

Marine Engineering Exam Resource – Review of Pneumatics

1. What are the two general classifications of compressors?
Positive displacement. Dynamic displacement ??????? Page 353
2. What is Boyles Law?
At constant temperature absolute pressure varies inversely to volume.
3. What is Charles Law?
At constant pressure the volume of gas is directly proportional to its absolute temperature.
4. What is Gay-Lussacs Law?
At constant volume the absolute pressure varies directly to its absolute temperature. Double the temperature = double the pressure. Volume of container will not change temperature w
5. What does P.S.I.A. stand for?
Pounds per square inch absolute. Gauge pressure minus atmospheric pressure which 100 PSI gauge = 114.7 P.S.I.A.
6. How do we normally measure air pressure?
PSI Gauge.
7. What is a single acting piston compressor?
Compressor air on one side of compressor. Double action will compress on both sides.
8. What is a single stage piston compressor?
Single stage compressors reach final pressure with one compression stroke. In two stage air passes from one piston to another and pressure is built up gradually
9. How does a piston compressor work?
A piston will reduce the volume of air in a cylinder and compress the air to a given pressure. Boyles Law - Reduce volume increases pressure,
10. Name three rotary compressors
Sliding vane, Lobe , and Screw. Page 355-356
11. What is an unloading valve?
A valve that prevents the inlet valve from closing on a piston compressor, this prevents the compressor from building up pressure ?????? Page 354-355
12. Where would you find an unloading valve?
On top of cylinder at intake valve.
13. What is an intercooler?
Air water cooled used to cool air between stages of compression. This will help reduce the amount of H.P. ? to drive the compressor. Page 354.
14. What is Multistage compressor?
Page 354

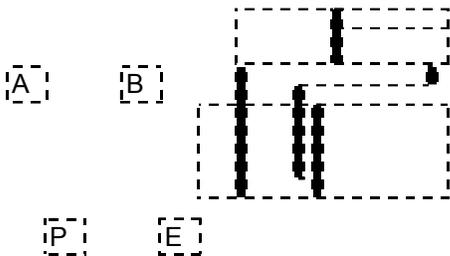
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15. Cooling of a compressor can be accomplished by using what medians?
Refrigeration. Forced air, fan. Water coolers.
16. What is an after-cooler.?
Cools air after leaving compressor. Page 357
17. When a compressor is relieved of all internal pressure, it is said to be?
Unloaded. Page 355
18. The discharged valves of a compressor are opened by?
Air pressure after build up. Page 355
19. Where does the compressed air go to?
Tank reservoir. Page 358
20. An inter-cooler on a multistage compressor reduces the...?
The temperature between stages. Reduces heat.
21. Any compressor with cylinders of the same bore size, regardless of the number of cylinders may be called a... ?
Single stage - leaves the piston and goes to the tank. Multistage goes from piston to another piston then to the tank. Page 354
22. If excessive water accumulation is found in an air compressor receiver, what could be the possible cause?
Leak in head gasket if water cooled. Cracked cylinder head. Condensation caused by too cool of water. Leaking after cooler. Page 360
23. Failure of a compressor to reach a set operating pressure would likely be caused by?
Leak in discharge system. Dirty air filter. Faulty regulator. Compressor worn out. Faulty blow out valve. Page 360
24. The pressure in the low stage of a two stage compressor is showing higher than normal. The most probable cause would be?
Leaking back from second stage through valves. Page 360
25. What is a trio unit?
Filter- regulator -lubricator. Conditions of before entering machine or air tool or equipment. Page 362
26. What are two types of regulators?
Self relieving (hole in diaphragm and body) non releasing.
27. How does an air filter work on an airline?

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Filter removes liquids and solids by swirling the air inside the bowl. Centrifugal force will separate particles also the air has to change direction and push through a filter witch will remove any remaining particles. Particles and water fall into the quit zone below the baffle.

28. How does a lubricator work?
Air pressure which introduces a fine oil fog.
29. What is a cushioned cylinder?
An air cylinder which will slow down the speed of the piston at the end of its stroke. Prevents shock and damage to cylinders
30. How is cylinder speed controlled?
Control valves with check valve. Page 285
31. What is a two way valve N.O. N.C.?
Condition of port. Two main connections. N.O. = normally open N.C. = normally closed
32. What is a three way valve? N.O N.C.
diagram
33. What are the two most common types of valve designs for pneumatic valves?
361 Spaul 282 Poppet
34. What is the difference between a directional control valve and in pneumatics compared to hydraulics?
Pneumatics - air is exhausted to atmosphere
Hydraulics - oil is exhausted to tank.
35. What are some different actuating devices for pneumatic valves?
Push button -spring return Air pilot -spring return
Solenoid - spring return Level -pentant.
36. What is a five way valve?
A four way valve with two exhausts. IE five main ports see diagram



37. What line is attached to letter A port on a directional control valve?
A - control end B - rod end

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38. What is meant by the term 3 position?
The number of switch positions
39. What is an OR valve?
Sends a signal from one place or the other.
40. What is an AND valve?
This valve has to have both valves pushed to activate the device.
41. What device is used for quieting exhaust air?
Muffler