Final Exam
Questions

1. Why is the initial blood pressure goal >65 mm Hg?
   a. Because it is a nice round number
   b. Dogs overall did better in a study
   c. A large study showed that patients had significant renal and myocardial injury when higher than 65 mm Hg
   d. A large study showed that it is more harmful to the kidney and cardiac muscle when higher than 70 mm Hg

2. Which receptor causes smooth muscle vasoconstriction?
   a. Alpha 1
   b. Alpha 2
   c. Beta 1
   d. Beta 2
   e. D1

3. Why is tachycardia and diaphoresis dangerous in the setting of increased work of breathing?
   a. Likely to have a metabolic acidosis
   b. Not really concerning
   c. High concern for drug withdrawal
   d. High catecholamine surge

4. Which type of tachypnea is more worrisome?
   a. Rapid and shallow
   b. Rapid and deep

5. Is exhalation an active or passive process?
   a. Active
   b. Passive

6. Which medications are inopressors?
   a. Phenylephrine, vasopressin
   b. Norepinephrine, dobutamine, epinephrine
   c. Epinephrine, dopamine
   d. Norepinephrine, epinephrine, dopamine

7. Which mode of ventilation allows more control over the minute ventilation?
   a. Volume breath
   b. Pressure breath

8. Can you use dobutamine as a first line agent in septic shock?
   a. Yes
   b. No

9. What is the calculation of oxygen delivery?
   a. Heart rate x stroke volume x (1/ hematocrit)
   b. [(1.32 x hemoglobin x SaO₂ x cardiac output) + (0.003 X PaO₂)]
   c. [cardiac output x (1/ hematocrit) X (SVR)] - (0.003 X PaO₂)
   d. [(1.5 x hemoglobin x SaO₂) x heart rate x (PVR-SVR)] + (0.03 X PaO₂)

10. Which is better for cardiogenic shock: norepinephrine vs dopamine?
    a. Norepinephrine
    b. Dopamine

11. Which drug is best in pediatric septic shock?
    a. Vasopressin
    b. Epinephrine
    c. Norepinephrine
    d. Phenylephrine

12. Which medications are pure vasopressors?
    a. Phenylephrine, vasopressin
    b. Norepinephrine, vasopressin, epinephrine
    c. Epinephrine, phenylephrine
13. What does inotropic mean?
   a. Increase heart rate
   b. Increase diastolic filling time
   c. Increase contractility
   d. Increase conduction velocity

14. Vasopressin works on which receptors?
   a. V1 only
   b. V1 at low doses and then V2>V1 at high doses
   c. V2 at low doses and then V1>V2 at high doses
   d. V1 and V2
   e. V2 only

15. Can someone fake being diaphoretic?
   a. Yes
   b. No

16. What type of breath requires no work by the patient, as the frequency/rate of the breath and the amount of gas delivered is fully dependent on the ventilator?
   a. Controlled
   b. Assisted
   c. Manual
   d. Supported

17. Activation of this receptor is important in septic and obstructive shock by norepinephrine due to increased ________?
   a. Alpha 1 – vasoconstriction
   b. Beta 1- increased inotropy
   c. Beta 2- bronchodilation
   d. Alpha 2- vasodilation

18. What are signs of poor perfusion?
   a. Mental status change, increase in heart rate, increase in lactic acid, decrease in urine output, increased capillary refill time
   b. Mental status change, increase in lactic acid, increase in urine output, decreased capillary refill time, hemoconcentration
   c. Decrease in urine output, decreased capillary refill time, mottled extremities
   d. Mottled extremities increase in heart rate, increase in lactic acid, decrease in urine output, increased capillary refill time

19. Which receptor causes bronchodilation?
   a. Alpha 1
   b. Alpha 2
   c. Beta 1
   d. Beta 2
   e. D1

20. What is the underlying problem with shunt physiology?
   a. Something in the alveoli that prevents adequate gas exchange
   b. Something in the alveoli that prevents them from expanding
   c. Poor perfusion of the alveoli
   d. Fatigue from poor compliance

21. What is vasopressin?
   a. A catecholamine
   b. A combination of a catecholamine and hormone
   c. A hormone

22. Which pressor is more known to be the most arrhythmogenic?
   a. Dopamine
   b. Epinephrine
   c. Norepinephrine
   d. Phenylephrine
   e. Dobutamine
23. What is the main goal in treating septic shock?
   a. To get the MAP greater than 65 mm Hg
   b. To perfuse the brain, and cardiac muscle
   c. To allow / facilitate with antibiotic circulation
   d. To have a balance between perfusing organs and cellular death

24. What happens to the intrathoracic pressure/volume when you exhale?
   a. ↑ intra-thoracic pressure: ↑ intra-thoracic volume
   b. ↑ intra-thoracic pressure: ↓ intra-thoracic volume
   c. ↓ intra-thoracic pressure: ↑ intra-thoracic volume
   d. ↓ intra-thoracic pressure: ↓ intra-thoracic volume

25. Activation of this/these receptor(s) by norepinephrine can cause arrhythmias?
   a. Alpha 1
   b. Beta 1
   c. Alpha 1 + Beta 1
   d. Alpha 1 + Beta 2
   e. Beta 1 + Beta 2

26. What happens to the ratio of carbon dioxide to oxygen when a patient is apneic?
   a. ↑ Carbon dioxide: ↑ Oxygen
   b. ↑ Carbon dioxide: ↓ Oxygen
   c. ↓ Carbon dioxide: ↑ Oxygen
   d. ↓ Carbon dioxide: ↓ Oxygen

27. Why does positive pressure ventilation help with shunt physiology?
   a. Greater oxygen delivery
   b. Better carbon dioxide removal
   c. Increase surface area for gas exchange
   d. Helps with patient fatigue

28. What is the normal I:E ratio?
   a. Inspiration is longer than expiration
   b. Expiration is longer than inspiration
   c. Inspiration and expiration are equal

29. What correlates with diastolic blood pressure?
   a. Cardiac output
   b. End diastolic volume
   c. Stroke volume
   d. Peripheral vascular resistance

30. What percentage of alveoli are involved in shunt physiology to have refractory hypoxia?
   a. >30%
   b. >40%
   c. >50%
   d. >55%

31. Which is not a class of increased work of breathing causing respiratory distress?
   a. Opiate overdose
   b. Bronchospasms
   c. Increased metabolic demands
   d. Worsening compliance

32. Why is phenylephrine harmful in right heart failure?
   a. Increased pulmonary vascular resistance
   b. Increased cardiac preload due to venous vasoconstriction
   c. Reflex bradycardia
   d. All of the above
   e. None of the above

33. What is the duration of push dose epinephrine?
   a. 5-10 minutes
   b. <30 seconds
   c. 10-20 minutes
   d. 1-2 minute
34. Why is lactate produced during shock?
   a. Purely due to anaerobic metabolism of pyruvate to lactate from cell hypoxia
   b. Combination of anaerobic metabolism and epinephrine cause glycolysis
   c. Krebs cycle malfunction due to ischemia
   d. Mitochondrial increased demand from glycogen to glucose and glycolysis from beta 2 stimulation

35. Which medication is a phosphodiesterase 3 inhibitor?
   a. Dobutamine
   b. Norepinephrine
   c. Milrinone
   d. Selepressin

36. Are arrhythmias common with milrinone?
   a. Yes
   b. No

37. How do you check the plateau pressure (PPlat), on a pressure mode?
   a. Inspiratory pause
   b. Expiratory pause
   c. Same as the peak inspiratory pressure (PIP)
   d. Ask the respiratory therapist

38. In which mode of ventilation is a pre-set amount of gas delivered to the patient?
   a. Volume breath
   b. Pressure Breath
   c. Both
   d. Neither

39. What receptor(s) are activated by phenylephrine?
   a. Alpha 1
   b. Beta 1
   c. Alpha 1 + Beta 1
   d. Alpha 1 + Beta 2
   e. Beta 1 + Beta 2

40. In severe metabolic acidosis, why are the patients breathing rapidly?
   a. To stay awake
   b. Increased metabolic supply
   c. To overcome shunt physiology
   d. To get rid of CO₂

41. Which drug is a hormone?
   a. Milrinone
   b. Dobutamine
   c. Norepinephrine
   d. Vasopressin

42. What does it mean when there is increased peak inspiratory pressure (PIP) and low plateau pressure (PPlat)?
   a. High resistance in the circuit or patient
   b. Decreased compliance
   c. Poor pulmonary perfusion
   d. Need to change the ventilator mode

43. How does vasopressin cause vasodilation?
   a. Inhibits nitric oxide production
   b. Activates beta 2
   c. Inhibits alpha 1
   d. Activates alpha 1

44. What is the reversal agent for benzodiazepine overdose?
   a. Naloxone
   b. Flumazenil
   c. Naltrexone
   d. Disulfiram
45. What does inopressor mean?
   a. increases heart rate and causes arterial vasoconstriction
   b. increases cardiac contractility and induces vasoconstriction
   c. induces venous vasoconstriction and arterial vasodilation
   d. increases cardiac contractility and induces vasodilation

46. What is a feature of vasopressin?
   a. Increases sensitivity to catecholamines
   b. Increases sensitivity to endogenous vasopressin
   c. Doesn’t work very much on V2 receptors in the kidney during shock
   d. Tolerated better than norepinephrine in liver patients

47. Which of the following is not the main goal of mechanical ventilation in the ICU?
   a. Optimize patient comfort
   b. Optimize exchange of carbon dioxide and oxygen
   c. Get them through surgery with less discomfort
   d. Decrease work of breathing

48. What are ways to maximize patient comfort on the ventilator?
   a. Optimize ventilation settings
   b. Sedation
   c. Paralytics
   d. All of the above

49. What is the optimal type of breath?
   a. Spontaneous
   b. Controlled
   c. Assisted
   d. None of the above

50. Will all patients have perfect carbon dioxide and oxygen levels?
   a. Yes
   b. No

51. What should the carbon dioxide goal be with traumatic brain injury?
   a. High to allow increased cerebral blood flow
   b. High to prevent increased cerebral blood flow
   c. Normal to prevent increased cerebral blood flow
   d. Normal to allow increased cerebral blood flow

52. Which of the following is not a toxicity with mechanical intubation?
   a. Hypercarbia
   b. Barotrauma
   c. Volutrauma
   d. Atelactotrauma
   e. Oxygen toxicity

53. What percent of oxygen can lead to oxygen toxicity (even if only a short period of time)?
   a. >50 %
   b. >60%
   c. >70%
   d. >80%

54. What is the volume of gas in the lungs at the end of expiration, but prior to inhalation?
   a. Inspiratory Capacity
   b. Expiratory Capacity
   c. Vital Capacity
   d. Tidal Volume
   e. Functional Residual Capacity

55. Is inhalation an active or passive process?
   a. Active
   b. Passive

56. What the flow pattern of a pressure delivered breath?
   a. Constant
   b. Accelerating
c. Decelerating
d. Variable

57. What is the reversal agent for opiate overdose?
   a. Naloxone
   b. Flumazenil
   c. Naltrexone
   d. Disulfiram

58. What happens to the intrathoracic pressure/ volume when you inhale?
   a. ↑ intra-thoracic pressure: ↑ intra-thoracic volume
   b. ↑ intra-thoracic pressure: ↓ intra-thoracic volume
   c. ↓ intra-thoracic pressure: ↑ intra-thoracic volume
   d. ↓ intra-thoracic pressure: ↓ intra-thoracic volume

59. When does exhalation become an active process?
   a. With restrictive lung disease
   b. After you run a mile
   c. With obstructive lung disease

60. Mechanical ventilation works by______?
   a. Positive pressure- pushing air into the lungs
   b. Negative pressure- pulling out the chest wall

61. Which of the following is not a way to improve oxygenation?
   a. FiO2
   b. PEEP
   c. Inspiratory time
   d. Respiratory rate

62. What is mean airway pressure?
   a. Average pressure that alveoli are exposed to during inspiration
   b. Average pressure that the lungs are exposed to during expiration
   c. Average pressure the lung is exposed to during mechanical ventilation

63. Which is the lung injury due to oxygen production of free radicals?
   a. Barotrauma
   b. Volumtrauma
   c. Atelectotrauma
   d. Biotrauma
   e. Oxygen toxicity

64. What happens if you intubate a patient with RV failure?
   a. Nothing with rapid sequence intubation technique
   b. Improved pre-load to the RV
   c. RV collapse and cardiac arrest
   d. Increased ejection fraction of the right ventricle

65. What happens to blood return with spontaneous breathing?
   a. Positive intrathoracic pressure that causes less resistance and assists in venous return
   b. Negative intrathoracic pressure that causes increased resistance and impedes in adequate venous return
   c. Positive intrathoracic pressure that causes increased resistance and impedes venous return
   d. Negative intrathoracic pressure that causes less resistance and assists in venous return

66. What is removal of carbon dioxide from the body called?
   a. Hypercarbia
   b. Hypocarbia
   c. Ventilation
   d. Tidal Volume

67. What is the equation for minute ventilation?
   a. Respiratory Rate X PEEP
   b. Respiratory Rate X Tidal Volume
   c. Tidal Volume X Expiratory Time
   d. Expiratory Time X Respiratory Rate
68. What is dead space ventilation?
   a. Carbon dioxide in the unventilated alveoli
   b. Carbon dioxide delivered to the patient if the patient isn’t on 100% oxygen
   c. Carbon dioxide that is unable to diffuse out of the capillaries
   d. Carbon dioxide still in the airway at expiration

69. How does increasing the tidal volume allow more CO2 removal?
   a. Allows more surface area for the transfer of CO2
   b. Increases the mean airway pressure
   c. Allows the alveoli to remain open longer for gas exchange
   d. Improves compliance

70. Since tidal volume is limited, what else can we adjust to improve minute ventilation?
   a. Inspiratory time
   b. FiO2
   c. Respiratory Rate
   d. Expiratory time

71. Why is rapid and shallow breathing worse?
   a. Low CO2
   b. Easily tired
   c. Low tidal volumes

72. Why do patients with obstructive lung disease need a shorter respiratory rate?
   a. Gives the patients time to rest
   b. Shorter respiratory rate allows a longer expiratory time as they have trouble with air removal
   c. Shorter respiratory rate allows for less positive end expiratory pressure
   d. Shorter respiratory rate allows for longer inspiratory time to improve oxygenation

73. What does it mean when there is an increase in FiO2 without an increase in PaO2?
   a. Inadequate amount of oxygen
   b. Mostly mouth breathing
   c. Need to change from NC to non-rebreather
   d. No gas exchange due to shunt physiology

74. What is the injury to the alveoli caused by excessive pressure from the ventilator called?
   a. Barotrauma
   b. Volumtrauma
   c. Atelecctotrauma
   d. Biotrauma
   e. Oxygen toxicity

75. Where do you mainly want dobutamine to work in cardiogenic shock?
   a. Alpha 1
   b. Alpha 2
   c. Beta 1
   d. Beta 2

76. How can you help improve venous return in a patient on positive pressure ventilation?
   a. If the patient has decreased intravascular volume, a fluid bolus will help
   b. Higher levels of positive end expiratory pressure (PEEP)
   c. Increase the volume/pressure breath (depends on the mode)
   d. Trial of bronchodilators to decrease afterload

77. What is the injury from over distension of the alveoli from excessive tidal volume?
   a. Barotrauma
   b. Volumtrauma
   c. Atelecctotrauma
   d. Biotrauma
   e. Oxygen toxicity

78. In which situation would phenylephrine be harmful to the patient?
   a. Adult Septic Shock
   b. Pediatric Septic Shock
   c. Hemorrhagic shock
d. Cardiogenic shock

79. What is the injury from repetitively opening and closing lung units (a type of sheering stress to the lung) called?
   a. Barotrauma
   b. Volumtrauma
   c. Atelectotrauma
   d. Biotrauma
   e. Oxygen toxicity

80. Which is not a cause of increased peak inspiratory pressure (PIP) and low plateau pressure (PPlat)?
   a. Endotracheal tube occlusion
   b. Mucous plugging
   c. Pulmonary embolism
   d. Bronchospasms

81. Is positive pressure good or bad with heart failure? Why?
   a. Bad; increases afterload and decreases cardiac output
   b. Good; decreases preload and increases cardiac output
   c. Bad; decreases preload and decreases cardiac output
   d. Good; decreases the LV afterload and allows more cardiac output
   e. Depends on the type an etiology of heart failure

82. Which is the lung injury resulting from inflammatory mediators?
   a. Barotrauma
   b. Volumtrauma
   c. Atelectotrauma
   d. Biotrauma
   e. Oxygen toxicity

83. What is the equation for cardiac output?
   a. Heart rate x Stroke Volume
   b. (Preload – after load) X contractility
   c. Stroke volume – peripheral vascular resistance
   d. LOVT area X LVOT velocity

84. What happens with inadequate PEEP?
   a. Alveoli collapse and develop atelectasis
   b. Poor compliance
   c. Inadequate minute ventilation
   d. Higher oxygen requirements leading to oxygen toxicity

85. What happens with adequate PEEP?
   a. Better driving pressure
   b. Less pressure is needed to re-expand the alveoli at the end of expiration
   c. Improved minute ventilation
   d. Lower oxygen requirements thus decreasing risk of barotrauma

86. What is the difference between the plateau pressure (PPlat) and the positive end expiratory pressure (PEEP)?
   a. Driving pressure
   b. Static pressure
   c. Dynamic Pressure
   d. Compliance

87. At 1 mg dose or greater, what receptor is more activated by epinephrine (alpha or beta) & which is more harmful?
   a. Alpha 1 > Beta 1; Alpha 1
   b. Alpha 1 > Beta 1; Beta 1
   c. Alpha 1 < Beta 1; Alpha 1
   d. Alpha 1 < Beta 1; Beta 1

88. What happens to blood return to the right atrium with positive pressure ventilation?
   a. Positive intrathoracic pressure that causes less resistance and assists in venous return
b. Negative intrathoracic pressure that causes increased resistance and impedes in adequate venous return

c. Positive intrathoracic pressure that causes increased resistance and impedes venous return

d. Negative intrathoracic pressure that causes less resistance and assists in venous return

89. What is a static pressure that the alveoli see?
   a. Positive end expiratory pressure (PEEP)
   b. Driving pressure
   c. Plateau pressure (PPlat)
   d. Peak Inspiratory Pressure (PIP)

90. What happens to the pulse pressure in cold shock?
   a. Increases
   b. Stays the same
   c. Decreases
   d. Depends on the cause of cold shock

91. What is one indication that a patient is unable to protect his airway and would benefit from intubation?
   a. Pooling of secretions in the airway
   b. Frequent lethargy and unable to carry on a conversation
   c. Poor cough
   d. Recent stroke

92. What are the components of stroke volume?
   a. Preload, afterload, and heart rate
   b. Preload, contractility, and systemic vascular resistance
   c. Preload, afterload and contractility
   d. Afterload and contractility

93. What is the definition of shock?
   a. Systolic blood pressure < 65 mm Hg
   b. Lactic acid production due to anaerobic metabolism
   c. Metabolic supply to tissues does not meet demand
   d. When you are scared of something

94. What is warm shock?
   a. Decrease in cardiac output
   b. Increase in systemic vascular resistance leading to bradycardia
   c. Increase in afterload
   d. Decrease in stroke volume leading with decreased systemic vascular resistance

95. Which one of the following is not a class of respiratory failure?
   a. Refractory hypoxemia
   b. Increased work of breathing
   c. Airway protection
   d. Mountain sickness

96. When giving a pressure breath, how much volume of gas will be delivered to a patient?
   a. Depends on compliance
   b. 6-8 ml / kg of ideal body weight
   c. Depends on the respiratory rate
   d. Depends on the flow and inspiratory time

97. What should be checked on every patient, as it is easily reversible and can avoid intubation?
   a. Recent use of benzodiazepines
   b. Cough
   c. Nothing, just intubate and then evaluate
   d. Blood glucose

98. How is lactate cleared?
   a. It is metabolized by the brain
   b. Cleared by kidneys and liver
   c. It is changed back into pyruvate to go into the Krebs cycle
   d. Hoffman degradation
99. Cold shock is defined by…?
   a. Decreased effective intravascular volume
   b. Increased systemic vascular resistance
   c. Decreased or inadequate stroke volume
   d. Vasoconstriction (both venous and arterial)

100. What is the next step if an increase in heart rate is inadequate to maintain cardiac output?
   a. More increased heart rate
   b. Decreased urine output
   c. Increase systemic vascular resistance
   d. Increased contractility

101. Warm shock is defined by…?
   a. Decreased afterload
   b. Increased preload
   c. Narrow pulse pressure
   d. Decreased systemic vascular resistance

102. What are the two pathways that pyruvate can take?
   a. Krebs cycle or gluconeogenesis
   b. Lactate production or glycolysis
   c. Krebs cycle or lactate production
   d. Lactate production or gluconeogenesis

103. Which one does not cause increased afterload?
   a. Hypertensive emergency
   b. Left Ventricular outflow obstruction
   c. Increased vasodilation
   d. Aortic stenosis

104. What correlates with systolic blood pressure?
   a. Cardiac output
   b. End diastolic volume
   c. Stroke volume
   d. Peripheral vascular resistance

105. Which one does not cause a decrease in preload?
   a. Hemorrhage
   b. Myocarditis
   c. GI bleed
   d. Vasodilation

106. What is the first compensation for a decrease in stroke volume to maintain cardiac output?
   a. Increase heart rate
   b. Increase peripheral vascular resistance
   c. Epinephrine
   d. Decreased urine output

107. What type of shock is tamponade?
   a. Cardiogenic
   b. Obstructive
   c. Hypovolemic

108. What is cold shock?
   a. Decrease in cardiac output
   b. Increased in systemic vascular resistance leading to bradycardia
   c. Increase in afterload
   d. Decrease in stroke volume leading to increased systemic vascular resistance

109. What is the Glasgow coma score that is a general rule of thumb for intubation?
   a. Three
   b. Less than 10
   c. Less than 8
   d. Less than 11
110. Which one does not cause a decrease in contractility?
   a. Aortic stenosis
   b. Cardiac ischemia
   c. Myocarditis
   d. Congenital heart disease

111. What type of distributive shock has bradycardia?
   a. Septic
   b. Obstructive
   c. Neurogenic
   d. Cardiogenic

112. What are the three types of cold shock?
   a. Cardiogenic, hypovolemic, obstructive
   b. Hypovolemic, septic, neurogenic
   c. Cardiogenic, obstructive, neurogenic
   d. Hypovolemic, neurogenic, septic

113. Why does shock have increased lactic acid production (besides anaerobic metabolism)?
   a. Epinephrine activation of beta 2 receptors
   b. All of it is from anaerobic metabolism from tissue ischemia
   c. Epinephrine activation of alpha 2 receptors
   d. Decreased clearance so no increased production

114. What happens to the pulse pressure in warm shock?
   a. Increases
   b. Stays the same
   c. Decreases

115. What is another name of warm shock?
   a. Distributive shock
   b. Sepsis
   c. Hypovolemic

116. How does vasopressin help a patient with a pulmonary embolism?
   a. Decrease preload, decrease cardiac afterload
   b. Restore mean arterial blood pressure, decrease pulmonary vascular resistance
   c. Decrease cardiac afterload, decrease pulmonary vascular resistance
   d. Decrease preload, restore mean arterial blood pressure

117. What was the major unwanted effect by epinephrine in the SOAP II trial?
   a. Tachycardia
   b. Ischemia
   c. Hyperglycemia
   d. Hyperthermia

118. What happens to the right ventricle with positive pressure ventilation?
   a. Decreased right ventricular afterload
   b. Increased right ventricular preload
   c. No significant changes to the right ventricle
   d. Increased right ventricular afterload

119. What is the dosage of push dose phenylephrine that should be administered to a patient?
   a. 100-300 mcg every 5-10 minutes
   b. 100-200 mcg every 5-10 minutes
   c. 80-200 mcg every 2-4 minutes
   d. 150-200 mcg every 2-4 minutes

120. What does inodilator mean?
   a. Increases heart rate and causes arterial vasoconstriction
   b. Increases cardiac contractility and induces vasoconstriction
   c. Induces venous vasoconstriction and arterial vasodilation
   d. Increases cardiac contractility and induces vasodilation

121. Which medications are inodilators?
   a. Dobutamine, milrinone, dopamine
   b. Milrinone, dobutamine, epinephrine
c. Epinephrine, dopamine, milrinone
d. isoproterenol, dobutamine, milrinone

122. What does chronotropic mean?
a. Increase heart rate
b. Increase diastolic filling time
c. Increase contractility
d. Increase conduction velocity

123. At low doses, what receptor(s) are activated by epinephrine?
a. Alpha 1
b. Beta 1
c. Alpha 1 + Beta 1
d. Alpha 1 + Beta 2
e. Beta 1 + Beta 2

124. Which drug is best with anaphylactic shock?
a. Vasopressin
b. Epinephrine
c. Norepinephrine
d. Phenylephrine

125. At 5-10 mcg/kg/min, what receptor(s) are primarily activated by dopamine?
a. Alpha 1
b. Beta 1
c. Alpha 1 + Beta 1
d. Alpha 1 + Beta 2
e. Beta 1 + Beta 2

126. What does chronotropic mean?
a. Increase heart rate
b. Increase diastolic filling time
c. Increase contractility
d. Increase conduction velocity

127. How do you check the plateau pressure (PPlat), on a volume mode?
a. Inspiratory pause
b. Expiratory pause
c. Same as the peak inspiratory pressure (PIP)
d. Ask the respiratory therapist

128. At >10 mcg/kg/min, what receptor(s) are more activated by dopamine?
a. Alpha 1 = Beta 1
b. Alpha 1 > Beta 1
c. Alpha 1 < Beta 2
d. Beta 1 > Beta 2
e. Beta 1 < Beta 2

129. What is the onset of push dose phenylephrine?
a. 30 seconds
b. 2 minutes
c. 10 seconds
d. 1 minute

130. What is the dosage of push dose epinephrine that should be administered to a patient?
a. 5-10 mcg every 5-10 minutes
b. 15-20 mcg every 5-10 minutes
c. 8-20 mcg every 2-5 minutes
d. 10-20 mcg every 2-5 minutes

131. What happens to the left ventricle with positive pressure ventilation?
a. Increased stroke volume and increased cardiac output
b. Decreased stroke volume and decreased cardiac output
c. Increased heart rate and increased cardiac output
d. Decreased heart rate and decreased cardiac output

132. Where does dobutamine work?
a. Alpha 1
b. Beta 1
c. Alpha 1 + Beta 1
d. Alpha 1 + Beta 2
e. Beta 1 + Beta 2

133. When giving a volume breath, what is the relationship between compliance and pressure?
   a. Higher the pressure, higher the compliance needed
   b. Lower the compliance, higher the pressure needed
   c. Lower the pressure, lower the compliance needed
   d. Higher the compliance, higher the pressure needed

134. What is lusitropy?
   a. Increased ventricular filling
   b. Contraction of the ventricles
   c. Increased heart rate
   d. Diastolic relaxation

135. Are arrhythmias common with milrinone?
   a. Yes
   b. No

136. What is synchronized intermittent mandatory ventilation (SIMV)?
   a. A combination of a controlled/assisted breathing with a spontaneous breath
   b. A way for the ventilator to assist/ augment the efforts of the patient
   c. A controlled form of ventilation where the ventilator controls the rate and the amount of gas
   d. A combination of controlled and assisted breath

137. Why is milrinone good in obstructive shock?
   a. Decrease preload
   b. Decreased pulmonary vascular resistance
   c. Bronchodilator
   d. Decreased afterload

138. In which mode of ventilation will a pre-set pressure deliver gas to the patient?
   a. Volume breath
   b. Pressure Breath
   c. Both
   d. Neither

139. What receptor(s) are activated by norepinephrine?
   a. Alpha 1
   b. Beta 1
   c. Alpha 1 + Beta 1
   d. Alpha 1 + Beta 2
   e. Beta 1 + Beta 2

140. What does it mean when there is increased peak inspiratory pressure (PIP) and increased plateau pressure (PPlat)?
   a. High resistance in the circuit or patient
   b. Poor pulmonary perfusion
   c. Need to change the ventilator mode
   d. Decreased compliance

141. What does inopressor mean?
   a. increases heart rate and causes arterial vasoconstriction
   b. increases cardiac contractility and induces vasoconstriction
   c. induces venous vasoconstriction and arterial vasodilation
   d. increases cardiac contractility and induces vasodilation

142. What receptor causes free water reabsorption in the kidney?
   a. V1
   b. V2
   c. V1 and V2
143. Which of the following is not a type of breath that can be delivered by a ventilator?
   a. Controlled
   b. Assisted
   c. Manuel
   d. Spontaneous

144. What are the two types of breath delivery?
   a. FiO\textsubscript{2}, PEEP
   b. Volume, pressure
   c. Flow, volume
   d. Respiratory rate and tidal volume

145. Describe the type of breath when the patient starts the process (aka triggers a breath), but the ventilator takes over.
   a. Controlled
   b. Assisted
   c. Manuel
   d. Supported

146. With what type of breath does the patient do most/all of the work, and the ventilator gives only minimal assistance, if needed?
   a. Controlled
   b. Assisted
   c. Manuel
   d. Supported

147. What is controlled mandatory ventilation (CMV)?
   a. A combination of a controlled/assisted breathing with a spontaneous breath
   b. A way for the ventilator to assist/ augment the efforts of the patient
   c. A controlled form of ventilation where the ventilator controls the rate and the amount of gas
   d. A combination of controlled and assisted breath

148. What is pressure support?
   a. A combination of a controlled/assisted breathing with a spontaneous breath
   b. A way for the ventilator to assist/ augment the efforts of the patient
   c. A controlled form of ventilation where the ventilator controls the rate and the amount of gas
   d. A combination of controlled and assisted breath

149. How does increasing the inspiratory time lead to improved oxygenation?
   a. It increases mean airway pressure
   b. It decreases expiration time
   c. It improves PEEP
   d. It increases the tidal volume

150. What is assist controlled ventilation (ACV)?
   a. A combination of a controlled/assisted breathing with a spontaneous breath
   b. A way for the ventilator to assist/ augment the efforts of the patient
   c. A controlled form of ventilation where the ventilator controls the rate and the amount of gas
   d. A combination of controlled and assisted breath

151. When giving a volume breath, at what pressure will the gas be delivered?
   a. Depends on compliance
   b. 6-8 ml / kg of ideal body weight
   c. Depends on the respiratory rate
   d. Depends on the flow and inspiratory time

152. When giving a pressure breath, what is the relationship between compliance and volume?
   a. Lower compliance, the less volume delivered
   b. Lower compliance, the more volume delivered
   c. Higher volume, the higher the compliance needed
   d. Lower volume, the higher the compliance needed
153. Which is a dynamic pressure needed to fully inflate the lungs and overcome the resistive forces and elastic forces of the lungs?
   a. Peak Inspiratory Pressure (PIP)
   b. Positive end expiratory pressure (PEEP)
   c. Plateau pressure (PPlat)
   d. End Expiratory Pressure

154. What is the normal peak inspiratory pressure (PIP)?
   a. Variable depending on body habitus
   b. >20 cm of water pressure
   c. <10 cm of water pressure
   d. <20 cm of water pressure

155. What is meant by a static pressure vs dynamic pressure?
   a. Dynamic is seen during an inspiratory hold, whereas static is the same as the Peak inspiratory pressure (PIP)
   b. Static has no air movement, dynamic pressure has air movement
   c. Same thing: static pressure is used with volume mode and dynamic pressure with pressure mode
   d. Same thing: static pressure is used with pressure mode and dynamic pressure with volume mode

156. What is the main disadvantage of a pressure delivered breath?
   a. Not as well known to clinicians
   b. No control over minute ventilation
   c. Constantly pay attention to pressures to make sure adequate tidal volume
   d. All of the above

157. What should you consider before giving flumazenil for a benzodiazepine overdose?
   a. A higher dose is going to be needed if the patient is chronically on benzodiazepines
   b. Consider a drip due to the short half-life of flumazenil
   c. Add naloxone because of the likely use of opiates also
   d. Avoid if patient is on chronic benzodiazepines as they can go into withdrawal

158. Which is not a cause of increased peak inspiratory pressure (PIP) and increased plateau pressure (PPlat)?
   a. Pulmonary edema
   b. Bronchospasms
   c. Pneumothorax
   d. Abdominal compartment syndrome
   e. ARDS

159. Which receptor causes increased chronotropy and inotropy?
   a. Alpha 1
   b. Alpha 2
   c. Beta 1
   d. Beta 2
   e. D1

160. What happens as compliance decreases in a volume breath?
   a. Less oxygen delivery and hypoxia
   b. Higher peak inspiratory pressures (PIP) leading to barotrauma
   c. Higher FiO2 and oxygen toxicity
   d. Decrease in the minute ventilation leading to decreased PEEP and atelectasis

161. What is the normal flow pattern of a volume breath?
   a. Constant
   b. Accelerating
   c. Decelerating
   d. Variable

162. How is the peak inspiratory pressure (PIP) and the mean airway pressure of a pressure breath in comparison to a volume breath?
   a. ↑ peak airway pressure + ↓ mean airway pressure
   b. ↑ peak airway pressure + ↑ mean airway pressure
c. ↓ peak airway pressure + ↑ mean airway pressure
d. ↓ peak airway pressure + ↓ mean airway pressure

163. What is meant by shunt physiology?
   a. Inadequate ventilation with adequate perfusion
   b. Inadequate ventilation with inadequate perfusion
   c. Adequate ventilation with inadequate perfusion
   d. Adequate ventilation with adequate perfusion
Questions and Answers

1. Why is the initial blood pressure goal >65 mm Hg?
   a. Because it is a nice round number
   b. Dogs overall did better in a study
   c. A large study showed that patients had significant renal and myocardial injury when higher than 65 mm Hg
   d. A large study showed that it is more harmful to the kidney and cardiac muscle when higher than 70 mm Hg

2. Which receptor causes smooth muscle vasoconstriction?
   a. Alpha 1
   b. Alpha 2
   c. Beta 1
   d. Beta 2
   e. D1

3. Why is tachycardia and diaphoresis dangerous in the setting of increased work of breathing?
   a. Likely to have a metabolic acidosis
   b. Not really concerning
   c. High concern for drug withdrawal
   d. High catecholamine surge

4. Which type of tachypnea is more worrisome?
   a. Rapid and shallow
   b. Rapid and deep

5. Is exhalation an active or passive process?
   a. Active
   b. Passive

6. Which medications are inopressors?
   a. Phenylephrine, vasopressin
   b. Norepinephrine, dobutamine, epinephrine
   c. Epinephrine, dopamine
   d. Norepinephrine, epinephrine, dopamine

7. Which mode of ventilation allows more control over the minute ventilation?
   a. Volume breath
   b. Pressure breath

8. Can you use dobutamine as first line agent in septic shock?
   a. Yes
   b. No

9. What is the calculation of oxygen delivery?
   a. Heart rate x stroke volume x (1/ hematocrit)
   b. [(1.32 x hemoglobin x SaO2) x cardiac output] + (0.003 X PaO2)
   c. [cardiac output x (1/ hematocrit) x (SVR)] - (0.003 X PaO2)
   d. [(1.5 x hemoglobin x SaO2) x heart rate x (PVR-SVR)] + (0.03 X PaO2)

10. Which is better for cardiogenic shock: norepinephrine vs dopamine?
    a. Norepinephrine
    b. Dopamine

11. Which drug is best in pediatric septic shock?
    a. Vasopressin
    b. Epinephrine
    c. Norepinephrine
    d. Phenylephrine

12. Which medications are pure vasopressors?
    a. Phenylephrine, vasopressin
    b. Norepinephrine, vasopressin, epinephrine
    c. Epinephrine, phenylephrine
    d. Norepinephrine, and epinephrine
13. What does inotropic mean?
   a. Increase heart rate
   b. Increase diastolic filling time
   c. Increase contractility
   d. Increase conduction velocity

14. Vasopressin works on which receptors?
   a. V1 only
   b. V1 at low doses and then V2>V1 at high doses
   c. V2 at low doses and then V1>V2 at high doses
   d. V1 and V2
   e. V2 only

15. Can someone fake being diaphoretic?
   a. Yes
   b. No

16. What type of breath requires no work by the patient, as the frequency/rate of the breath and the amount of gas delivered is fully dependent on the ventilator?
   a. Controlled
   b. Assisted
   c. Manuel
   d. Supported

17. Activation of this receptor is important in septic and obstructive shock by norepinephrine due to increased ______?
   a. Alpha 1 – vasoconstriction
   b. Beta 1- increased inotropy
   c. Beta 2- bronchodilation
   d. Alpha 2- vasodilation

18. What are signs of poor perfusion?
   a. Mental status change, increase in heart rate, increase in lactic acid, decrease in urine output, increased capillary refill time
   b. Mental status change, increase in lactic acid, increase in urine output, decreased capillary refill time, hemoconcentration
   c. Decrease in urine output, decreased capillary refill time, mottled extremities
   d. Mottled extremities increase in heart rate, increase in lactic acid, decrease in urine output, increased capillary refill time

19. Which receptor causes bronchodilation?
   a. Alpha 1
   b. Alpha 2
   c. Beta 1
   d. Beta 2
   e. D1

20. What is the underlying problem with shunt physiology?
   a. Something in the alveoli that prevents adequate gas exchange
   b. Something in the alveoli that prevents them from expanding
   c. Poor perfusion of the alveoli
   d. Fatigue from poor compliance

21. What is vasopressin?
   a. A catecholamine
   b. A combination of a catecholamine and hormone
   c. A hormone

22. Which pressor is more known to be the most arrhythmogenic?
   a. Dopamine
   b. Epinephrine
   c. Norepinephrine
   d. Phenylephrine
   e. Dobutamine

23. What is the main goal in treating septic shock?
24. What happens to the intrathoracic pressure/volume when you exhale?
   a. ↑ intra-thoracic pressure: ↑ intra-thoracic volume
   b. ↑ intra-thoracic pressure: ↓ intra-thoracic volume
   c. ↓ intra-thoracic pressure: ↑ intra-thoracic volume
   d. ↓ intra-thoracic pressure: ↓ intra-thoracic volume

25. Activation of this/these receptor(s) by norepinephrine can cause arrhythmias?
   a. Alpha 1
   b. Beta 1
   c. Alpha 1 + Beta 1
   d. Alpha 1 + Beta 2
   e. Beta 1 + Beta 2

26. What happens to the ratio of carbon dioxide to oxygen when a patient is apneic?
   a. ↑ Carbon dioxide: ↑ Oxygen
   b. ↑ Carbon dioxide: ↓ Oxygen
   c. ↓ Carbon dioxide: ↑ Oxygen
   d. ↓ Carbon dioxide: ↓ Oxygen

27. Why does positive pressure ventilation help with shunt physiology?
   a. Greater oxygen delivery
   b. Better carbon dioxide removal
   c. Increase surface area for gas exchange
   d. Helps with patient fatigue

28. What is the normal I:E ratio?
   a. Inspiration is longer than expiration
   b. Expiration is longer than inspiration
   c. Inspiration and expiration are equal

29. What correlates with diastolic blood pressure?
   a. Cardiac output
   b. End diastolic volume
   c. Stroke volume
   d. Peripheral vascular resistance

30. What percentage of alveoli are involved in shunt physiology to have refractory hypoxia?
    a. >30%
    b. >40%
    c. >50%
    d. >55%

31. Which is not a class of increased work of breathing causing respiratory distress?
    a. Opiate overdose
    b. Bronchospasms
    c. Increased metabolic demands
    d. Worsening compliance

32. Why is phenylephrine harmful in right heart failure?
    a. Increased pulmonary vascular resistance
    b. Increased cardiac preload due to venous vasoconstriction
    c. Reflex bradycardia
    d. All of the above
    e. None of the above

33. What is the duration of push dose epinephrine?
    a. 5-10 minutes
    b. <30 seconds
    c. 10-20 minutes
    d. 1-2 minute

34. Why is lactate produced during shock?
a. Purely due to anaerobic metabolism of pyruvate to lactate from cell hypoxia
b. Combination of anaerobic metabolism and epinephrine cause glycolysis
c. Krebs cycle malfunction due to ischemia
d. Mitochondrial increased demand from glycogen to glucose and glycolysis from beta 2 stimulation

35. Which medication is a phosphodiesterase 3 inhibitor?
   a. Dobutamine
   b. Norepinephrine
   c. Milrinone
   d. Selepressin

36. Are arrhythmias common with milrinone?
   a. Yes
   b. No

37. How do you check the plateau pressure (PPlat), on a pressure mode?
   a. Inspiratory pause
   b. Expiratory pause
   c. Same as the peak inspiratory pressure (PIP)
   d. Ask the respiratory therapist

38. In which mode of ventilation is a pre-set amount of gas delivered to the patient?
   a. Volume breath
   b. Pressure Breath
   c. Both
   d. Neither

39. What receptor(s) are activated by phenylephrine?
   a. Alpha 1
   b. Beta 1
   c. Alpha 1 + Beta 1
   d. Alpha 1 + Beta 2
   e. Beta 1 + Beta 2

40. In severe metabolic acidosis, why are the patients breathing rapidly?
   a. To stay awake
   b. Increased metabolic supply
   c. To overcome shunt physiology
   d. To get rid of CO2

41. Which drug is a hormone?
   a. Milrinone
   b. Dobutamine
   c. Norepinephrine
   d. Vasopressin

42. What does it mean when there is increased peak inspiratory pressure (PIP) and low plateau pressure (PPlat)?
   a. High resistance in the circuit or patient
   b. Decreased compliance
   c. Poor pulmonary perfusion
   d. Need to change the ventilator mode

43. How does vasopressin cause vasodilation?
   a. Inhibits nitric oxide production
   b. Activates beta 2
   c. Inhibits alpha 1
   d. Activates alpha 1

44. What is the reversal agent for benzodiazepine overdose?
   a. Naloxone
   b. Flumazenil
   c. Naltrexone
   d. Disulfiram

45. What does inopressor mean?
a. increases heart rate and causes arterial vasoconstriction  
b. increases cardiac contractility and induces vasoconstriction  
c. induces venous vasoconstriction and arterial vasodilation  
d. increases cardiac contractility and induces vasodilation

46. What is a feature of vasopressin?  
a. Increases sensitivity to catecholamines  
b. Increases sensitivity to endogenous vasopressin  
c. Doesn’t work very much on V2 receptors in the kidney during shock  
d. Tolerated better than norepinephrine in liver patients

47. Which of the following is not the main goal of mechanical ventilation in the ICU?  
a. Optimize patient comfort  
b. Optimize exchange of carbon dioxide and oxygen  
c. Get them through surgery with less discomfort  
d. Decrease work of breathing

48. What are ways to maximize patient comfort on the ventilator?  
a. Optimize ventilation settings  
b. Sedation  
c. Paralytics  
d. All of the above

49. What is the optimal type of breath?  
a. Spontaneous  
b. Controlled  
c. Assisted  
d. None of the above

50. Will all patients have perfect carbon dioxide and oxygen levels?  
a. Yes  
b. No

51. What should the carbon dioxide goal be with traumatic brain injury?  
a. High to allow increased cerebral blood flow  
b. High to prevent increased cerebral blood flow  
c. Normal to prevent increased cerebral blood flow  
d. Normal to allow increased cerebral blood flow

52. Which of the following is not a toxicity with mechanical intubation?  
a. Hypercarbia  
b. Barotrauma  
c. Volutrauma  
d. Atelactotrauma  
e. Oxygen toxicity

53. What percent of oxygen can lead to oxygen toxicity (even if only a short period of time)?  
a. >50 %  
b. >60%  
c. >70%  
d. >80%

54. What is the volume of gas in the lungs at the end of expiration, but prior to inhalation?  
a. Inspiratory Capacity  
b. Expiratory Capacity  
c. Vital Capacity  
d. Tidal Volume  
e. Functional Residual Capacity

55. Is inhalation an active or passive process?  
a. Active  
b. Passive

56. What is the flow pattern of a pressure delivered breath?  
a. Constant  
b. Accelerating  
c. Decelerating
57. What is the reversal agent for opiate overdose?
   a. Naloxone
   b. Flumazenil
   c. Naltrexone
   d. Disulfiram

58. What happens to the intrathoracic pressure/ volume when you inhale?
   a. ↑ intra-thoracic pressure: ↑ intra-thoracic volume
   b. ↓ intra-thoracic pressure: ↓ intra-thoracic volume
   c. ↑ intra-thoracic pressure: ↑ intra-thoracic volume
   d. ↓ intra-thoracic pressure: ↓ intra-thoracic volume

59. When does exhalation become an active process?
   a. With restrictive lung disease
   b. After you run a mile
   c. With obstructive lung disease

60. Mechanical ventilation works by______?
   a. Positive pressure- pushing air into the lungs
   b. Negative pressure- pulling out the chest wall

61. Which of the following is not a way to improve oxygenation?
   a. FiO2
   b. PEEP
   c. Inspiratory time
   d. Respiratory rate

62. What is mean airway pressure?
   a. Average pressure that alveoli are exposed to during inspiration
   b. Average pressure that the lungs are exposed to during expiration
   c. Average pressure the lung is exposed to during mechanical ventilation

63. Which is the lung injury due to oxygen production of free radicals?
   a. Barotrauma
   b. Volumtrauma
   c. Atelectotrauma
   d. Biotrauma
   e. Oxygen toxicity

64. What happens if you intubate a patient with RV failure?
   a. Nothing with rapid sequence intubation technique
   b. Improved pre-load to the RV
   c. RV collapse and cardiac arrest
   d. Increased ejection fraction of the right ventricle

65. What happens to blood return with spontaneous breathing?
   a. Positive intrathoracic pressure that causes less resistance and assists in venous return
   b. Negative intrathoracic pressure that causes increased resistance and impedes in adequate venous return
   c. Positive intrathoracic pressure that causes increased resistance and impedes venous return
   d. Negative intrathoracic pressure that causes less resistance and assists in venous return

66. What is removal of carbon dioxide from the body called?
   a. Hypercarbia
   b. Hypocarbia
   c. Ventilation
   d. Tidal Volume

67. What is the equation for minute ventilation?
   a. Respiratory Rate X PEEP
   b. Respiratory Rate X Tidal Volume
   c. Tidal Volume X Expiratory Time
   d. Expiratory Time X Respiratory Rate

68. What is dead space ventilation?
a. Carbon dioxide in the unventilated alveoli
b. Carbon dioxide delivered to the patient if the patient isn’t on 100% oxygen
c. Carbon dioxide that is unable to diffuse out of the capillaries
d. Carbon dioxide still in the airway at expiration

69. How does increasing the tidal volume allow more CO2 removal?
   a. Allows more surface area for the transfer of CO2
   b. Increases the mean airway pressure
   c. Allows the alveoli to remain open longer for gas exchange
   d. Improves compliance

70. Since tidal volume is limited, what else can we adjust to improve minute ventilation?
   a. Inspiratory time
   b. FiO2
   c. Respiratory Rate
   d. Expiratory time

71. Why is rapid and shallow breathing worse?
   a. Low CO2
   b. Easily tired
   c. Low tidal volumes

72. Why do patients with obstructive lung disease need a shorter respiratory rate?
   a. Gives the patients time to rest
   b. Shorter respiratory rate allows a longer expiratory time as they have trouble with air removal
   c. Shorter respiratory rate allows for less positive end expiratory pressure
   d. Shorter respiratory rate allows for longer inspiratory time to improve oxygenation

73. What does it mean when there is an increase in FiO2 without an increase in PaO2?
   a. Inadequate amount of oxygen
   b. Mostly mouth breathing
   c. Need to change from NC to non-rebreather
   d. No gas exchange due to shunt physiology

74. What is the injury to the alveoli caused by excessive pressure from the ventilator called?
   a. Barotrauma
   b. Volumtrauma
   c. Atelectotrauma
   d. Biotrauma
   e. Oxygen toxicity

75. Where do you mainly want dobutamine to work in cardiogenic shock?
   a. Alpha 1
   b. Alpha 2
   c. Beta 1
   d. Beta 2

76. How can you help improve venous return in a patient on positive pressure ventilation?
   a. If the patient has decreased intravascular volume, a fluid bolus will help
   b. Higher levels of positive end expiratory pressure (PEEP)
   c. Increase the volume/pressure breath (depends on the mode)
   d. Trial of bronchodilators to decrease afterload

77. What is the injury from over distension of the alveoli from excessive tidal volume?
   a. Barotrauma
   b. Volumtrauma
   c. Atelectotrauma
   d. Biotrauma
   e. Oxygen toxicity

78. In which situation would phenylephrine be harmful to the patient?
   a. Adult septic shock
   b. Pediatric septic shock
   c. Hemorrhagic shock
   d. Cardiogenic shock
79. What is the injury from repetitively opening and closing lung units (a type of sheering stress to the lung) called?
   a. Barotrauma
   b. Volumtrauma
   c. Atelectotrauma
   d. Biotrauma
   e. Oxygen toxicity

80. Which is not a cause of increased peak inspiratory pressure (PIP) and low plateau pressure (PPlat)?
   a. Endotracheal tube occlusion
   b. Mucous plugging
   c. Pulmonary embolism
   d. Bronchospasms

81. Is positive pressure good or bad with heart failure? Why?
   a. Bad; increases afterload and decreases cardiac output
   b. Good; decreases preload and increases cardiac output
   c. Bad; decreases preload and decreases cardiac output
   d. Good; decreases the LV afterload and allows more cardiac output
   e. Depends on the type an etiology of heart failure

82. Which is the lung injury resulting from inflammatory mediators?
   a. Barotrauma
   b. Volumtrauma
   c. Atelectotrauma
   d. Biotrauma
   e. Oxygen toxicity

83. What is the equation for cardiac output?
   a. Heart rate x Stroke Volume
   b. (Preload – after load) X contractility
   c. Stroke volume – peripheral vascular resistance
   d. LOVT area X LVOT velocity

84. What happens with inadequate PEEP?
   a. Alveoli collapse and develop atelectasis
   b. Poor compliance
   c. Inadequate minute ventilation
   d. Higher oxygen requirements leading to oxygen toxicity

85. What happens with adequate PEEP?
   a. Better driving pressure
   b. Less pressure is needed to re-expand the alveoli at the end of expiration
   c. Improved minute ventilation
   d. Lower oxygen requirements thus decreasing risk of barotrauma

86. What is the difference between the plateau pressure (PPlat) and the positive end expiratory pressure (PEEP)?
   a. Driving pressure
   b. Static pressure
   c. Dynamic Pressure
   d. Compliance

87. At 1 mg dose or greater, what receptor is more activated by epinephrine (alpha or beta) & which is more harmful?
   a. Alpha 1 > Beta 1; Alpha 1
   b. Alpha 1 > Beta 1; Beta 1
   c. Alpha 1 < Beta 1; Alpha 1
   d. Alpha 1 < Beta 1; Beta 1

88. What happens to blood return to the right atrium with positive pressure ventilation?
   a. Positive intrathoracic pressure that causes less resistance and assists in venous return
   b. Negative intrathoracic pressure that causes increased resistance and impedes in adequate venous return
c. Positive intrathoracic pressure that causes increased resistance and impedes venous return
d. Negative intrathoracic pressure that causes less resistance and assists in venous return

89. What is a static pressure that the alveoli see?
   a. Positive end expiratory pressure (PEEP)
   b. Driving pressure
c. Plateau pressure (Pplat)
d. Peak Inspiratory Pressure (PIP)

90. What happens to the pulse pressure in cold shock?
   a. Increases
   b. Stays the same
c. Decreases
d. Depends on the cause of cold shock

91. What is one indication that a patient is unable to protect his airway and would benefit from intubation?
   a. Pooling of secretions in the airway
   b. Frequent lethargy and unable to carry on a conversation
c. Poor cough
d. Recent stroke

92. What are the components of stroke volume?
   a. Preload, afterload, and heart rate
   b. Preload, contractility, and systemic vascular resistance
c. Preload, afterload and contractility
d. Afterload and contractility

93. What is the definition of shock?
   a. Systolic blood pressure < 65 mm Hg
   b. Lactic acid production due to anaerobic metabolism
c. Metabolic supply to tissues does not meet demand
d. When you are scared of something

94. What is warm shock?
   a. Decrease in cardiac output
   b. Increase in systemic vascular resistance leading to bradycardia
c. Increase in afterload
d. Decrease in stroke volume leading with decreased systemic vascular resistance

95. Which one of the following is not a class of respiratory failure?
   a. Refractory hypoxemia
   b. Increased work of breathing
c. Airway protection
d. Mountain sickness

96. When giving a pressure breath, how much volume of gas will be delivered to a patient?
   a. Depends on compliance
   b. 6-8 ml / kg of ideal body weight
   c. Depends on the respiratory rate
d. Depends on the flow and inspiratory time

97. What should be checked on every patient, as it is easily reversible and can avoid intubation?
   a. Recent use of benzodiazepines
   b. Cough
c. Nothing, just intubate and then evaluate
d. Blood glucose

98. How is lactate cleared?
   a. It is metabolized by the brain
   b. Cleared by kidneys and liver
c. It is changed back into pyruvate to go into the Krebs cycle
d. Hoffman degradation

99. Cold shock is defined by…?
   a. Decreased effective intravascular volume
b. Increased systemic vascular resistance
c. Decreased or inadequate stroke volume
d. Vasoconstriction (both venous and arterial)

100. What is the next step if an increase in heart rate is inadequate to maintain cardiac output?
   a. More increased heart rate
   b. Decreased urine output
c. Increase systemic vascular resistance
d. Increased contractility

101. Warm shock is defined by…?
   a. Decreased afterload
   b. Increased preload
c. Narrow pulse pressure
d. Decreased systemic vascular resistance

102. What are the two pathways that pyruvate can take?
   a. Krebs cycle or gluconeogenesis
   b. Lactate production or glycolysis
c. Krebs cycle or lactate production
d. Lactate production or gluconeogenesis

103. Which one does not cause increased afterload?
   a. Hypertensive emergency
   b. Left Ventricular outflow obstruction
c. Increased vasodilation
d. Aortic stenosis

104. What correlates with systolic blood pressure?
   a. Cardiac output
   b. End diastolic volume
c. Stroke volume
d. Peripheral vascular resistance

105. Which one does not cause a decrease in preload?
   a. Hemorrhage
   b. Myocarditis
c. GI bleed
d. Vasodilation

106. What is the first compensation for a decrease in stroke volume to maintain cardiac output?
   a. Increase heart rate
   b. Increase peripheral vascular resistance
c. Epinephrine
d. Decreased urine output

107. What type of shock is tamponade?
   a. Cardiogenic
   b. Obstructive
c. Hypovolemic

108. What is cold shock?
   a. Decrease in cardiac output
   b. Increased in systemic vascular resistance leading to bradycardia
c. Increase in afterload
d. Decrease in stroke volume leading to increased systemic vascular resistance

109. What is the Glasgow coma score that is a general rule of thumb for intubation?
   a. Three
   b. Less than 10
c. Less than 8
d. Less than 11

110. Which one does not cause a decrease in contractility?
   a. Aortic stenosis
b. Cardiac ischemia  
c. Myocarditis  
d. Congenital heart disease  

111. What type of distributive shock has bradycardia?  
a. Septic  
b. Obstructive  
c. Neurogenic  
d. Cardiogenic  

112. What are the three types of cold shock?  
a. Cardiogenic, hypovolemic, obstructive  
b. Hypovolemic, septic, neurogenic  
c. Cardiogenic, obstructive, neurogenic  
d. Hypovolemic, neurogenic, septic  

113. Why does shock have increased lactic acid production (besides anaerobic metabolism)?  
a. Epinephrine activation of beta 2 receptors  
b. All of it is from anaerobic metabolism from tissue ischemia  
c. Epinephrine activation of alpha 2 receptors  
d. Decreased clearance so no increased production  

114. What happens to the pulse pressure in warm shock?  
a. Increases  
b. Stays the same  
c. Decreases  

115. What is another name of warm shock?  
a. Distributive shock  
b. Sepsis  
c. Hypovolemic  

116. How does vasopressin help a patient with a pulmonary embolism?  
a. Decrease preload, decrease cardiac afterload  
b. Restore mean arterial blood pressure, decrease pulmonary vascular resistance  
c. Decrease cardiac afterload, decrease pulmonary vascular resistance  
d. Decrease preload, restore mean arterial blood pressure  

117. What was the major unwanted effect by epinephrine in the SOAP II trial?  
a. Tachycardia  
b. Ischemia  
c. Hyperglycemia  
d. Hyperthermia  

118. What happens to the right ventricle with positive pressure ventilation?  
a. Decreased right ventricular afterload  
b. Increased right ventricular preload  
c. No significant changes to the right ventricle  
d. Increased right ventricular afterload  

119. What is the dosage of push dose phenylephrine that should be administered to a patient?  
a. 100-300 mcg every 5-10 minutes  
b. 100-200 mcg every 5-10 minutes  
c. 80-200 mcg every 2-4 minutes  
d. 150-200 mcg every 2-4 minutes  

120. What does inodilator mean?  
a. Increases heart rate and causes arterial vasoconstriction  
b. Increases cardiac contractility and induces vasoconstriction  
c. Induces venous vasoconstriction and arterial vasodilation  
d. Increases cardiac contractility and induces vasodilation  

121. Which medications are inodilators?  
a. Dobutamine, milrinone, dopamine  
b. Milrinone, dobutamine, epinephrine  
c. Epinephrine, dopamine, milrinone  
d. Isoproterenol, dobutamine, milrinone
122. What does chronotropic mean?
   a. Increase heart rate
   b. Increase diastolic filling time
   c. Increase contractility
   d. Increase conduction velocity

123. What does chronotropic mean?
   a. Increase heart rate
   b. Increase diastolic filling time
   c. Increase contractility
   d. Increase conduction velocity

124. What is the onset of push dose phenylephrine?
   a. 30 seconds
   b. 2 minutes
   c. 10 seconds
   d. 1 minute

125. What is the dosage of push dose epinephrine that should be administered to a patient?
   a. 5-10 mcg every 5-10 minutes
   b. 15-20 mcg every 5-10 minutes
   c. 8-20 mcg every 2-5 minutes
   d. 10-20 mcg every 2-5 minutes

126. At low doses, what receptor(s) are activated by epinephrine?
   a. Alpha 1
   b. Beta 1
   c. Alpha 1 + Beta 1
   d. Alpha 1 + Beta 2
   e. Beta 1 + Beta 2

127. Which drug is best with anaphylactic shock?
   a. Vasopressin
   b. Epinephrine
   c. Norepinephrine
   d. Phenylephrine

128. At >10 mcg/kg/min, what receptor(s) are more activated by dopamine?
   a. Alpha 1 = Beta 1
   b. Alpha 1 > Beta 1
   c. Alpha 1 < Beta 2
   d. Beta 1 > Beta 2
   e. Beta 1 < Beta 2

129. What is the dosage of push dose epinephrine that should be administered to a patient?
   a. 5-10 mcg every 5-10 minutes
   b. 15-20 mcg every 5-10 minutes
   c. 8-20 mcg every 2-5 minutes
   d. 10-20 mcg every 2-5 minutes

130. What happens to the left ventricle with positive pressure ventilation?
   a. Increased stroke volume and increased cardiac output
   b. Decreased stroke volume and decreased cardiac output
   c. Increased heart rate and increased cardiac output
   d. Decreased heart rate and decreased cardiac output

131. Where does dobutamine work?
   a. Alpha 1
   b. Beta 1
c. Alpha 1 + Beta 1
d. Alpha 1 + Beta 2
e. Beta 1 + Beta 2

133. When giving a volume breath, what is the relationship between compliance and pressure?
   a. Higher the pressure, higher the compliance needed
   b. Lower the compliance, higher the pressure needed
   c. Lower the pressure, lower the compliance needed
   d. Higher the compliance, higher the pressure needed

134. What is lusitropy?
   a. Increased ventricular filling
   b. Contraction of the ventricles
   c. Increased heart rate
   d. Diastolic relaxation

135. Are arrhythmias common with milrinone?
   a. Yes
   b. No

136. What is synchronized intermittent mandatory ventilation (SIMV)?
   a. A combination of a controlled/assisted breathing with a spontaneous breath
   b. A way for the ventilator to assist/ augment the efforts of the patient
   c. A controlled form of ventilation where the ventilator controls the rate and the amount of gas
   d. A combination of controlled and assisted breath

137. Why is milrinone good in obstructive shock?
   a. Decrease preload
   b. Decreased pulmonary vascular resistance
   c. Bronchodilator
   d. Decreased afterload

138. In which mode of ventilation will a pre-set pressure deliver gas to the patient?
   a. Volume breath
   b. Pressure Breath
   c. Both
   d. Neither

139. What receptor(s) are activated by norepinephrine?
   a. Alpha 1
   b. Beta 1
   c. Alpha 1 + Beta 1
   d. Alpha 1 + Beta 2
   e. Beta 1 + Beta 2

140. What does it mean when there is increased peak inspiratory pressure (PIP) and increased plateau pressure (Pplat)?
   a. High resistance in the circuit or patient
   b. Poor pulmonary perfusion
   c. Need to change the ventilator mode
   d. Decreased compliance

141. What does inopressor mean?
   a. Increases heart rate and causes arterial vasoconstriction
   b. Increases cardiac contractility and induces vasoconstriction
   c. Induces venous vasoconstriction and arterial vasodilation
   d. Increases cardiac contractility and induces vasodilation

142. What receptor causes free water reabsorption in the kidney?
   a. V1
   b. V2
   c. V1 and V2

143. Which of the following is not a type of breath that can be delivered by a ventilator?
   a. Controlled
b. Assisted

c. Manuel

d. Spontaneous

144. What are the two types of breath delivery?
   a. FiO$_2$, PEEP
   b. Volume, pressure
   c. Flow, volume
   d. Respiratory rate and tidal volume

145. Describe the type of breath when the patient starts the process (aka triggers a breath), but the ventilator takes over:
   a. Controlled
   b. Assisted
   c. Manuel
   d. Supported

146. With what type of breath does the patient do most/all of the work, and the ventilator gives only minimal assistance, if needed?
   a. Controlled
   b. Assisted
   c. Manuel
   d. Supported

147. What is controlled mandatory ventilation (CMV)?
   a. A combination of a controlled/assisted breathing with a spontaneous breath
   b. A way for the ventilator to assist/ augment the efforts of the patient
   c. A controlled form of ventilation where the ventilator controls the rate and the amount of gas
   d. A combination of controlled and assisted breath

148. What is pressure support?
   a. A combination of a controlled/assisted breathing with a spontaneous breath
   b. A way for the ventilator to assist/ augment the efforts of the patient
   c. A controlled form of ventilation where the ventilator controls the rate and the amount of gas
   d. A combination of controlled and assisted breath

149. How does increasing the inspiratory time lead to improved oxygenation?
   a. It increases mean airway pressure
   b. It decreases expiration time
   c. It improves PEEP
   d. It increases the tidal volume

150. What is assist controlled ventilation (ACV)?
   a. A combination of a controlled/assisted breathing with a spontaneous breath
   b. A way for the ventilator to assist/ augment the efforts of the patient
   c. A controlled form of ventilation where the ventilator controls the rate and the amount of gas
   d. A combination of controlled and assisted breath

151. When giving a volume breath, at what pressure will the gas be delivered?
   a. Depends on compliance
   b. 6-8 ml / kg of ideal body weight
   c. Depends on the respiratory rate
   d. Depends on the flow and inspiratory time

152. When giving a pressure breath, what is the relationship between compliance and volume?
   a. Lower compliance, the less volume delivered
   b. Lower compliance, the more volume delivered
   c. Higher volume, the higher the compliance needed
   d. Lower volume, the higher the compliance needed

153. Which is a dynamic pressure needed to fully inflate the lungs and overcome the resistive forces and elastic forces of the lungs?
a. **Peak Inspiratory Pressure (PIP)**

b. Positive end expiratory pressure (PEEP)

c. Plateau pressure (PPlat)

d. End Expiratory Pressure

154. What is the normal peak inspiratory pressure (PIP)?

a. Variable depending on body habitus

b. >20 cm of water pressure

c. <10 cm of water pressure

d. <20 cm of water pressure

155. What is meant by a static pressure vs dynamic pressure?

a. Dynamic is seen during an inspiratory hold, whereas static is the same as the Peak inspiratory pressure (PIP)

b. Static has no air movement, dynamic pressure has air movement

c. Same thing: static pressure is used with volume mode and dynamic pressure with pressure mode

d. Same thing: static pressure is used with pressure mode and dynamic pressure with volume mode

156. What is the main disadvantage of a pressure delivered breath?

a. Not as well known to clinicians

b. No control over minute ventilation

c. Constantly pay attention to pressures to make sure adequate tidal volume

d. All of the above

157. What should you consider before giving flumazenil for a benzodiazepine overdose?

a. A higher dose is going to be needed if the patient is chronically on benzodiazepines

b. Consider a drip due to the short half-life of flumazenil

c. Add naloxone because of the likely use of opiates also

d. Avoid if patient is on chronic benzodiazepines as they can go into withdrawal

158. Which is not a cause of increased peak inspiratory pressure (PIP) and increased plateau pressure (PPlat)?

a. Pulmonary edema

b. Bronchospasms

c. Pneumothorax

d. Abdominal compartment syndrome

e. ARDS

159. Which receptor causes increased chronotropy and inotropy?

a. Alpha 1

b. Alpha 2

c. Beta 1

d. Beta 2

e. D1

160. What happens as compliance decreases in a volume breath?

a. Less oxygen delivery and hypoxia

b. Higher peak inspiratory pressures (PIP) leading to barotrauma

c. Higher FiO2 and oxygen toxicity

d. Decrease in the minute ventilation leading to decreased PEEP and atelectasis

161. What is the normal flow pattern of a volume breath?

a. Constant

b. Accelerating

c. Decelerating

d. Variable

162. How is the peak inspiratory pressure (PIP) and the mean airway pressure of a pressure breath in comparison to a volume breath?

a. ↑ peak airway pressure + ↓ mean airway pressure

b. ↑ peak airway pressure + ↑ mean airway pressure

c. ↓ peak airway pressure + ↑ mean airway pressure

d. ↓ peak airway pressure + ↓ mean airway pressure
163. What is meant by shunt physiology?
   a. Inadequate ventilation with adequate perfusion
   b. Inadequate ventilation with inadequate perfusion
   c. Adequate ventilation with inadequate perfusion
   d. Adequate ventilation with adequate perfusion