

Marine Engineering Exam Resource – Review of Rigging and Hoisting

1. What is the weight of steel?
1" steel plate 1'ft x 1'ft = 40 lbs. 40lbs/sq ft 1" in thick
480lbs / cubic foot.
2. What does I.W.R.C. mean in wire rope?
Independent wire rope core. For sudden heavy loads. Centers of wire rope, the strands are wrapped around. Holds the shape of the rope and supports the strands. Wire core. Page 28.
3. What does 6 x 19 mean with wire rope?
Wire rope with 6 strands 19 wires per strand. Can be 17 to 26 wires.
4. How is wire rope measured?
Across its greatest diameter.
5. How much is a sling reduced by making an eye in the end by using a Crosby clip?
Reduced by 20%.
6. How should Crosby clips be installed on a wire rope?
Saddle on the live end, U - bolt on the dead end. A cowboy always saddles a live horse. Page 32.
7. What is the formula for S.W.L. of wire rope?
Diameter squared x 8 x 2000 = lbs.
Diameter squared x 8 = tons
 $\frac{3}{4} \times \frac{3}{4} \times 8 = 4.5$ tons.
8. What would be the minimum sheave size for 1" in diameter 6 x 19 wire rope?
20:1 1" in wire rope 20" in diameter pulley
8:1 for fiber rope. For minimum bending and flexing. Page 32.
9. What is a snatch block used for?
Single sheave made so that the shell opens on one side of the base allowing a rope to be slipped over the sheave without threading it. Used to change direction of pull. Page 58.
10. If the wires are laid right handed and the strands are laid left handed, the rope is called?
Left regular lay. Strands laid to the left.
Wires twisted right handed around a center wire to make the strand and strand twisted left around the core.
Strand appears straight along wire rope. Page 28 – 29.

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11. What is a rope called when both wires and strands are laid right handed?
Right Lang Lay. Strands appear diagonal across wire rope. Page 28 – 29.
12. Why do we remove all the rope from a drum hoist that has more than one wrap of wire on the drum, and clip several feet off the anchor end?
To change position of the crossover point. To help stop excessive wear of the drum and the rope. Also wear around the anchor end. Page 32.
13. How is fibre rope measured?
Up to 1" in it is measured by diameter over 1" in it is measured by circumference. Page 34.
14. Fibre rope can be made of?
Hemp, cotton, sisal, jute, which are all natural fibre's. Hemp is the most common.
15. What type of rope would be used on a safety line? Lanyard?
Nylon with a minimum 5/8" diameter. The stretch and spring can stand the shock load.
16. What is the formula for the S.W.L. of fibre rope?
S.W.L. = D^2 in 1/8" of an inch x 20
1/2" in of rope = 320lbs x 4 x 4 x 20.
17. What is the S.W.L. formula for nylon rope?
S.W.L = D^2 in 1/8" of an inch x 60.
18. What are the S.W.L formulas for polypropylene?
S.W.L = D^2 in 1/8" of an inch x 40.
19. What is a reef knot used for?
Tying together two links of the same size so they will not slip. Page 38.
20. What is a figure eight knot used for?
Used at the end of a line to prevent the end from slipping through a fastening or load in another line. Page 37.
21. What is a bowline used for?
To form a loop in the end of a line. Easy to tie and will not slip. Can be used wherever loop is required.
22. What is the safety factor of rope when personnel are involved?
10:1 elevator breaking strength 10,000 S.W.L 1000.

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23. What are sheet bends used for?
To join ropes of two unequal diameter. Light to medium load. Page 42.
24. What is a cat's paw used for?
Temporary means of attaching rope to a hook. Page 44.
25. What is a moused hook?
A hook with strands of wire across the opening. To stop it from slipping off. Page 67.
26. Which hook is weaker on a chain fall?
The lower hooks so it will distort and give warning of possible overload. Replace never repair.
27. How do you measure for wear on a hook? What is an ultrasonic test used for?
Ultrasonic test is used to check for cracks using sound beams. To check for crack and twist in neck. To check throat opening. To check eye for wear or elongation. To check for crack and wear in body. Page 475.
28. What is a spreader bar and where would you use one?
Used for making a lift on long loads or heavy machinery. It eliminates load tipping, sliding or bending.
29. Name three ways a single sling can be used?
A single sling can be used for vertical, choker, and basket. Page 59.
30. What is the minimum angle to be maintained with wire rope slings?
Minimum angle is 45 degrees in Ontario and 30 degrees according to the millwright's manual. Minimum angle is critical angle.
31. What is a double basket sling?
Two single basket hitches passed onto load. Angle between load and sling should be 60 degrees or greater to stop sling from slipping.
32. What is the minimum thickness of scaffold planking?
Two inches nominal.
33. How should lifts be made when using two eyebolts?
Force of lift should be vertical. Using shoulder eyebolts you can use 45 degree angle or greater.
34. What should be used with eyebolts when lifting?

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Spreader bar and shackles.

35. Slings have a safety factor of?
5:1 Five times the breaking distance.
36. Mechanical advantage of a rope block is computed from?
Moving block and the number of ropes on this block. 4:1 Effort = load divided by M.A 100 = 400 divided by 4. Four ropes 100 pull 400-lb. load.
37. How are shackles sized?
By the diameter of the bow section not the pin. Made of forged alloy steel.
38. How many Crosby clips are required for $\frac{3}{4}$ " wire rope?
Four.
39. What is whipping and why is it used?
Means of fixing a fibre rope so that the strands will not unravel. Page 48. On wire rope it is called seize or wrap. Use tape or light wire. Can braze end of wire if going through drum or winch and take wire off.
40. How far apart should Crosby clips be spaced?
Six times rope diameter. $\frac{3}{4}$ diameter x 6 = 4.5" inches apart.
41. What are thimbles used for?
Placed in the eye to reduce wear and stress when rope is bent around a small diameter.
42. What does a Grab Hook look like, and what is it used for?
Looks like a narrow hook and is used for attaching directly onto a chain so no slippage occurs. Page 57.
43. What is the hand signal for stop?
Right hand bending at elbow back and forth straight into the body.
44. What is the hand signal for raise load?
Forefinger on hand raised twirling in clockwise circular motion.
45. What is the hand signal for use whip line?
Tap elbow with one hand then use regular signal. Whip line is a single cable on a reeved crane used for small loads.
46. What is a timber hitch used for?
General use for fastening rope to pole and for hoisting planks, timbers and pipes.

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47. What is the purpose of a tag line?
To help guide or direct load and prevent spins. Is a length of rope tied to a load.
48. For a wedge eye, what is the correct procedure for tying off the tail?
Use Crosby clip. Do not fasten to live line. Tail should be 6-9 times diameter.
49. What type of steel should be used in wire rope for heavy loads?
Specially approved plow steel or extra-approved plow steel. Page 28.
50. What does tapping the hard hat mean?
Use load line or main hoist line. First tap on hard hat then use regular signals.