RSPT 1115 Module C-1 Oxygen Supply Systems: Self –Assessment

1. List gases that fit into each of the three categories:

FLAMMABLE	NONFLAMMABLE	SUPPORTS COMBUSTION
ACETONE **AMMONIA** **BENZENE** **CARBON MONOXIDE** **CYCLOPROPANE** **ETHYLENE** **ETHANOL** **METHANE** **TOLUENE**	**NITROGEN** **HELIUM** **CARBON DIOXIDE**	**AIR** **OXYGEN** **HELIOX** **CARBOGEN** **NITRIC OXIDE** **NITROUS OXIDE**

2. List two therapeutic gases: **AIR, OXYGEN, HELIOX, CARBOGEN, NITRIC OXIDE**
3. List two diagnostic gases: **NITROGEN, HELIUM, CARBON DIOXIDE**

4. List the four methods of producing oxygen and which is the cheapest:

   a. **FRACTIONAL DISTILLATION**
   b. **PHYSICAL SEPARATION**
   c. **CHEMICAL DEPOSITION**
   d. **ELECTROLYSIS**

5. Who invented the process of Fractional Distillation and in what year:

   KARL VON LINDE IN 1907

6. What purity is dictated by the FDA? **99.0%**

7. What is the name of the device that verifies proper flow from a concentrator?

   ERIE FLOWMETER

8. What level of oxygen and at what flow range to oxygen concentrators operate?

   90 TO 96 % and **0.5 TO 5** lpm

9. What is the most common type of oxygen concentrator? **MOLECULAR SIEVE**

10. List two hazards of oxygen concentrator use?

    a. **INADEQUATE POWER SUPPLY (AMPS).**
    b. **UNGROUNDED EQUIPMENT.**
    c. **OXYGEN NEAR *(WITHIN 10 FT.)* SMOKING *OR* OPEN FLAMES.**
    d. **OXYGEN NEAR FLAMMABLE MATERIAL OR EXTREME HEAT.**
    e. **NEED FOR BACK-UP CYLINDERS (3 TIMES NEEDED FOR NORMAL DELIVERY RESPONSE TIME).**

11. How many psi are in a full cylinder of oxygen (regardless of size)? **2200** psi

12. What color are the following cylinders?

    a. Oxygen **GREEN**

    b. Air **YELLOW**

    c. Nitrous Oxide **BLUE**

    d. Helium **BROWN**

13. Name two things that can be used to support a cylinder of gas?

    a. **WHEELED CART.**
    b. **STATIONARY STAND.**
    c. **CHAIN TO WALL *(LARGE).***
    d. **RING STAND.**
    e. **WHEEL CHAIR HOLDER.**
    f. **UNDER STRETCHER.**
    g. **ON STRETCHER BETWEEN PATIENT'S LEGS.**

14. Define reducing valve. **REDUCES THE PRESSURE OF A GAS FROM A CYLINDER.**

15. Define regulator. **REDUCES THE PRESSURE OF A GAS FROM A CYLINDER AND REGULATES THE FLOW OF GAS COMING OUT OF THE CYLINDER.**

16. What is the ASSS used for? **PROVIDES STANDARDS FOR THREADED HIGH-PRESSURE CONNECTIONS BETWEEN LARGE COMPRESSED GAS CYLINDERS (F THROUGH H/K) AND THEIR ATTACHMENTS.**

17. What is the PISS used for? **PART OF THE ASSS, BUT ONLY APPLIES TO THE VALVE OUTLETS OF SMALL CYLINDERS UP TO AND INCLUDING SIZE E.**

18. What is the DISS used for? **PREVENTS ACCIDENTAL INTERCHANGE OF LOW PRESSURE (<200 PSIG) MEDICAL GAS CONNECTIONS.**

19. What are the three types of pressure relief mechanisms for cylinders/regulators?

    a. **FRANGIBLE DISK**

    b. **SPRING-LOADED DISK**

    c. **FUSIBLE PLUG**

20. What is the PISS connection for oxygen? **2-5**

21. Label the picture to the right:

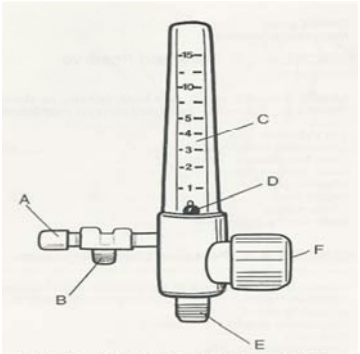

FIGURE 4.7 Components of a Thorpe tube flowmeter.

    a. **DISS OR QUICK-CONNECT HIGH-PRESSURE GAS INLET**
    b. **PRESSURE TAKE OFF 50 PSI OUTLET**
    c. **THORPE TUBE**
    d. **FLOAT**
    e. **DISS GAS OUTLET**
    f. **FLOWMETER NEEDLE VALVE CONTROL KNOB.**

22. What will happen to the flow reading on a bourdon gauge if the outlet is obstructed? **THE FLOW WILL READ HIGHER THAN THE ACTUAL FLOW.**

23. What will happen to the flow reading on a compensated Thorpe tube if the outlet is obstructed? **THE FLOW WILL READ ACCURATELY (ZERO)**

24. You have an "H" cylinder that is filled to 900 psi and is attached to nasal cannula running at 6 L/min.

    a. How long will the cylinder last until it is recommended to be changed?

$$\text{Duration of Cylinder} = \frac{\text{PSIG - 200 x Factor}}{\textit{Flow}} = \frac{(900\textit{psig} - 200\textit{psig}) \text{ x } 3.14}{6} = \frac{2198}{6} = 366.33 \text{ min.}$$

$$\frac{366.33}{60} = 6.106 \text{ hours} = 6 \text{ hours and } 6.33 \text{ minutes.}$$

    b. How long will the cylinder last until it is empty?

$$\text{Duration of Cylinder} = \frac{\text{PSIG x Factor}}{\textit{Flow}} = \frac{900\textit{psig} \text{ x } 3.14}{6} = \frac{2826}{6} = 471 \text{min.}$$

$$\frac{471}{60} = 7.85 \text{ hours} = 7 \text{ hours and } 51 \text{minutes.}$$

25. You have an “E” cylinder that is filled to 1400 psi and is attached to nasal cannula running at 3 L/min.

a. How long will the cylinder last until it is recommended to be changed?

$$\text{Duration of Cylinder} = \frac{\text{PSIG - 500 x Factor}}{\textit{Flow}} = \frac{(1400\textit{psig} - 500\textit{psig}) \text{ x } 0.28}{3} = \frac{252}{3} = 84 \text{ min.}$$

$$\frac{84}{60} = 1.4 \text{ hours} = 1 \text{hour and } 24 \text{ minutes.}$$

b. How long will the cylinder last until it is empty?

$$\text{Duration of Cylinder} = \frac{\text{PSIG x Factor}}{\textit{Flow}} = \frac{1400\textit{psig} \text{ x } 0.28}{3} = \frac{392}{3} = 130.67 \text{ min.}$$

$$\frac{130.67}{60} = 2.18 \text{ hours} = 2 \text{ hours and } 10.8 \text{ minutes.}$$

26. Why must a cylinder of carbon dioxide be weighed?

THE PRESSURE GUAGE WON’T READ ACCURATELY UNTIL THE LIQUID IS ALL DEPLETED.

27. What is the boiling point for oxygen (in Celsius)? **-183** degrees C.

28. A liquid reservoir weighs 8 lbs. and is powering a nasal cannula at 4 L/min. What is the duration in hours and minutes?

$$\textit{Amount} \text{ of Gas in Cylinder} = \frac{\text{Liquid } O_2 \text{ weight} \times 860}{2.5 \, \textit{lb}/\textit{L}}$$

$$\textit{Amount} \text{ of Gas} = \frac{8 \text{ lb} \times 860}{2.5 \, \textit{lb}/\textit{L}} = \frac{6880}{2.5} = 2{,}752 \text{ L}$$

$$\text{Duration of Cylinder} = \frac{\text{Amount of Gas}}{\textit{Flow}} = \frac{2752 \text{ L}}{4} = 688 \text{ min.}$$

$$\frac{688}{60} = 11.47 \text{ hours} = 11 \text{hours and } 28 \text{ minutes}$$