University of South Alabama
Department of Cardiorespiratory Care
CRT Self-Assessment Exam
(Time limit = 2 hr 38 min)

NOTES: The time limit of 2 hours 38 minutes is accurate for 140 questions. The actual CRT exam has 160 questions with a time limit of 3 hours. The cut score (minimum passing score) for this exam is 63% using the Modified Nedelsky Procedure.

Name _____ Date _____

1. The normal range for $PaCO_2$ is:

A. 25 torr to 35 torr.
B. 30 torr to 40 torr.
C. 35 torr to 45 torr.
D. 80 torr to 100 torr.

2. In compensated metabolic acidosis, the pH is typically between:

A. 7.25 and 7.35.
B. 7.35 and 7.40.
C. 7.35 and 7.45.
D. 7.40 and 7.45.

3. Calculation of the V_D/V_T ratio requires measurements of:

A. pH and HCO_3^-
B. PaO_2 and F_IO_2
C. $PaCO_2$ and P_ECO_2
D. $PaCO_2$ and PaO_2

4. A 40 year-old post-operative patient is being mechanically ventilated. The initial arterial blood gases show: PH = 7.23, $PaCO_2$ = 62 torr, PO_2 = 45 torr, HCO_3^- = 25 mEq/L. What should be done to normalize the patient's ventilatory status?

A. Decrease the SIMV rate.
B. Increase the F_IO_2.
C. Increase the PEEP.
D. Increase the pressure support.

5. During volume-controlled ventilation, an increased tidal volume would lead to a(n):

A. increase of the $PaCO_2$.
B. increase of the PIP.
C. decrease of the PEEP.
D. decrease of the PaO_2.

6. Mr. Lamplighter, a 30 year-old 60-Kg patient in post-anesthesia recovery unit, has normal arterial blood gases while breathing 28% oxygen via air entrainment mask. Since he is likely to require oxygen therapy for at least 24 hours, what oxygen set up should be used so that Mr. Lamplighter can begin feeding by mouth?

A. 2 L/min oxygen via nasal cannula.
B. 2 L/min oxygen via nasal catheter.
C. 1 L/min oxygen via nasal cannula.
D. 1 L/min oxygen via nasal catheter.

7. For a short distance ground transport of an intubated patient, the therapist may use a(n) _____ to provide the humidification requirement.

A. laryngeal mask airway.
B. bubble humidifier.
C. heat and moisture exchanger.
D. heated cascade.

8. A patient has the following vital sign measurements: SBP = 110/60 mm Hg, HR = 80/min, SPO_2 = 90%. What is the calculated pulse pressure?

A. 40 mm Hg.
B. 50 mm Hg.
C. 60 mm Hg.
D. 70 mm Hg.

9. For adult asthmatic patients who have been using bronchodilators to control the symptoms, the recommended starting dose of Pulmicort (budesonide) using dry-powder turbuhaler is:

A. 50 mcg to 100 mcg TID
B. 100 mcg to 200 mcg TID
C. 200 mcg to 400 mcg BID
D. 400 mcg to 800 mcg BID

10. Rotameter is an instrument that calibrates:

A. helium analyzers.
B. blood gas analyzers.
C. oximeters.
D. pneumotachometers.

11. On the flow/time tracing of a ventilator graphic display, the expiratory flow tracing returns to the baseline:

A. in the absence of air trapping or air leaks.
B. when PEEP is set at 0 cm H_2O.
C. in the presence of air trapping.
D. in the presence of air leaks.

12. For adults, the normal cardiac output and cardiac index are _____ and _____, respectively.

A. 2 to 3 L/min; 1.5 to 2.5 L/min/m^2
B. 4 to 8 L/min; 2.5 to 3.5 L/min/m^2
C. 1.5 to 2.5 L/min; 2 to 3 L/min/m^2
D. 2.5 to 3.5 L/min; 4 to 8 L/min/m^2

13. The treatment of choice for the cardiac rhythm shown below is:

A. cardioversion.
B. 0.5 mg atropine.
C. carotid artery massage.
D. defibrillation.

14. During volume-controlled ventilation, patient-ventilator dyssynchrony can occur when the set:

A. tidal volume is greater than 800 mL.
B. SIMV frequency is less than 4/min.
C. peak flow equals minute ventilation.
D. pressure support provides spontaneous tidal volume greater than 500 mL.

15. Mr. Jones has been using oxygen via nasal cannula at 5 L/min around the clock. During discharge planning, the therapist should recommend the home care company to set up a(n):

A. oxygen concentrator.
B. liquid oxygen system.
C. size H oxygen cylinders.
D. mechanical ventilator.

16. A mechanically ventilated patient has been using a heat and moisture exchanger (HME) for the past three days. The therapist notices that the amount of secretions has gradually decreased. At the same time, the secretions are getting thicker and more difficult to remove by suction. The therapist should change the HME to a(n):

A. ultrasonic nebulizer.
B. large volume nebulizer.
C. heated cascade.
D. high flow cannula.

17. A capnography tracing is shown below with P_ECO2 measurements ranging from 0 mm Hg to 35 mm Hg. This tracing illustrates:

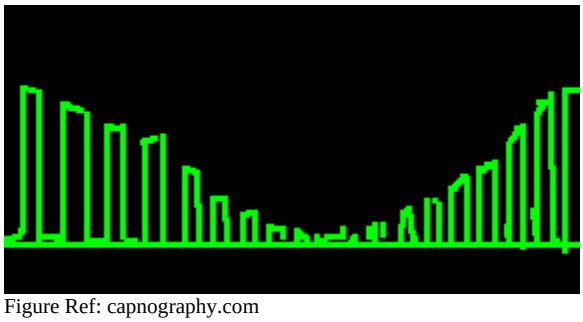


Figure Ref: capnography.com

A. air leak and tubing obstruction.
B. tubing obstruction and disconnection.
C. apnea and bag-mask ventilation.
D. cardiac arrest and successful resuscitation.

18. Damage to the medulla oblongata due to strokes or trauma may lead to:

A. Kussmaul breathing.
B. Biot's respiration.
C. central sleep apnea.
D. hyperventilation.

19. Premedication with _____ prior to flexible bronchoscopy may help to reduce the incidence of excessive secretions, bronchoconstriction and vagal stimulation.

A. morphine sulfate
B. lidocaine
C. midazolam
D. atropine sulfate

20. Cardiac index is calculated by:

A. cardiac output x heart rate
B. stroke volume x heart rate
C. cardiac output / body surface area
D. stroke volume / body surface area

21. During intubation, midazolam may be used to:

A. provide pain relief.
B. provide sedation.
C. relax and open the vocal cords.
D. paralyze the skeletal muscles.

22. A physician's order to use patient restraint as a protective device:

A. must be reviewed and renewed every 8 hours.
B. must be reviewed and renewed every 24 hours.
C. can be a standing order to be used at the discretion of the nursing staff.
D. can be a standing order until patient regains normal mental status.

23. A patient has the following arterial blood gases: PH = 7.55, $PaCO_2$ = 33 torr, PO_2 = 57 torr, $HCO3^-$ = 28 mEq/L. The primary acid-base status is called:

A. respiratory acidosis.
B. respiratory alkalosis.
C. metabolic acidosis.
D. metabolic alkalosis.

24. Which of the following reports shows acute respiratory alkalosis superimposed on compensated respiratory acidosis?

A. PH = 7.50, $PaCO_2$ = 40 torr, PO_2 = 46 torr, $HCO3^-$ = 30 mEq/L.
B. PH = 7.40, $PaCO_2$ = 47 torr, PO_2 = 51 torr, $HCO3^-$ = 28 mEq/L.
C. PH = 7.22, $PaCO_2$ = 63 torr, PO_2 = 44 torr, $HCO3^-$ = 25 mEq/L.
D. PH = 7.54, $PaCO_2$ = 30 torr, PO_2 = 73 torr, $HCO3^-$ = 25 mEq/L.

25. Which of the following arterial blood gas data indicates hypoventilation?

A. PH = 7.11
B. $PaCO_2$ = 47 torr
C. PO_2 = 43 torr
D. $HCO3^-$ = 31 mEq/L.

26. The recommended CPR technique for a neonate is done by alternating the following steps:

A. 15 chest compressions; 1 breath.
B. 15 chest compressions; 2 breaths.
C. 30 chest compressions; 1 breath.
D. 30 chest compressions; 2 breaths.

27. A respiratory therapist is intubating a premature infant weighing 1,000 grams. The therapist should select and use an endotracheal tube that is:

A. size 4 and cuffed.
B. size 4 and cuffless.
C. size 2.5 and cuffed.
D. size 2.5 and cuffless.

28. An RCP is preparing to perform endotracheal suctioning. In the process, the suction catheter touched to top of the night stand. The therapist should:

A. wipe the catheter with an alcohol pad before use.
B. spray the catheter with lidocaine before use.
C. replace the catheter with a new one.
D. rinse the catheter in sterile water before use.

29. A Lukens trap:

A. requires an air compressor.
B. is used to collect blood sample.
C. collects sputum from patient's cough and spit.
D. collects sputum sample from a suction procedure.

30. Under normal conditions, the sensitivity setting on a ventilator should be set at or near:

A. 2 cm H_2O.
B. 5 cm H_2O.
C. -2 cm H_2O.
D. -5 cm H_2O.

31. A patient who is using BiPAP at 14/6 cm H_2O complains that she is unable to breathe deeply. The therapist should:

A. increase IPAP to 16 cm H_2O.
B. decrease IPAP to 12 cm H_2O.
C. increase EPAP to 8 cm H_2O.
D. decrease EPAP to 4 cm H_2O.

32. The following changes have been observed in a 48-hour period: unchanged plateau (static) pressures; increased peak inspiratory pressures. This observation is consistent with a(n):

A. decreasing airway resistance.
B. decreasing lung compliance.
C. increasing airway resistance.
D. increasing lung compliance.

33. Exercise tolerance can be quantified by evaluating the patient's response for the following question:

A. Do you eat a high calorie diet?
B. Are you able to do laundry?
C. Do your children take you to the doctor's office?
D. Do you snore during sleep?

34. Singulair is:

A. administered by inhalation.
B. same as Accolate.
C. a brand name for montelukast sodium.
D. a long-acting beta agonist.

35. A capnography tracing is shown below with P_ECO2 measurements ranging from 0 mm Hg to 5 mm Hg. This tracing illustrates:

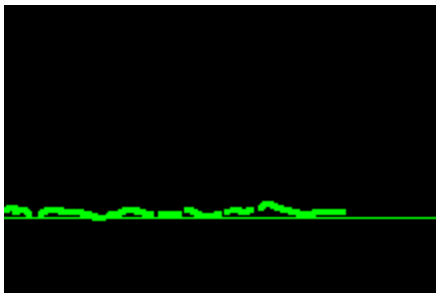


Figure Ref: capnography.com

A. obstructive sleep apnea.
B. esophageal intubation.
C. rebreathing.
D. hypoventilation.

36. The ventilator flow-time graphic is shown below with peak inspiratory flow of 50 L/min and peak expiratory flow of 45 L/min. This tracing shows presence of:

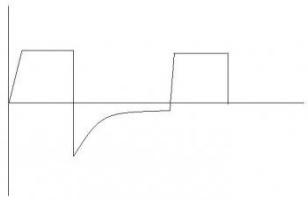


Figure Ref: keepbreathing.files.wordpress.com

A. descending flow pattern.
B. normal flow-time tracing.
C. incomplete exhalation.
D. PEEP.

37. During mechanical ventilation, presence of auto-PEEP due to air trapping may be managed by:

A. increasing the peak flow.
B. increasing the tidal volume.
C. increasing the frequency.
D. suctioning the airway.

38. The ventilator flow-time graphic is shown below with peak inspiratory flow of 50 L/min and peak expiratory flow of 45 L/min. The therapist should:

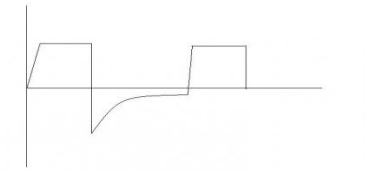


Figure Ref: keepbreathing.files.wordpress.com

A. decrease the peak flow setting.
B. increase the tidal volume setting.
C. increase the PEEP setting.
D. decrease the SIMV rate.

39. A patient has the following hemodynamic data: SaO_2 = 92%, CaO_2 - CvO_2 = 4 vol%, VO_2 = 250 ml/min. The calculated cardiac output is:

A. 4.75 L.
B. 5.25 L.
C. 6.25 L.
D. 7.15 L.

40. A patient is receiving SIMV at a rate of 12/min. If the total rate is 12/min, an increase of peak flow would lead to a:

A. higher SIMV rate.
B. lower SIMV rate.
C. longer inspiratory time.
D. longer expiratory time.

41. In disease conditions such as bronchopleural and bronchocutaneous fistulas, the therapist should recommend using a(n):

A. laryngeal mask airway.
B. double-lumen endobronchial tube.
C. pharyngealtracheal lumen airway.
D. esophageal gastric tube airway.

42. Auto-PEEP during mechanical ventilation may be corrected by using one or more of the following changes *except*:

A. lower tidal volume.
B. lower frequency.
C. higher peak flow.
D. higher PEEP.

43. By keeping all other ventilator settings the same, a reduction of the tidal volume from 600 mL to 500 mL would:

A. increase the inspiratory time.
B. increase the expiratory time.
C. decrease the PEEP.
D. decrease the $PaCO_2$.

44. Heimlich maneuver can be performed:

A. to treat aspiration.
B. on new born infants.
C. by one rescurer.
D. All of the above.

45. After intubation of an adult patient weighing 120 lbs with a size 7 endotracheal tube. The initial cuff pressure reads 40 H_2O. The therapist should adjust the cuff pressure to:

A. 15 cm H_2O.
B. 25 cm H_2O.
C. 35 cm H_2O.
D. 45 cm H_2O.

46. A patient in the emergency department has a large tension pneumothorax in the left thorax. This condition should coincide with the following finding.

A. Shifting of trachea to right.
B. Shifting of trachea to left.
C. Absence of breath sounds on right.
D. Dull percussion note on left.

47. Rapid shallow breathing increases the:

A. oxygenation level.
B. dead space ventilation.
C. likelihood of weaning success.
D. intrapulmonary shunting.

48. A physician has ordered pulmonary function testing before and after bronchodilator. This procedure is done to evaluate presence of:

A. restrictive disorder.
B. reversibe restrictive disorder.
C. air flow obstruction.
D. reversible air flow obstruction.

49. The treatment of choice for post-extubation stridor is:

A. albuterol by metered dose inhaler.
B. albuterol by small volume nebulizer.
C. racemic epinephrine by metered dose inhaler.
D. racemic epinephrine by small volume nebulizer.

50. Crackles are the common breath sounds in patients with:

A. asthma.
B. pneumonia.
C. pulmonary fibrosis.
D. rhinitis.

51. During patient interview and assessment, the patient tells the therapist that he experiences shortness of breath during walking. The therapist should record the findings as:

A. hypopnea on exertion.
B. occasional shortness of breath.
C. dyspnea on exertion.
D. orthopnea.

52. After intubating a patient with active MRSA infection, the laryngoscope and blades must be processed with:

A. ethylene oxide.
B. gluteraldehyde.
C. 70% ethyl alcohol.
D. 100% vinegar.

53. Under normal conditions, the normal $P_{ET}CO_2$ measurement is about:

A. 2 torr higher than the $PaCO_2$.
B. 2 torr lower than the $PaCO_2$.
C. 40 torr.
D. 30 torr.

54. Following proper placement of an endotracheal tube and establishment of adequate ventilation, the:

A. $P_{ET}CO_2$ should be near 0 torr.
B. patient should be able to verbalize.
C. PaO_2 should be 100 torr.
D. SpO_2 should improve immediately.

55. Reversibility of air flow obstruction has occurred when the post-bronchodilator:

A. FVC increases by 5%.
B. FEV_1 increases by 200 ml.
C. $FEF_{25\%-75\%}$ increases by 10%.
D. FRC increases by 15%.

56. Increases in the RV, FRC or TLC measurements may be caused by conditions such as:

A. pulmonary fibrosis.
B. pulmonary edema.
C. emphysema.
D. congestive heart failure.

57. A patient with persistent asthma does not respond to frequent rescue bronchodilator therapy. The therapist should administer and evaluate the effectiveness of an inhaled:

A. antihistamine.
B. beta blocker.
C. long-acting bronchodilator.
D. steroid.

58. A 100-lb patient has been intubated orally with a size 7 endotracheal (ET) tube. The ET tube should be initially positioned and taped with a marking of:

A. 18 cm at the patient's lips.
B. 21 cm at the patient's lips.
C. 25 cm at the patient's lips.
D. 30 cm at the patient's lips.

59. Wright respirometer is commonly used to measure:

A. volumes at low flow rates.
B. peak flows.
C. total lung capacity.
D. residual volume and functional residual capacity

60. Thoracotomy tube with under water drainage is the treatment of choice for:

A. aspiration.
B. tension pneumothorax.
C. ARDS.
D. chest trauma.

61. A patient's SpO_2 changes from 95% to 80% when the ventilator circuit is disconnected for suctioning. For subsequent suctioning procedures, the therapist should use a(n):

A. close-system suctioning device.
B. BiPAP device.
C. laryngeal mask airway.
D. resuscitation bag-mask device.

62. A laboratory report shows the following measurements: $PaCO_2$ = 40 torr, $P_{\bar{E}}CO_2$ = 25 torr. What is the calculated V_D/V_T?

A. 15%.
B. 27%
C. 38%.
D. 65%

63. The normal range of PCWP for adults is:

A. 1 to 7 mm Hg.
B. 8 to 12 mm Hg.
C. 15 to 25 mm hg.
D. 60 to 100 mm Hg.

64. A serum potassium measurement of 7 mEq/L is interpreted as:

A. normal.
B. hypokalemia.
C. hyperkalemia.
D. metabolic acidosis.

65. During cardiopulmonary resuscitation, epinephrine is the treatment of choice for:

A. ventricular fibrillation.
B. bradycardia.
C. tachycardia.
D. asystole.

66. A 30 year-old, 110-lb patient has been orally intubated with a size 7.5 endotracheal tube. When a cuff manometer is not immediately available, the cuff should be inflated slowly:

A. until no air leaks at end-inspiration.
B. until no air leaks at end-expiration.
C. with 10 ml of air.
D. with 15 ml of air.

67. Given: expired V_T = 600 ml, peak inspiratory pressure = 30 cm H_2O, plateau pressure = 20 cm H_2O, PEEP = 0 cm H_2O. What is the calculated static compliance?

A. 10 ml/cm H_2O.
B. 20 ml/cm H_2O.
C. 30 ml/cm H_2O.
D. 50 ml/cm H_2O.

68. Lateral neck radiography is indicated to evaluate presence of:

A. epiglottitis.
B. aspiration.
C. asthma.
D. vocal cord dysfunction.

69. During SIMV ventilation at a rate of 6/min, the following measurements are obtained: V_E = 6 L/min, total frequency = 10/min. What is the calculated rapid shallow breathing index (RSBI)?

A. 10 breaths/min/L
B. 100 breaths/min/L
C. 1000 breaths/min/L
D. Insufficient data to calculate RSBI.

70. A patient has a PCWP measurement of 10 mm Hg. All other hemodynamic values are within normal limits. The hemodynamic status can be interpreted as:

A. normal.
B. left-sided heart failure.
C. pulmonary hypertension.
D. hypovolemia.

71. A patient has the following pulmonary function measurements: FEV_1 = 4.0 L (normal predicted 5.0 L) and FVC = 5.0 L (normal predicted 7.0 L). What is the calculated FEV_1%?

A. 71%
B. 80%
C. 100%.
D. 125%.

72. Coumadin therapy and vitamin K deficiency are two indications for monitoring a patient's:

A. prothrombin time.
B. arterial blood gases.
C. serum electrolytes.
D. metabolic study.

73. Culture and sensitivity of the sputum sample has been ordered for a patient in the ICU. This test is done to determine all of the following *except*:

A. type of effective antibiotics.
B. severity of infection.
C. appropriate dosage of antibiotics.
D. identification of microbes.

74. A patient is critically ill due to severe pneumonia. In order to initiate antibiotic treatment as soon as feasible, the therapist should recommend:

A. blood type and match.
B. blood transfusion.
C. sputum culture and sensitivity.
D. sputum Gram Stain.

75. The normal range of white blood count for adults is:

A. 3 to 6 x 10^3 / mm^3
B. 5 to 10 x 10^3 / mm^3
C. 8 to 14 x 10^3 / mm^3
D. 15 to 20 x 10^3 / mm^3

76. What is the interpretation for these electrolyte measurements? Cl^- = 103 mEq/L, Na^+ = 140 mEq/L, K^+ = 2.5 mEq/L, HCO_3^- = 26 mEq/L.

A. Hypokalemia.
B. Normal acid-base balance.
C. Hyperchloremia.
D. Hypernatremia.

77. An increased blood urea nitrogen (BUN) measurement may suggest:

A. congestive heart failure.
B. malnutrition.
C. impaired kidney function.
D. overhydration.

78. Mr. Fender has the following hemodynamic measurements: CVP = 6 mm Hg, PAP = 32/18 mm Hg, PCWP = 12 mm Hg, CO = 6 L/min. The data show:

A. fluid overload.
B. pulmonary hypertension.
C. congestive heart failure.
D. dehydration.

79. The abnormal heart rhythm below is called:

A. complete heart block.
B. left Bundle Branch Block.
C. right Bundle Branch Block.
D. premature ventricular contraction.

80. Pulmonary maturity of a newborn can be evaluated by the:

A. Apgar score.
B. bilirubin.
C. L/S ratio.
D. α-fetoprotein.

81. During tranillumination of the chest of a newborn, a small halo (~1 cm) is seen around the tip of the light source. This finding is consistent with:

A. normal lung.
B. tension pneumothorax.
C. pleural effusion.
D. atelectasis.

82. The one- and five-minute Apgar scores for a neonate are 6 and 4, respectively. These data suggest that:

A. oxygen therapy is indicated.
B. meconium aspiration has occurred.
C. the neonate should be transferred to the NICU.
D. resuscitation is indicated.

83. In reviewing the chest radiograph of a 30 year-old patient, the respiratory therapist notices that the tip of a central catheter is resting at the superior vena cava. The therapist should recommend:

A. keeping the catheter at this position.
B. advancing the catheter by 5 cm.
C. withdrawing the catheter by 5 cm.
D. removing the catheter immediately.

84. In order to prevent clotting in a radial artery catheter, the catheter must be attached to a:

A. 0.9% saline drip.
B. 0.9% saline drip under pressure.
C. heparin drip.
D. heparin drip under pressure.

85. A 5-year-old girl is being evaluated in the emergency department. She has an oral temperature of 39 ºC and appears to be under severe respiratory distress. Her history consist of anxiety, shortness of breath and difficulty in swallowing. Severe stridors are heard. To further evaluate this patient, the RCP should recommend a(n):

A. stat chest radiograph.
B. arterial blood gases.
C. stat lateral neck radiograph.
D. flexible bronchoscopy.

86. A 76 year-old male patient from a nursing home has been admitted to the emergency department for evaluation of weakness and weight loss. On physical exam, the patient shows apathy with dry skin tone. His abdomen and lower extremities seem to be moderately swollen. In order to further evaluate the patient, the RCP should recommend a(n):

A. arterial blood gases.
B. sputum culture and sensitivity.
C. cardiac stress test.
D. nutritional status study.

87. Facial grimacing, constant shifting in bed, moaning and groaning sounds are some signs of:

A. hypoxia.
B. pain.
C. hypotension.
D. hypertension.

88. After drawing a sample from an arterial catheter, the therapist should flush the line and the sampling port of the three-way stopcock and leave the "off" position of three-way stopcock pointing toward the:

A. patient's hand.
B. patient's elbow.
C. direction of the sampling port.
D. pressure transducer line.

89. A patient in the out-patient unit is complaining about daytime sleepiness and tireless in spite of being in bed from 9 p.m. to 7 a.m. daily. His wife states that the patient has abnormal breathing and loud snoring during sleep. The respiratory therapist should recommend a(n):

A. sleep study.
B. BiPAP at 12 / 4 cm H_2O.
C. arterial blood gases.
D. nasal CPAP at 12 cm H_2O.

90. Based on the ATS statement guidelines for the six-minute walk test (6MWT), the absolute contraindications for the 6MWT include:

A. unstable angina during the previous month.
B. acid-base disorders for three years or longer.
C. hypotension during the previous six months.
D. persistent tachycardia during the previous three months.

91. Transcutaneous monitoring of a newborn requires:

A. changing of the electrode site every one hour.
B. an umbilical artery catheter.
C. an arterial blood gases every 4 hours.
D. adequate peripheral perfusion.

92. A blood sample properly prepared and collected from an infant's heel is considered a(n):

A. arterialized capillary sample.
B. arterial sample.
C. mixed venous sample.
D. venous sample.

93. Oxygen titration during exercise is done to evaluate the required amount of supplemental oxygen to prevent:

A. congestive heart failure.
B. dyspnea on exertion.
C. pulmonary hypertension.
D. pulmonary hypotension.

94. Artificial surfactant may be used as a prophylactic therapy for newborns with:

A. high Apgar score.
B. low oxygen saturation.
C. low gestational age.
D. low birth weight.

95. For secured electronic charting of a patient's medical information, each user must have a(n):

A. password.
B. personal computer.
C. hand-held computer.
D. private area for charting.

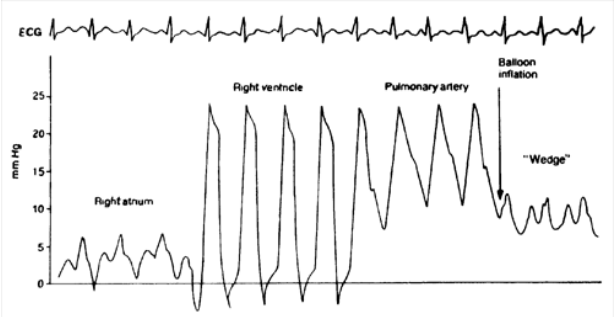
96. CPAP titration during sleep is done to determine the minimum level of CPAP needed to eliminate:

A. obstructive apnea.
B. central apnea.
C. hypopnea.
D. A and B only.

97. An exercise stress test positive for myocardial ischemia may include the following finding:

A. drop of more than 10 mm Hg in systolic pressure.
B. drop of more than 10 mm Hg in diastolic pressure.
C. ST-segment depressions by 1 to 2 mm
D. A and B only.

98. The bottom tracing of the figure is obtained from:



A. arterial catheter.
B. central venous catheter.
B. Swan-Ganz catheter.
D. transcutaneous catheter.

99. The general indications for bronchoalveolar lavage (BAL) include all of following conditions *except*:

A. pulmonary fibrosis.
B. diffuse lung infiltrates.
C. suspected alveolar hemorrhage.
D. cultures for ventilator associated pneumonia.

100. A patient has the following measurements: FEV_1 = 2.8 L (normal predicted 4.0 L) and FVC = 3.0 L (normal predicted 5.0 L), FEV_1% = 93%. What should the RCP recommend to further assess this patient?

A. airway resistance study.
B. lung compliance study.
C. lung volume study.
D. shunt study.

101. A high-flow nasal cannula is a device that delivers a(n):

A. oxygen flow up to 15 L/min.
B. oxygen concentration up to 90%.
C. gas source at body temperature.
D. gas source at 90% relative humidity.

102. The ECG tracing below shows a heart rate of about:

A. 32/min.
B. 46/min.
C. 52/min.
D. 66/min.

103. When a speaking valve is attached to a tracheotomy tube, the one-way valve:

A. prevents exhalation through the tracheotomy tube.
B. prevents inhalation through the tracheotomy tube.
C. requires a minimal inspiratory flow of 5 L/min.
D. requires a minimal expiratory flow of 5 L/min.

104. The single breath gas dilution method used in lung volume measurements requires a(n):

A. oxygen analyzer.
B. nitrogen analyzer.
C. carbon monoxide analyzer.
D. helium analyzer.

105. The airway shown below:

A. is called an esophageal obturator airway.
B. can be inserted into the trachea or esophagus.
C. has one cuff inflated during operation.
D. is called a double lumen endobronchial tube.

106. An oxygen conserving device is most suitable for use along with a(n):

A. oxygen concentrator.
B. liquid oxygen system.
C. compressed oxygen system.
D. Heliox gas mixture.

107. Which of the following set of PFT data shows a restrictive impairment?

A. Peak Flow = 44% predicted, FEV_1 = 56% predicted, FEV_1% = 56%
B. Peak Flow = 91% predicted, FEV_1 = 89% predicted, FEV_1% = 56%
C. Peak Flow = 103% predicted, FEV_1 = 108% predicted, FEV_1% = 99%
D. Peak Flow = 61% predicted, FEV_1 = 56% predicted, FEV_1% = 95%

108. A patient in the ICU has the following findings: barrel chest, pursed lip breathing, dyspnea on exertion, cyanosis. These findings are consistent with a diagnosis of:

A. pulmonary edema.
B. pulmonary fibrosis.
C. smoke inhalation.
D. pulmonary emphysema.

109. High frequency chest wall oscillation should be considered in treating patients with retained secretions due to:

A. post-operative complications.
B. bronchiectasis.
C. status asthmaticus.
D. ARDS.

110. A patient complains to the RCP that the vibratory PEP device is not producing any vibrations. The RCP should ask the patient to try again by:

A. creating a small air leak around the mouthpiece.
B. increasing the breathing frequency to 16/min.
C. breathing out more forcefully.
D. blocking the mouth piece with the tongue.

111. When volume controlled ventilation is used to initiate lung protection protocol, the therapist should:

A. adjust the PIP to 45 cm H_2O or lower.
B. titrate the V_T until P_{PLAT} is 35 cm H_2O or lower.
C. reduce PEEP to 5 cm H_2O or lower.
D. add pressure support of 15 cm H_2O.

112. A patient in the emergency department suffered smoke inhalation in a house fire. Which of the following procedure or data should be used to guide the treatment plan for this patient?

A. co-oximetry.
B. SpO_2.
C. $PaCO_2$.
D. PaO_2.

113. During a bronchoprovocation study, the therapist should terminate the test when the patient's:

A. SpO_2 is below 90%.
B. FEV_1 drops 20% below baseline.
C. breath sounds become diminished.
D. heart rate is above 120/min.

114. Mr. Thomson, a 38 year-old patient on volume controlled mechanical ventilation, suddenly develops tachycardia, hypotension, and oxygen desaturation. The therapist hears clear breath sound on left and no breath sounds on right. The high pressure limit alarm is also triggered persistently. Which of the following should the therapist do immediately?

A. Increase the pressure limit on the ventilator.
B. Ventilate patient with a manual resuscitator.
C. Perform needle decompression on the left lung.
D. Call for help.

115. A 34-week low birth weight newborn has been receiving 60% of oxygen via an oxyhood since birth. The SpO_2 is about 86% while breathing spontaneously. The chest radiographs done in the past 24 hours show progressive "white out" bilaterally. The RCP should recommend immediate administration of:

A. surfactant.
B. bronchodilator.
C. antibiotic.
D. sedative.

116. A 76 year-old patient with severe COPD and congestive heart failure is being discharged from the hospital following a two-week stay for pneumonia. As part of the discharge planning, the therapist should recommend:

A. drink plenty of fluid as directed by dietitian.
B. obtain flu vaccine as directed by physician.
C. use bronchodilator MDI q 2 hrs.
D. use home oxygen at 5 L/min via nasal cannula.

117. The treatment for a large tension pneumothorax in the ICU is:

A. decompression with an 18-gauge needle.
B. endotracheal intubation.
C. chest tube with three-column water drainage set up.
D. mechanical ventilation.

118. Simultaneous measurements of the $P_{tc}O_2$ and umbilical P_aO_2 are used to evaluate the presence of:

A. hypoxemia.
B. oxygen deficit.
C. dead space ventilation.
D. ductal shunt.

119. A 100-lb patient is being mechanically ventilated with a tidal volume of 600 ml at an SIMV rate of 12/min. The total frequency is 12/min. What is the approximate alveolar minute ventilation?

A. 4.6 L.
B. 5.8 L.
C. 6.0 L.
D. 7.2 L.

120. During controlled ventilation, a decrease in peak flow leads to:

A. a larger I:E ratio (e.g., from 1:2 to 1:3)
B. a smaller I:E ratio (e.g., from 1:3 to 1:2)
C. hypoventilation.
D. hyperventilation.

121. The F_IO_2 of an air-entrainment oxygen device is set at 60%. The calculated oxygen:air entrainment ratio is about:

A. 1:4
B. 1:2
C. 1:1
D. 2:1

122. An “H” size oxygen cylinder has a pressure of 2,000 psig. The flow rate is set at 2 L/min. How long will the cylinder last until empty?

A. 1 day and 2 hours.
B. 2 days and 4 hours.
C. 3 days and 6 hours.
D. 4 days and 8 hours.

123. To calculate the amount of gaseous oxygen from a liquid oxygen source, the conversion factor is:

A. 1 lb of liquid oxygen = 344 L of gaseous oxygen.
B. 1 lb of liquid oxygen = 688 L of gaseous oxygen.
C. 1 L of liquid oxygen = 344 L of gaseous oxygen.
D. 1 L of liquid oxygen = 688 L of gaseous oxygen.

124. Accumulation of water condensate in the large bore tubing of an air-entrainment aerosol device may:

A. increase the total flow.
B. cause the F_IO_2 to increase.
C. increase the density of aerosol.
D. cause the F_IO_2 to decrease.

125. Given: cardiac output (C.O.) = 4 L/min; arterial-venous oxygen content difference = 5 vol %. What is the calculated oxygen consumption?

A. 125 mL/min.
B. 200 mL/min.
C. 250 mL/min.
D. 800 mL/min.

126. The monitor of a ventilator shows: A/C frequency = 12/min; total frequency = 20 min; I time = 1.0 sec. The calculated I:E ratio is:

A. 1:1
B. 1:2
C. 1:3
D. 1:4

127. The normal capillary PaO_2 obtained from a heel sample is:

A. 30 torr.
B. 50 torr.
C. 70 torr.
D. 100 torr.

128. The ABG data obtained from a 33 year-old post-operative patient show: pH = 7.22, $PaCO_2$ = 48 torr, PO_2 = 77 torr. What is the interpretation?

A. Metabolic acidosis.
B. Partially compensated metabolic acidosis.
C. Acute alveolar hypoventilation.
D. Combined acidosis.

129. The potential side effects of excessive PEEP include:

A. increased urinary output.
B. decreased intracranial pressure.
C. decreased pulmonary artery pressure.
D. decreased cardiac output.

130. A mechanically ventilated patient is showing signs of progressive air trapping and development of auto-PEEP. The management plan for this condition should include increasing the:

A. tidal volume.
B. frequency.
C. peak flow.
D. pressure support.

131. A mechanically ventilated patient has developed an auto-PEEP of 10 cm H_2O. The patient also experiences extreme difficulty in triggering the sensitivity of the ventilator. The therapist should adjust the ventilator settings and:

A. suction the patient.
B. initiate pressure support at 12 cm H_2O.
C. provide stat bronchodilator treatment.
D. initiate mechanical PEEP at 8 cm H_2O.

132. Which of the following is most beneficial in reducing air trapping and mobilizing secretions for a COPD patient?

A. BiPAP.
B. Incentive spirometry.
C. Positive expiratory pressure.
D. Postural drainage.

133. Short-term hyperventilation for up to 24 hours is the non-invasive treatment of choice for:

A. elevated intracranial pressure.
B. hyperkalemia.
C. metabolic acidosis.
D. combined acidosis.

134. An unconscious patient is admitted to the emergency department. The 40 year-old patient has an irregular breathing pattern at an average rate of 8/min. The chest expansion appears to be shallow. Severe cyanosis is noted at the lips and earlobes. What should the therapist initiate immediately?

A. IPPB at 18 cm H_2O with 100% oxygen.
B. MDI with bronchodilator.
C. BiPAP at 20/12 cm H_2O with 40% oxygen.
D. Manual bag-mask ventilation with 100% oxygen.

135. Allen's Tests is done before puncture of the:

A. radial artery.
B. ulnar artery.
C. brachial artery.
D. carotid artery.

136. When a patient has excessive secretions, the following device is contraindicated.

A. heat and moisture exchanger (HME).
B. positive expiratory pressure (PEP).
C. vibratory positive expiratory pressure.
D. bi-level positive airway pressure (BiPAP).

137. Kussmaul breathing is one of the physical findings in patients with:

A. diabetic lactic acidosis.
B. diabetic ketoacidosis.
C. organic metabolic alkalosis.
D. botulism metabolic alkalosis.

138. The I:E ratio of a volume-controlled breath should remain constant when the following setting is adjusted.

A. peak flow.
B. tidal volume.
C. frequency.
D. PEEP.

139. A spontaneously breathing patient is receiving oxygen via nasal cannula at 2 L/min. The tidal volume and frequency are progressively decreasing. This breathing pattern would cause the:

A. $PaCO_2$ to decrease.
B. pH to increase.
C. F_IO_2 to increase.
D. F_IO_2 to decrease.

140. The rapid shallow breathing index of a mechanically ventilated patient is 160 cycles/L. This measurement suggests:

A. successful weaning is likely.
B. weaning attempt should be deferred.
C. pressure support should be decreased.
D. extubation is indicated.