

Marine Engineering Exam Resource – Review of Pumps

1. What is a non-positive displacement pump?
Allow slipping in fluid it is pumping. No positive seal between inlet and outlet.
2. What is a positive displacement pump?
Gives a certain amount of fluid every revolution. It will not slip. Positive seal between inlet and discharge.
3. What pump is a centrifugal pump in?
Non positive. Page 333.
4. What is static suction lift?
Measured in vertical distance given in feet from center of pump to the free level of the liquid to be pumped. Page 331.
5. What is suction head?
Level of liquid supply is above center of pump.
6. How far could a pump lift fluid under ideal conditions?
34 Ft. Do to the low pressure in the regain of the pump inlet.
7. What so most manufactures rate their pumps lift capabilities at?
15 Ft Do to friction loss and leakage.
8. Name three types of impellers?
Open - some solids and grit. Semi open. Liquids and sediments. Closed - clear liquids. Parts of am Impellers eye - where fluid enters veins - part that pushes fluid shroud. In closes sides. Page 334.
9. What are wear rings used for?
They are used for minimizing leakage from the high-pressure side of the impeller to the low-pressure suction side. They also prevent erosion of the casing in this area. Page 335.
10. What is double suction pump?
Were fluid enters both sides of impeller. Inside casing. Page 338.
11. What are the two main parts of a centrifugal pump?
Casing or valve (the shape of casing on inside). Impellers. Test.
12. What is the shape of the housing of a centrifugal pump, and why?
Volute shape. Shape directs fluid from impeller to outlet this increases the pressure to the outlet. Increase Velocity - Decrease Pressure.
13. Are centrifugal pumps reversible?
No. Because of shape.
14. What type of impeller would you use if there were some solids in the fluid you were pumping?
Open impeller. So no jamming.
15. What is a single suction pump?

Marine Engineering Exam Resource – Review of Pumps

One entry to impeller.

16. What is a multistage pump?
Pump with more than one impeller and pump casing. Used for higher pressure on final outlet.
Page 335.
17. What kind of pump is an axial flow pump?
Impeller type pump fluid flow parallel to shaft axis. Like boat. Can be mounted vertical or horizontal.
18. What is a radial split casing?
Were front comes off. Casing spit horizontal to shaft axis.
19. What is a horizontal split casing?
Casing split parallel to shaft axis. Were top comes off.
20. What happens when a centrifugal pump is started backwards?
No flow.
21. What are shaft sleeves used for?
Absorb the wear caused by packing on the shaft in the stuffing box area. Cheaper and easier to replace sleeves.
22. What types of bearings are used in centrifugal pumps?
Single or double row angular contact (thrust bearing). Deep groove ball (radial bearing). Plain bearing (babbit, not used much anymore.)
23. Why are there holes in the impeller?
Where the fluid is being used to equalize the thrust loads on the shaft. Ie. Double suction pumps.
24. What is a lantern ring and why is it used?
H section brass rings for letting fluid to be equally distributed around shaft for cooling and lubricating the packing. Adds in sealing the pump from air leaks up the shaft if the pump is working with a suction lift. Page 344.
25. What are the two most common seals used in centrifugal pumps?
Packing and Mechanical seals. Page 345-346.
26. What is an internally sealed gland?
Were fluid from pump is fed into lantern ring or stuffing box.
27. What is an externally sealed gland?
Were outside source of fluid is fed to lantern ring or stuffing box.
28. When a centrifugal pump is pumping an abrasive fluid, what would be the external sealing water pressure on the packing seal?
10 PSI higher than pump pressures. To keep abrasives out of stuffing box.

Marine Engineering Exam Resource – Review of Pumps

29. What is the most important consideration when mounting a pump and a motor?
The temperature of fluid that is going to be pumped. Coefficient of expansion X temperature rise X center. Page 79.
30. What is the start up checks for a centrifugal pump?
Turn by hand. Direction is correct. Proper lubrication. May have to prime pump. Water to seal or lantern ring. Page 340–341.
31. What valving could you expect on the discharge side of the pump?
Gate valve, for service. Check valve, stop fluid from backing up when stopping.
32. How could you repair wear on the volute casing?
Welding to replace lost metal then grind down to reshape. Page 344.
33. When do you check for stress in a pump?
Before you couple it to a drive. Before alignment. Turn by hand.
34. How should the joints on pump packing be?
Ninety-degree intervals from last one. Or staggered 90 degrees.
35. What precautions should be observed when using a mechanical seal in a pump?
Make sure faces are lubricated (before starting). Don't let seal run dry at any time.
36. What type of packing is used in high temperature application?
All braided metal. Foil wrapped. Wire braided.
37. What care should be taken when tightening a newly packed stuffing box?
Do not over tighten. Gradually tighten gland nut while pump is running until desired leakage is achieved. Recheck after running approximately 24 hours of running.
38. What would you look for if there was a shortage of fluid being delivered by a centrifugal pump?
Fluid level to low. Plugged inlet. Direction of rotation. Possible shear key in impeller.
39. Where is a lantern ring placed in the stuffing box?
Must be under the hole in the packing gland.
40. If a pump is working against a suction lift and receiving air through the stuffing box, what could be done to prevent this?
Repack. Install lantern ring to act like seal.
41. The purpose of springs in a mechanical seal installed in a centrifugal pump is to?
Is to apply constant pressure on sealing faces. Takes up endplay. Page 349.
42. How many extra packing rings can be placed in a stuffing box in an emergency?
Just one turn.
43. What should also be done in regards to question 42?

Marine Engineering Exam Resource – Review of Pumps

Tag on pump that there is one extra turn of packing in there.

44. What is the advantage of a steel fabricated base over a cast iron base?
Steel base can be more easily modified. Page 340.
45. What are the various schedules of pipe used in industry?
Schedule 40, schedule 80, schedule 160 and double extra heavy. Outside stays the same inside diameter changes. Page 305.
46. How are anchor bolts positioned in a foundation?
Wooden template. For pouring of cement.
47. How would you check to see if your anchors were square in the foundation?
Corner to corner square test.
48. What is grout used for?
Spread the weight of impact over a larger area. Fill in spaces under machine. Better support. Prevents water and adds to rust resistance. Page 453.
49. What is the biggest advantage in using removable anchor bolts?
Easier to replace if broken. Page 452.
50. What is the formula for leveling and the procedure?
Make sure machine is stable and that there is no wobble. Determine shim size. Distance between holes divided by level length time's feeler gage.
51. What is the rule of thumb regarding shim size?
Shim size should be 10x-bolt diameter.
52. Name three types of jack and an advantage of each?
Screw jack - lifts slowly. Ratchet jack - lifts quickly. Hydraulic jack - for precision movement of heavy loads.
53. What is the purpose of the holes in a pump base?
For putting grout in under machine.
54. On a 3 - 4 - 5 triangle, which points should you measure to check for square?
Any triangle with sides having a 3 - 4 - 5 length ratio is a right angle triangle.
55. Where should you place shims on a base?
Just under bolt hole locations.
56. What is the purpose of using wedges when leveling?
Just to hold machine level in place quickly until shims are in place.
57. What is the best type of level to use when leveling off points 50 feet apart?
Transit level. Laser level. Page 455.