**Testbank Problems for Chapter 2.**

1. Find the density for air at 230 kPa and 500 K. Use R=0.287 kJ/(kg\*K).

A. 0.624 kg/m3

\*B. 1.60 kg/m3

C. 2.45 kg/m3

D. 12.8 kg/m3

2. Find the density for air at 450 kPa and 620 K. Use R=0.287 kJ/(kg\*K).

A. 0.395 kg/m3

B. 1.72 kg/m3

\*C. 2.53 kg/m3

D. 8.35 kg/m3

3. Find the specific volume for air at 270 kPa and 520 K. Use R=0.287 kJ/(kg\*K).

\*A. 0.553 m3/kg

B. 1.32 m3/kg

C. 1.81 m3/kg

D. 4.35 m3/kg

4. Find the specific volume for air at 170 kPa and 720 K. Use R=0.287 kJ/(kg\*K).

A. 0.527 m3/kg

B. 0.823 m3/kg

C. 0.986 m3/kg

\*D. 1.22 m3/kg

5. Find the volume of 3 kg of air at 320 kPa and 540 K. Use R=0.287 kJ/(kg\*K).

A. 0.484 m3

B. 0.844 m3

\*C. 1.45 m3

D. 2.06 m3

6. Find the volume of 5 kg of air at 450 kPa and 670 K. Use R=0.287 kJ/(kg\*K).

A. 0.427 m3

\*B. 2.14 m3

C. 2.34 m3

D. 11.7 m3

7. What is the mass of air in a 4m×5m×3m room that is at 300K and 101 kPa?

\*A. 70.4 kg

B. 95.3 kg

C. 145 kg

D. 218 kg

8. What is the mass of air in a 4m×4m×3m room that is at 295K and 101 kPa?

A. 33.8 kg

B. 43.2 kg

\*C. 57.3 kg

D. 178 kg

9. A fixed volume of air is initially at 200 kPa and 300K. If the air is heated to 520K, what is the pressure?

A. 88.3 kPa

B. 95.2 kPa

C. 115 kPa

\*D. 347 kPa

10. A fixed volume of air is initially at 420 kPa and 600K. If the air is cooled to 350K, what is the pressure?

A. 94.0 kPa

\*B. 245 kPa

C. 520 kPa

D. 720 kPa

11. Air at 600 kPa and 500K expands to 4 times the volume in an isothermal process. What is the final pressure of the air?

\*A. 125 kPa

B. 250 kPa

C. 1200 kPa

D. 2000 kPa

12. Air at 600 kPa and 500K is compressed to 1/3 the volume in an isothermal process. What is the final pressure of the air?

A. 83.3 kPa

B. 250 kPa

\*C. 750 kPa

D. 1500 kPa

13. Air in a rigid tank is initially at 200 kPa and 300K. If the final pressure is 400 kPa, what is the final temperature?

A. 150 K

B. 300 K

C. 450 K

\*D. 600 K

14. Air in a rigid tank is initially at 500 kPa and 650K. If the final pressure is 350 kPa, what is the final temperature?

A. 250 K

B. 375 K

\*C. 455 K

D. 929 K

15. Air at 600 kPa and 500K is compressed to 1/3 the volume in an isobaric process. What is the final temperature of the air?

\*A. 167 K

B. 250 K

C. 500 K

D. 1500 K

16. Air at 300 kPa and 250°C expands to 3 times the volume in an isobaric process. What is the final temperature of the air?

A. 174°C

B. 750°C

\*C. 1296°C

D. 1570°C

17. 3 m3 of air at 200 kPa and 80°C is heated to 300°C in an isobaric (constant pressure) process. What is the final volume of the air?

A. 1.23 m3

B. 5.71 m3

C. 12.5 m3

\*D. 18.8 m3

18. 3 m3 of air at 200 kPa and 450°C is cooled to 50°C in an isobaric (constant pressure) process. What is the final volume of the air?

A. 0.56 m3

\*B. 2.23 m3

C. 9.56 m3

D. 11.2 m3

19. What is the volume of 3 kg saturated water mixture at a temperature of 405 K and quality of 80%?

A. 1.18 m3

\*B. 1.52 m3

C. 3.25 m3

D. 4.56 m3

20. What is the volume of 4 kg saturated water mixture at a temperature of 365 K and quality of 60%?

A. 1.29 m3

B. 3.37 m3

\*C. 5.31 m3

D. 7.56 m3

21. What is the quality of saturated water at 370 K if 3 kg has a volume of 2 m3?

\*A. 0.358

B. 0.465

C. 0.623

D. 0.786

22. What is the quality of saturated water at 450 K if 5 kg has a volume of 0.8 m3?

A. 0.435

B. 0.567

C. 0.646

\*D. 0.769

23. What is the mass of 2 m3 saturated water mixture at a pressure of 400 kPa and quality of 80%?

A. 1.94 kg

B. 3.13 kg

\*C. 5.40 kg

D. 6.51 kg

24. What is the mass of 3 m3 saturated water mixture at a pressure of 1200 kPa and quality of 40%?

A. 5.23 kg

B. 9.81 kg

C. 22.3 kg

\*D. 45.5 kg

25. A 20% quality saturated water mixture (boiling water) is in a pressure cooker at 100 kPa (atmospheric). The pressure cooker is closed allowing the pressure to increase during a constant volume process. What is the quality of the mixture when the pressure is 200 kPa?

\*A. 0.383

B. 0.475

C. 0.524

D. 0.731

26. A 30% quality saturated water mixture (boiling water) is in a pressure cooker at 100 kPa (atmospheric). The pressure cooker is closed allowing the pressure to increase during a constant volume process. What is the quality of the mixture when the pressure is 200 kPa?

A. 0.326

B. 0.498

\*C. 0.574

D. 0.747

27. What is the mass of water in a 3 m3 tank at 300 kPa and 460 K?

A. 2.08 kg

\*B. 4.32 kg

C. 6.72 kg

D. 7.68 kg

28. What is the mass of water in a 2 m3 tank at 300 kPa and 540 K?

A. 0.94 kg

B. 1.34 kg

C. 1.65 kg

\*D. 2.43 kg

29. What is the volume of 4 kg water at 300 kPa and 440 K?

\*A. 2.65 m3

B. 3.47 m3

C. 5.20 m3

D. 6.04 m3

30. What is the volume of 6 kg water at 300 kPa and 520 K?

A. 2.86 m3

\*B. 4.75 m3

C. 5.20 m3

D. 7.58 m3

1. What is the internal energy of 3 kg saturated water at 370 K that has a volume of 2 m3?

A. 1.04 MJ

B. 1.78 MJ

C. 2.13 MJ

\*D. 3.47 MJ

32. What is the internal energy of 5 kg saturated water at 450 K that has a volume of 0.8 m3?

A. 8.35 MJ

B. 9.43 MJ

\*C. 10.8 MJ

D. 13.6 MJ

To solve Problems 2.19 to 2.22, 2.31, and 2.32, include Table B.1 for temperatures from 350K to 470 K.

**Table B.1 Saturation Properties of Water and Steam—Temperature Increments**



To solve problems 2.23 to 2.26, include Table B.2 for pressures from 0.1 MPa to 2.0 MPa.

**Table B.2 Saturation Properties of Water and Steam—Pressure Increments**



To solve problems 2.27 to 2.30, include Table B.3F for P=0.300 MPa for temperatures up to 600 K

**Table B.3F Isobaric Data for P=0.300 MPa**

