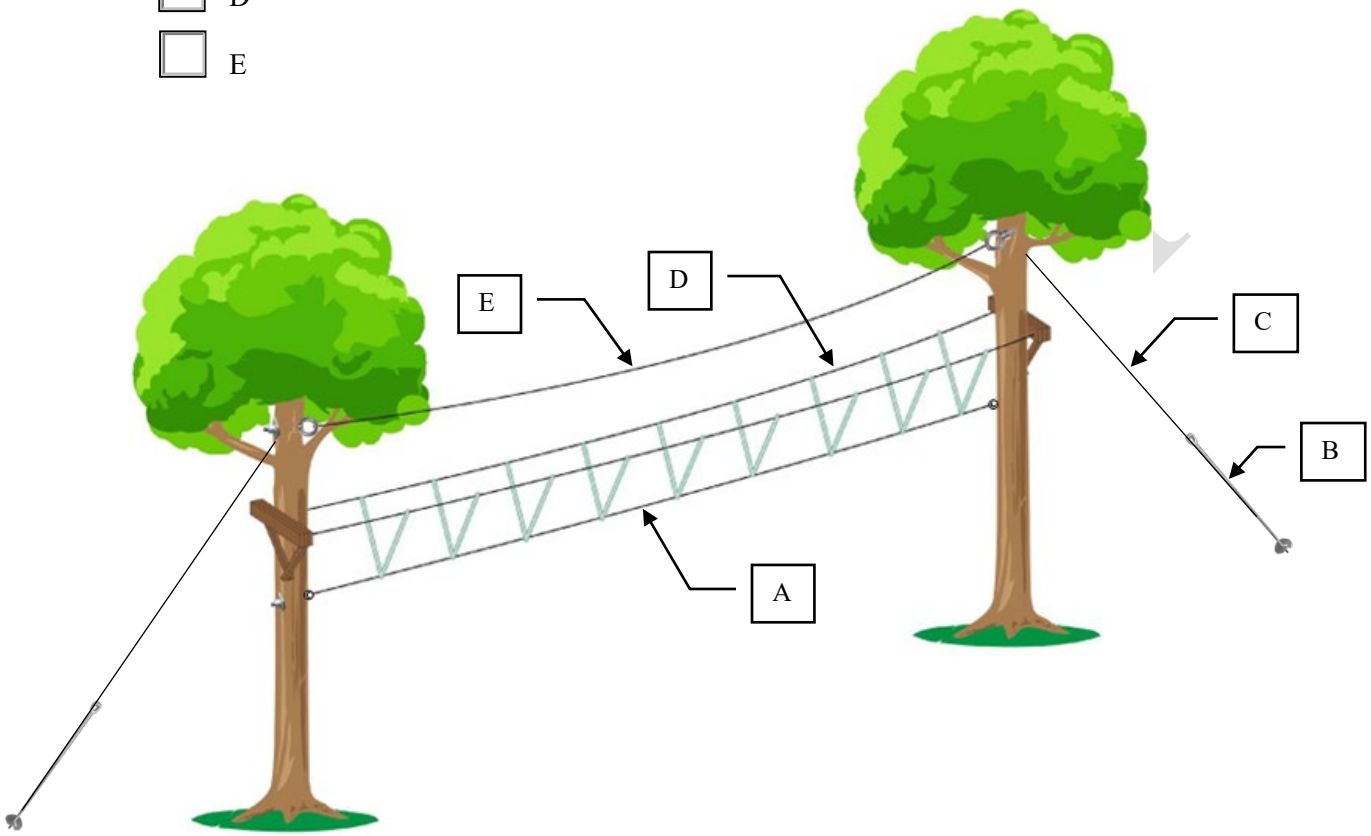
SAFETY CALL	DETAILED MEANING
Belay ready	
Climber ready	
'Have you got me?' / 'Got me?'	
Lower me	

Q37. What does each letter of the following safety checklist mean?

	SHORT DESCRIPTOR	DETAILED MEANING
A		
B		
C		
D		
E		

Q38. Identify the critical load support element in the image below.
Clarifying note: If this element fails, it would result in a catastrophic outcome.

- ☐ A
- ☐ B
- ☐ C
- ☐ D
- ☐ E



Q39. Steel wire rope is used in the construction of permanent challenge ropes courses.
Grade 2070, 7x19 construction galvanised steel wire rope is commonly found on challenge ropes courses in Australia.
Hypothetical:
During a routine inspection, a life critical wire rope was discovered to have damage.

How many broken wires are permitted? Choose the response you think is correct.

- ☐ 1 broken wire strand is permitted, but it must be reported immediately and inspected by a competent person who specialises in steel wire rope used in lifting and cranes.
- ☐ Up to a maximum of 4 broken strands are permitted (more than this triggers immediate withdrawal of the steel wire rope from service).
- ☐ No broken wire strands are permitted in any steel wire rope used in human life critical applications.

RESCUE SKILLS

Q40. A staff member had to climb a pole to re-thread a broken pull cord (3mm VB cord). While climbing to the top of the pole, the staff member suffered a heart attack. The staff member is unconscious and hanging from his/her dual leg (twin-tail) lanyard.
Explain the procedure in a step-by-step process for extracting the patient from the pole top and getting him/her down to the safety of the ground.

Add as many steps in the sequence as you think necessary…

Step 1: _____

Step 2: _____

Step 3: _____

Step 4: _____

Step 5: _____

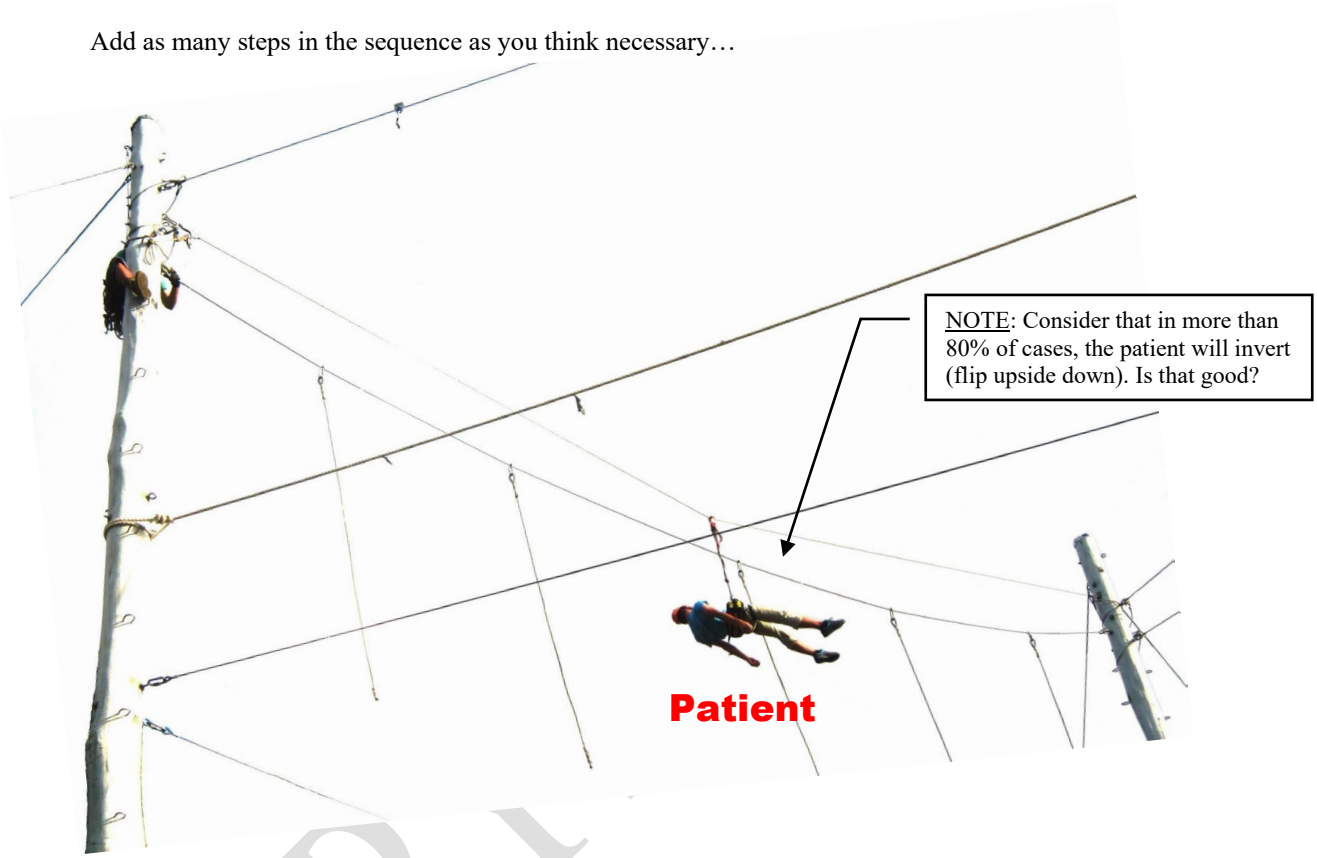
Step 6: _____

Step 7: _____

Step 8: _____

Q41. A staff member had to climb a pole and then traverse out to a pulley to re-thread a broken pull cord (3mm VB cord). When arriving at the pulley along the cable, a wasp nest is disturbed and the staff member suffers hundreds of stings to the face and neck. The staff member goes into shock and lapses into unconsciousness. The patient (ie staff member) is located at a mid-span position on a horizontal cable.
Explain the procedure in a step-by-step process for extracting the patient from the cable and getting him/her down to the safety of the ground.

Add as many steps in the sequence as you think necessary…



Step 1: _____

Step 2: _____

Step 3: _____

Step 4: _____

Step 5: _____

Step 6: _____

Step 7: _____

Step 8: _____

Q42. Study the photo carefully. In terms of rescue, what is this particular system designed (intended) to do?

Answer the questions in the spaces provided...

42.1 What is the purpose of this device?

42.2 What is the purpose of this device?

42.3 What does this connector attach to?

What is this system designed (intended) to do? Does it solve many issues? Or does it make the rescuers job harder? Explain your answer:

ROPES COURSE INSPECTION

Q43. Study the photo carefully. What is the staff member checking as part of his pre-activity inspection?

What is the staff member checking?

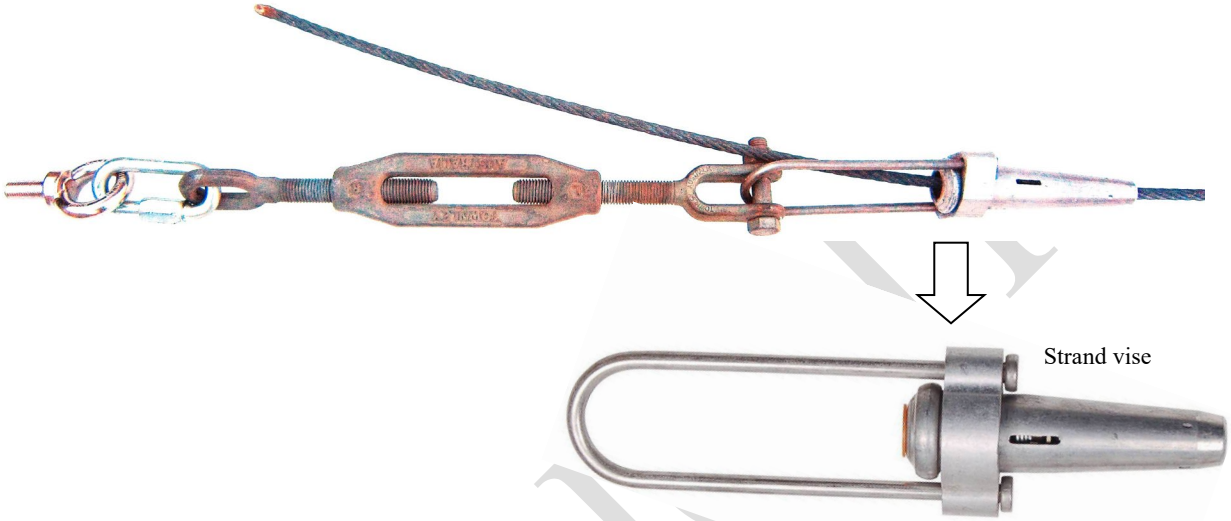
Explain your answer.

Q44. Study the images carefully. Some challenge ropes course builders tensioned the steel wire rope cables using a strand vise.

You must read the technical notice at this link (Maclean power systems USA).

Link: https://ridesdatabase.org/wp-content/uploads/2019/11/maclean-power-systems_ropes-course_ride-file_610.pdf

Warning: Save your work before clicking on the link as you may lose all your data.



Q44a. Are Maclean Power Systems recommending the use of Strandvise's on challenge ropes courses?

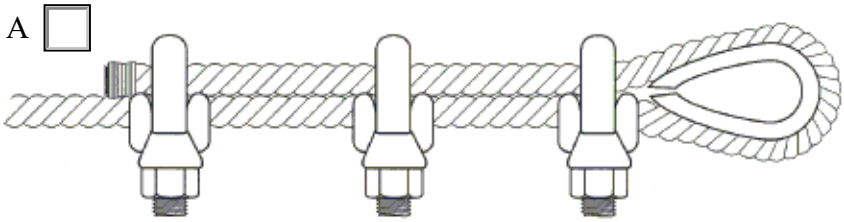
☐ Yes ☐ No

Q44b. Briefly summarise the Maclean Power Systems position and explain if Strandvise's can still be used and/or installed on challenge ropes courses.

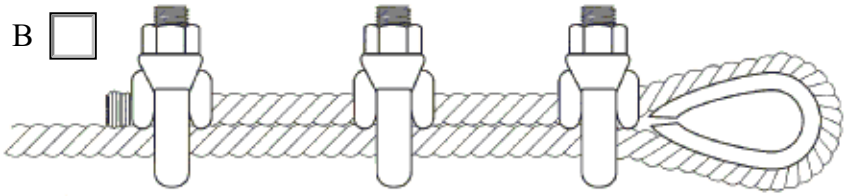
Explain your answer:

Q45. Study the diagrams carefully. Choose the diagram you believe indicates the correct installation of single throated cable grips (for guy lines).

A ☐



B ☐



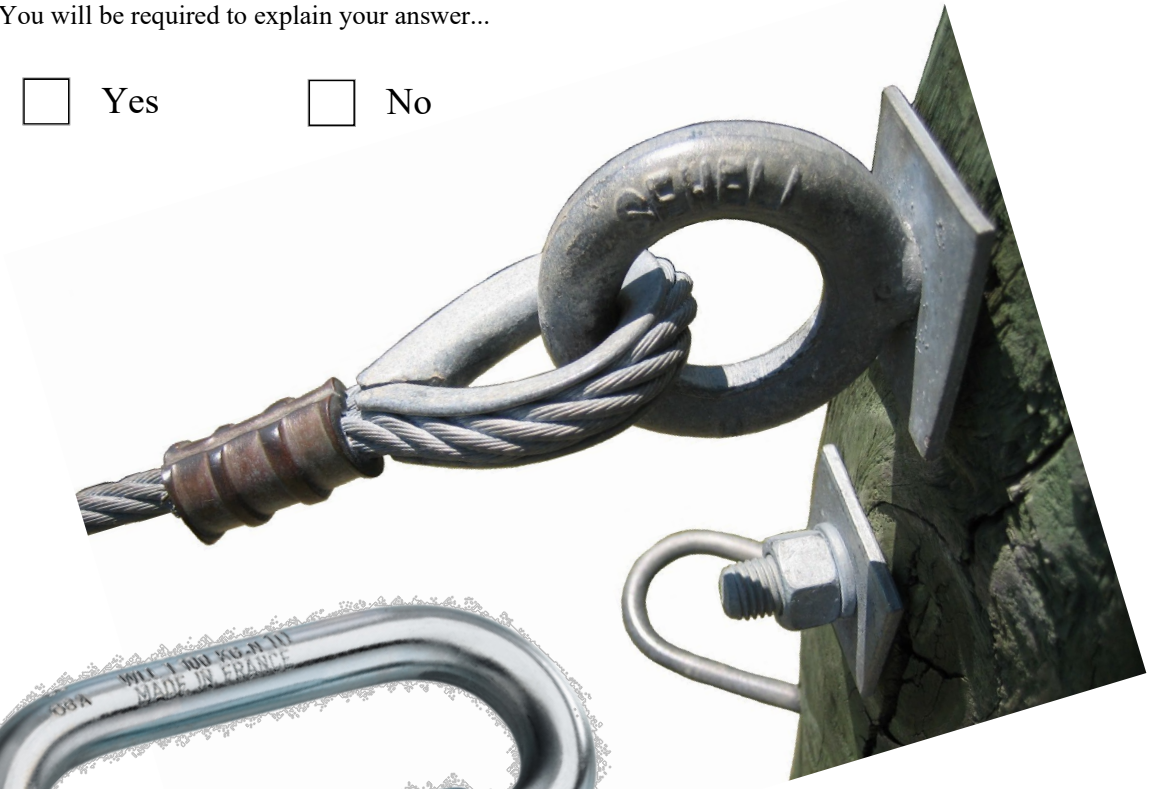
Guy line (backstay)

Q46. Study the photo carefully. What has happened? What caused this issue?
Explain your answer…

Explain:

Q47. Study the photo carefully. Some ropes course builders directly attach horizontal cable life-lines to an eye bolt (typically an M16 eye bolt).
Could a size M16 Maillon rapide be used to link the cable to the eye bolt instead?
You will be required to explain your answer...

☐ Yes ☐ No



Explain your answer: (discuss the pro's / con's and any safety issues)

Q48. Study the images carefully. In October 2019, a steel wire rope zip line termination failed – resulting in catastrophic loss of life. High elements on challenge ropes courses also use wire rope terminations of various forms – and the same fundamentals apply.

Each image is depicting a different method of terminating the wire rope.

Choose the wire rope termination you believe is most secure and legally justifiable in consideration of the 2019 tragedy. You will be required to explain your answer...

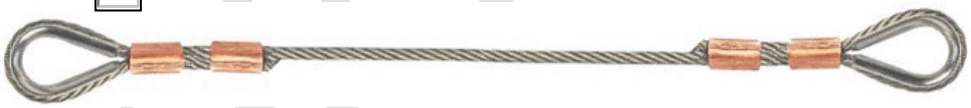
***NOTE**: For the purposes of answering this question, assume the steel wire rope is life critical – and failure of an end termination will result in catastrophic loss of life.*

A ☐

B ☐

C ☐

D ☐



Explain your answer:
Include a comment about any legislative requirements (ie the law).

Ladder safety

Q49. Study the photo carefully. Answer the questions where indicated.

According to ladder safety regulations, how many body parts must be in contact with the ladder at all times while climbing?

☐

Why is this person holding the ladder?

What is the required angle?

☐ degrees

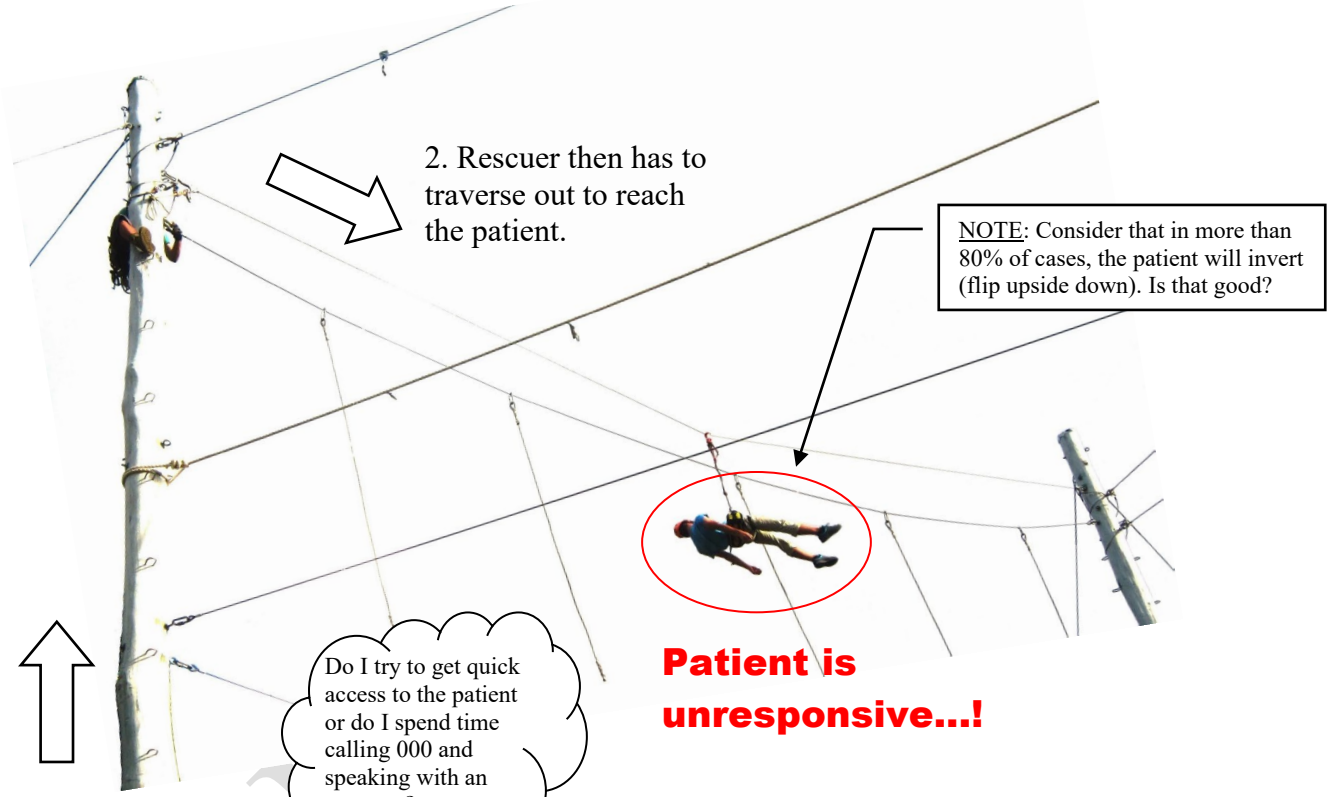
Is the angle of the ladder a legislative requirement? ☐ Yes ☐ No

Why is it important to lean the ladder at the correct angle?

Q50.

This question is about the decision to attempt a rescue. Study the photo and read the question carefully. Assume there are two (2) qualified staff members working and setting up high elements before the clients are scheduled to arrive. There are other admin staff on site working in their office but they are not trained or skilled in vertical rescue techniques – and don't know how to climb up a pole.

Situation: During setup, one of the draw-cords ejected and fell to the ground. Now there is no threaded draw cord, and that element is crucial for the activity. One of the staff must climb a pole and then traverse out to re-thread the draw-cord. The other staff member remains on the ground. While traversing out to reach the mobile attachment pulley, something went wrong and the staff member (at height) is in serious difficulty and not responding. What do you do? Select your response from the options below.



Q. Should the rescuer (as a first priority) immediately call 000 before climbing a pole and attempting a rescue?

- ☐ YES – that's what I was taught to do and I don't question it.
- ☐ NO – you need to properly assess the situation and the patient before alerting emergency service responders
- ☐ NO – Don't do anything (that way you can't get sued)

Explain your answer:

Final score:

LOCK

Lock this exam.
Note: When you hit this button and lock the exam, it can no longer be edited.

Student declaration:

I declare that I completed this exam paper without the assistance of others. I realise that my exam score is an indication of my current knowledge and experience in the area of challenge ropes courses. I accept and acknowledge that if I am Guiding participants on high elements, I owe a duty of care and that the safety of everyone will be my responsibility. I further agree and accept that I must be diligent and focussed at all times while working. All of my answers are my own work – and not the work of someone else.

Student signature: _____ Date: _____