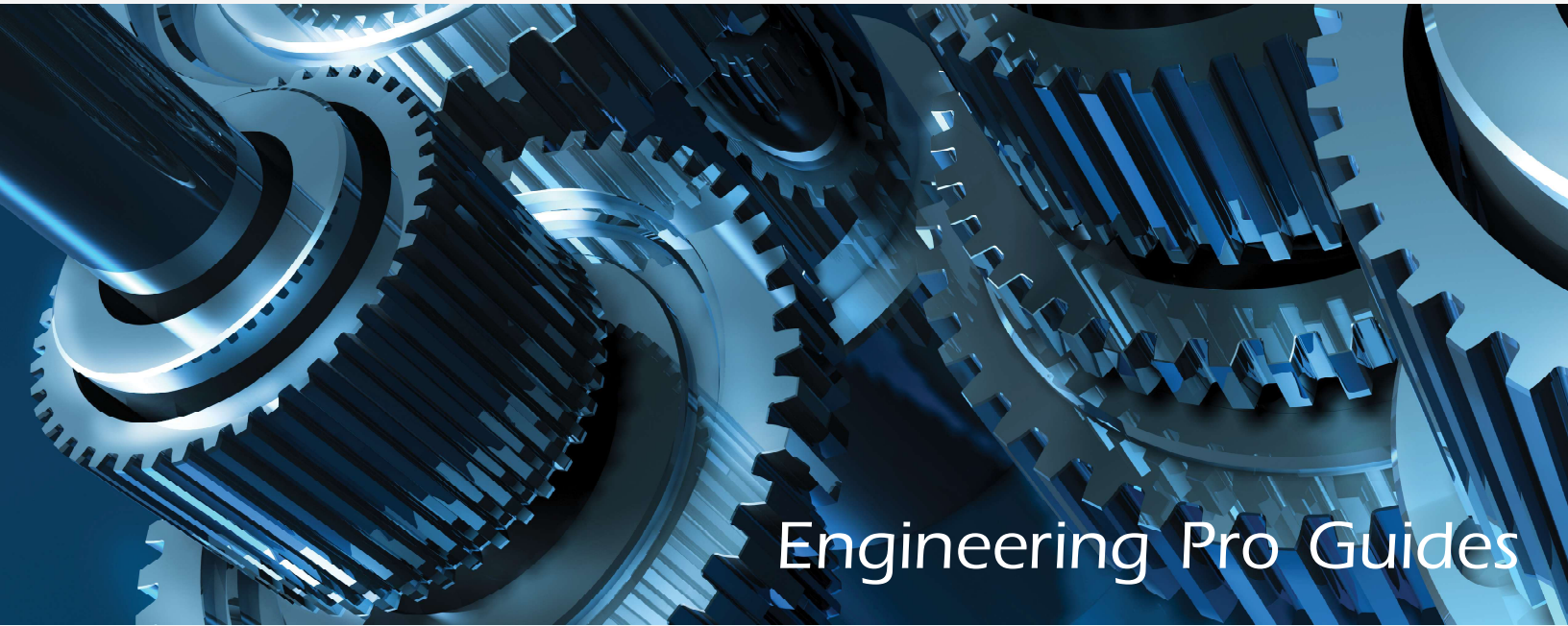


Mechanical Final Exam PE



Engineering Pro Guides

HVAC & Refrigeration

- 80 exam difficulty level problems
- Covers Mechanical PE HVAC & Refrigeration exam topics
- Written in exam format
- Also includes detailed solutions and statistics on past scores. Assess your preparedness.

Justin Kauwale, P.E.

PROBLEM 1

PRINCIPLES BASIC ENGINEERING PRACTICE

A client is deciding between equipment A and B, which equipment should you recommend? Equipment A - 10 year life, \$1,000 initial cost, \$25 annual cost. Equipment B - 30 year life, \$2,000 initial cost, \$25 annual cost. Assume an effective interest rate of 5%.

- (A) Equipment A because it has a lower annual owning cost.
- (B) Equipment B because it has a lower annual owning cost.
- (C) Equipment A because it has a higher salvage value
- (D) Equipment B because it has a longer life

PROBLEM 2

PRINCIPLES – THERMODYNAMICS

A refrigerant cycle uses R-404a at a condenser temperature of 100°F and an evaporator temperature of 20°F. What is the entropy at the exit of the condenser? Assume no sub-cooling and a 100% effective condenser.

- (A) 0.0912 Btu/lb-°F
- (B) 0.0926 Btu/lb-°F
- (C) 0.0949 Btu/lb-°F
- (D) 0.0966 Btu/lb-°F

PROBLEM 3

PRINCIPLES – PSYCHROMETRICS

70 °F DB, 55 °F WB air is to be injected with steam to raise the dew point to 60°F. What is the ratio of steam to dry air required to achieve this dew point? Assume sea level and assume the steam is mixed adiabatically with the dry air. Assume steam has an enthalpy of 1100 Btu/lb.

- (A) 0.0026 lb steam/lb dry air
- (B) 0.0053 lb steam/lb dry air
- (C) 95 lb steam/lb dry air
- (D) 189 lb steam/lb dry air

PROBLEM 4

PRINCIPLES – PSYCHROMETRICS

An air conditioning system installed 5,000 ft above sea level supplies 11,000 CFM of air at 55°F DB/54°F WB to maintain the space at 75°F DB, 50% RH. 2,000 CFM of the air entering the air handling unit is outside air at 88°F DB/78°F WB. How much condensate will be produced?

- (A) 20%
- (B) 40%
- (C) 60%
- (D) 72%

PROBLEM 6

PRINCIPLES – FLUID MECHANICS

Water is pumped from tank 1 to tank 2 in the figure below at a rate of 100 GPM. Both tanks are open to atmosphere. The system is made up of 20 ft of 3" schedule 40, welded steel piping with flanged fittings. Assume a roughness coefficient of 0.0018 inches, four 90° long radius elbows, two gate valves, one sharp entrance, and one sharp exit. What will be the pressure required at the pump?

Assume the following conditions:

Viscosity of water $\nu = 1.08 \times 10^{-5} \text{ ft}^2/\text{s}$

Schedule 40 Steel Pipe Inside Diameter = 3.07 inches

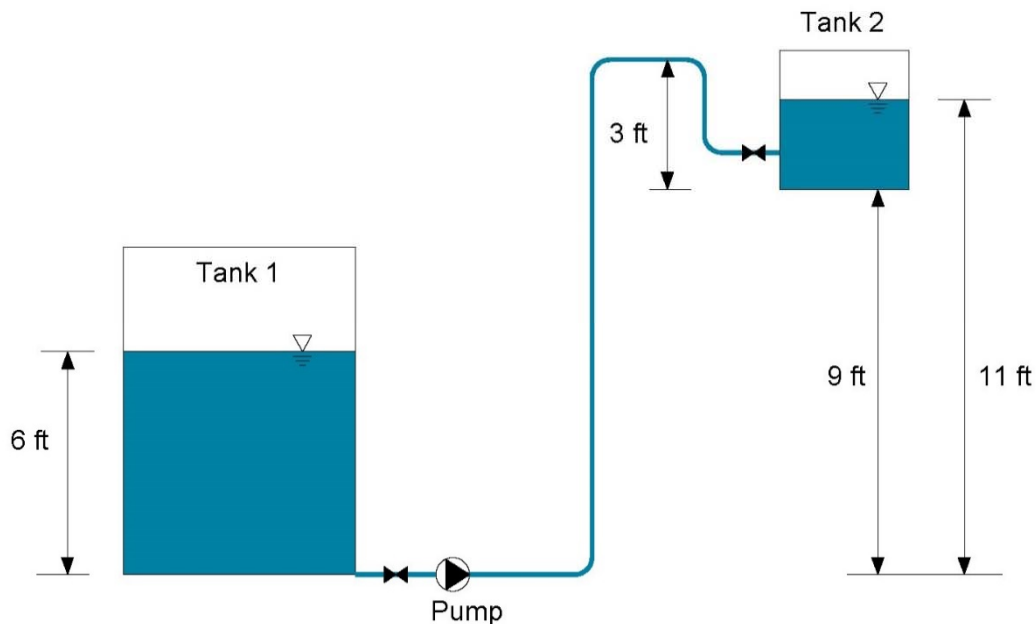
Schedule 40 Steel Pipe Outside Diameter = 3.5 inches

Sharp Exit, $K=1.0$

Sharp Entrance, $K=1.0$

3" Flanged 90° long radius elbows, $K=0.25$

3" Flanged 90° gate valve, $K=0.22$



- (A) 5.0 ft
- (B) 6.3 ft
- (C) 7.3 ft
- (D) 8.4 ft

6.0 CONCLUSION & STATISTICS

6.1 MORNING SESSION STATISTICS

On average, the total number correct in the morning session was 23 out of 40. The percentage was a 57.7%. If you scored well above this average then you should be in good shape to pass the PE exam.

Problem Number	% People who Correctly Solved this Problem	Problem Number	% People who Correctly Solved this Problem
1	62%	21	24%
2	52%	22	83%
3	81%	23	38%
4	40%	24	79%
5	64%	25	66%
6	29%	26	38%
7	52%	27	83%
8	38%	28	24%
9	76%	29	79%
10	40%	30	83%
11	64%	31	41%
12	52%	32	41%
13	48%	33	28%
14	71%	34	83%
15	24%	35	86%
16	24%	36	66%
17	43%	37	90%
18	60%	38	55%
19	74%	39	69%
20	57%	40	79%

6.2 AFTERNOON SESSION STATISTICS

On average, the total number correct in the morning session was 27 out of 40. The average percentage correct was a 67.5%. If you scored well above this average then you should be in good shape to pass the PE exam.

Problem Number	% People who Correctly Solved this Problem	Problem Number	% People who Correctly Solved this Problem
41	82%	61	35%
42	91%	62	25%
43	86%	63	55%
44	69%	64	40%
45	73%	65	75%
46	69%	66	80%
47	86%	67	45%
48	82%	68	65%
49	91%	69	85%
50	78%	70	85%
51	100%	71	50%
52	78%	72	50%
53	17%	73	60%
54	26%	74	50%
55	65%	75	70%
56	82%	76	60%
57	43%	77	85%
58	43%	78	50%
59	65%	79	90%
60	60%	80	65%

6.3 CONCLUSION

On average, the total number correct was 50 out of 80, for a 62.5% correct. If you scored well above this score then you should be in good shape to pass the PE exam. Obviously, I cannot make any guarantees as it depends on how well you perform on the actual exam. But if you are knowledgeable about all the items on this exam and have gone through the other products, then you should have a very high chance of passing the HVAC & Refrigeration PE Exam.

HVAC & Refrigeration PE Technical Study Guide: <https://www.engproguides.com/pe-mechanical-hvac-and-refrigeration-practice-exam-guide.html>

HVAC & Refrigeration PE Full Exam: <https://www.engproguides.com/pe-mechanical-hvac-and-refrigeration-practice-exam.html>

HVAC & Refrigeration PE References Exam: <https://www.engproguides.com/mechanical-pe-hvac-refrigeration-supplemental-reference-exam.html>

HVAC & Refrigeration PE Final Exam:

Online HVAC & Refrigeration PE Course: <https://www.engproguides.com/online-hvac-pe-course.html>

If you have any questions on this sample exam or any other Engineering Pro Guides product, then please contact me at any of the websites or at my email address below.

Justin Kauwale at contact@engproguides.com

Company Facebook: <https://www.facebook.com/engineeringproguides/>

Company LinkedIn: <https://www.linkedin.com/company/engineering-pro-guides/>

Person LinkedIn: <https://www.linkedin.com/in/justin-kauwale/>

Personal Facebook: <https://www.facebook.com/justin.kauwale>

Hi. My name is Justin Kauwale, the creator of Engineering Pro Guides. I will be happy to answer any questions you may have about the PE exam. Good luck on your studying! I hope you pass the exam and I wish you the best in your career. Thank you for your purchase!