NAME_____ DATE_____

# 3100A Competency Exam

(Circle the appropriate answer)

1. Of the following, which best describes the mechanics of ventilation used by the 3100A?
    a. Active inspiration with passive exhalation
    b. Active inspiration with active exhalation
    c. Passive inspiration with active exhalation

2. Data from animal studies and human clinical trials supports
    a. A high lung volume strategy using the 3100A to interrupt the process of Pulmonary Injury Sequence of Immaturity
    b. The availability of surfactant therapy eliminates the need for HFOV
    c. A conservative approach using only mechanical ventilation support

3. Hyaline Membrane Disease (HMD), uncomplicated by air leak, is best treated with the following:
    a. Delaying intervention as long as possible or until the patient meets the criteria for HFOV rescue
    b. A low lung volume strategy
    c. Optimizing lung volume, by increasing the mean airway pressure in one (1) cm steps until oxygenation improves.

4. Which of the following concepts LEAST applies to the method used by the 3100A for oxygenation of a patient?
    a. Oxygenation is related to Paw and alveolar volume
    b. Oxygenation is a factor of V/Q matching which is normalized at higher lung volume
    c. Oxygenation is not dependent of $FiO_2$ and not affected by distribution of ventilation

5. Ventilation and CO2 clearance using the 3100A is best described by
    a. Ventilation is a function of large tidal volumes at low Paw
    b. Ventilation is a function of I:E ratio
    c. Ventilation is a function of frequency and $Vt^2$

6. Treating Pulmonary Interstitial Emphysema (PIE) with the 3100A SHOULD NOT include the following
    a. Increasing FiO2 and Delta P until capillary filling time increased one second
    b. A lower lung volume strategy
    c. Initiating HFOV with a Paw 1 cm $H_2O$ lower than that required by conventional mechanical ventilation

7. The following statement is TRUE
    a. Decreasing frequency results in a lowered $PaCO_2$
    b. Frequency is the primary control for $CO_2$ elimination in HFOV
    c. Increasing the frequency results in an increased stroke volume

8. The main contributor for the control of mean airway pressure (Paw) in the 3100A is
    a. The electromagnetic forces of the oscillator
    b. Adjusting the power control
    c. The restricting of the bias flow exiting the circuit past the balloon valve

9. Which of the following features protects the patient from high mean airway pressures?
    a. Servo control of the actual measured pressure
    b. Automatic limit of bias flow
    c. Adjustable mean airway pressure limit and an adjustable high pressure alarm

10. Which alarms stop the oscillator and opens the circuit pressure to atmospheric pressure
    a. Paw < 20% “Paw set max” and/or Paw > 50 cm $H_2O$
    b. High or low Mean Airway Pressure Limit
    c. Volume limit

11. The 3100A can generate oscillatory pressures > 90 $cmH_2O$. Of the following statements, which best describes the application of high pressures in neonates?
    a. Delta P of > 90 cmH2O is the normal delivered pressure to the lungs and is always used in neonates
    b. Delta P is dramatically attenuated to 10 to 20% of the measured value by the ET tube, and therefore is much lower than the peak pressures delivered to the airways by conventional ventilation
    c. There is no need to monitor Delta P

12. Decreasing frequency would result in what affect on the proximal (displayed) and distal (tracheal) oscillatory pressures
    a. Both would decrease proportionally
    b. Both would remain unchanged
    c. The proximal remains relatively unchanged but the distal increases

13. The effect of increasing the oscillatory Power Setting from 2 to 3 would BEST be described by the following?
    a. An increase in Delta P between 10 - 15 $cmH_2O$
    b. An increase in the Mean Airway Pressure by 1 $cmH_2O$
    c. A decrease in Delta P by 1cm $H_2O$

14. Setting a bias flow of 10LPM would result in an expected maximum mean airway pressure of
    a. Between 15 – 20 $cmH_2O$
    b. Between 0 an 10 $cmH_2O$
    c. Would have no significant effect on Paw

15. The 3100A requires a source of pressurized air. The following statement is NOT true
    a. The gas is used to mix with oxygen to achieve the correct FiO2
    b. The gas determines the piston power
    c. The gas cools the oscillator electromagnet

16. The Patient Circuit Calibration procedure should be performed:
    a. Only when receiving a new circuit from the factory
    b. Whenever switching patient circuits or circuit components
    c. Only when putting a new patient on the 3100A

17. The Ventilator Performance Check and Alarm Verification on the 3100A needs to be performed
    a. Every 500 hours of use
    b. After each patient use
    c. When setting up for a new patient

18. Which of the following is NOT a common cause of set up problems
    a. Deviation from test procedures
    b. Leaks in the patient circuit/humidifier
    c. A blender malfunction

19. A change in the Delta P or Paw reading from the initial setting may be caused by
    a. A small change in the air and oxygen line pressures
    b. Water in the bias flow circuit
    c. A change in the ET tube position

20. Which of the following best describes why barotrauma is reduced by HFOV using a high volume strategy
    a. By eliminating the opening and closing of the surfactant deficient lung units
    b. Paw is higher, so peak distending pressures are increased
    c. Nitrogen splinting of the alveolus is eliminated by HFOV

21. In the early stages of PIE, a high lung volume strategy would be best appropriate in which of the following conditions?
    a. When cardiac output has been compromised
    b. When the lung has significant atelectasis
    c. When an inspired O2 of greater than 50% is required

22. When using HFOV on patients with severe respiratory failure, the initial Paw should be set to
    a. The same as on conventional ventilation (CMV)
    b. Depends on the size of the ET tube
    c. Substantially higher than on CMV

23. When using HFOV to ventilate a patient with non homogeneous lung disease such as meconium aspiration the clinician should
    a. Carefully monitor the chest X-ray for focal over-distention
    b. Expect effective meconium and mucous clearance
    c. Never attempt ECMO intervention following HFOV failure

24. Following successful HFOV intervention and stabilization on a patient with RDS, the initial goals of weaning are
    a. Lower Paw to decrease lung volumes
    b. Decrease Delta P as required to decrease $PaCO_2$
    c. Reduce $FiO_2$ to well below 50%

25. When attempting to use HFOV on a patient with potential myocardial dysfunction the clinician should always
    I. Aggressively address marginal blood volume
    II. Provide adequate inotropic support
    III. Carefully monitor cardiovascular status when increasing Paw
        a. I only
        b. I and II only
        c. I, II and III

**Note: This exam is not designed to be a comprehensive evaluation of the scope of clinical skills necessary to manage patients with HFOV.**