AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF NURSING
HIGHER DIPLOMA IN CRITICAL CARE NURSING

END OF SEMESTER EXAMINATION APRIL 2022

Course Unit: ACN120: Essentials of Critical Care Nursing

Date: 14th April, 2022

Time: 2 hours

Start: 9.00 AM Stop: 11.00 AM

Instructions

1) This paper has two sections: Section A, Section B
2) Answer **ALL** questions in Section A and B
3) Use the University examination booklets provided
4) Re-writing the questions on your answer sheet is unnecessary

SECTION A: MULTIPLE CHOICE QUESTIONS (50 MARKS)

1. The amount of air that remains in the lungs after a maximum expiration is:

a) Vital capacity
b) Expiratory reserve volume
c) Functional residual capacity
d) Residual volume

2. Pulse oximetry is used to measure the proportion of:

a) Hemoglobin in the blood
b) Hemoglobin that is oxygenated
c) Hemoglobin that is deoxygenated
d) Hemoglobin concentration

3. Continuous Positive Airway Pressure (CPAP) ventilatory mode exerts positive airway pressure:

a) Throughout the respiratory cycle during spontaneous breathing
b) Throughout the respiratory cycle during controlled mode of ventilation
c) Only during inspiratory phase of spontaneous breathing
d) Only during expiratory phase of spontaneous breathing

4. 70% of carbon-dioxide is transported as:

a) Dissolved in blood
b) Bicarbonate
c) Carbonic acid
d) Carboxy -hemoglobin

5. Voluntary control of respiration occurs at the:

a) Medulla
b) Pons
c) Brain stem
d) Cerebral cortex

6. The percentage (%) of oxygen delivered by a non-rebreather mask is:

a) 85 – 90%
b) 70 – 90%
c) 80 – 100%
d) 24 – 55%

7. The most powerful buffer system in the extra-cellular fluid compartment (ECF) is:

a) Phosphate
b) Protein
c) Chloride
d) Bicarbonate

8. The most likely acid base disturbance when pH is 7.28, PCO_2 - 60mmhg, HCO_3 – 24mmol/l is:

a) Metabolic acidosis
b) Respiratory acidosis
c) Respiratory alkalosis
d) Metabolic alkalosis

9. Acute respiratory failure is evidenced by:

a) High pH, Low PCO_2, Low PO_2
b) Low pH, High PCO2, High PO2
c) Low pH, High PCO2, Low PO2
d) High pH, Low PCO2, High PO2

10.The volume of air that can be exhaled after normal exhalation is the:

a. Tidal volume
b. Residual volume
c. Inspiratory reserve volume
d. Expiratory reserve volume

11. The primary chemical stimulus for breathing is the concentration of:

a. Carbon-monoxide in blood
b. Carbon-dioxide in blood
c. Oxygen in the blood
d. Carbonic acid in the blood

12. The dorsal respiratory group is:

a) Involved in forced expiration
b) Sets the basic respiratory system
c) Inactive during normal quiet respiration
d) Delays the “switch off” signal of the inspiratory ramp

13. Functional residual capacity refers to:

a) Volume of gas that can be forcefully exhaled after normal expiration

b) Volume of gas remaining in the lungs after normal respiration
c) Volume of gas exchanged in quiet breath
d) Volume of gas remaining in the lungs after normal expiration

14. Mode of mechanical ventilation recommended for a patient with acute respiratory distress syndrome (ARDS) is:

a) Pressure support ventilation (PSV)
b) Assist control (AC)
c) Continuous positive airway pressure (CPAP)
d) Synchronized intermittent mandatory ventilation (SIMV)

15. The acid base imbalance in a patient with a respiratory rate of 32 b/min in severe pain and sustained tachypnea would be:

a) Metabolic alkalosis
b) Respiratory alkalosis
c) Metabolic acidosis
d) Respiratory acidosis

16. A Cerebral hemorrhage located underneath the dura is called:

a) Epidural hemorrhage
b) Subdural hemorrhage
c) Sub-arachnoid hemorrhage
d) Extra-dura hemorrhage

17. The permanent removal of a section of the cranium is:

a) Craniotomy
b) Burr-hole
c) Craniectomy
d) Cranioplasty

18.Decorticate posturing refers to:

a) Abnormal flexion of the upper limbs, flexion of the lower limbs
b) Abnormal extension of the upper limbs, extension of the lower limbs
c) Abnormal flexion of the upper limbs, extension of the lower limbs
d) Abnormal extension of the upper limbs, flexion of the lower limbs

19. Chronic pain signals are carried by:

a) delta fibers
b) C fibers
c) B fibers
d) Myelinated fibers

20. The sixth (6) cranial nerve is:

a. Trigeminal
b. Abducens
c. Facial
d. Vestibulo-cochlea

21. During a lumbar puncture (LP) the needle is inserted between:

a) T12 – L1
b) L1 – L2
c) L2 – L3
d) L3 – L4

22. Patients who are awake and conscious but have no means of producing speech, limb or face movements are described as:

a) Comatose
b) Persistent vegetative state
c) Locked syndrome
d) Minimally conscious state

23. The part of the spinal cord that when injured would lead to quadriplegia is:

a) Thoracic
b) Sacral
c) Cervical
d) Lumbar

24. The drug contraindicated in patients with hypertensive crisis is:

a) Neostigmine
b) Atropine
c) Ketamine
d) Propofol

25. The initial noticeable manifestations of myasthenia gravis include:

a) Ptosis, easy fatigability, slurred speech, waddling gait
b) Slurred speech , muscle weakness with activity, shortness of breath
c) Ptosis, diplopia, dyspyhagia, slurred speech
d) Dysphagia, slurred speech, bland facial expression, waddling gait

26. In tetanus disease, the toxins block release of:

a) Inhibitory neurotransmitters, serotonin and gamma-aminobutyric acid
b) Excitatory neurotransmitters, epinephrine and norepinephrine
c) Excitatory neurotransmitters, acetycholine and dopamine
d) Inhibitory neurotransmitters, glycine and gamma aminobutyric acid

27. Classical signs of autonomic dysreflexia include:

a) Pounding headache, marked hypertension, diaphoresis, bradycardia
b) Pounding headache, marked hypotension, diaphoresis, bradycardia
c) Pounding headache, marked hypertension, flushing, tachycardia
d) Pounding headache, marked hypotension, diaphoresis, tachycardia

28. Adverse consequences of status epilepticus include:

a) Hypotension, hypoxia, acidosis
b) Acidosis, hypothermia, hypotension
c) Hypertension, hyperthermia, acidosis
d) Hypotension, Diabetic Keto-acidosis (DKA), hyperventilation

29. Progressive ascending paralysis is mainly indicative of

a) Myasthenia gravis
b) Multiple sclerosis
c) Gullain barre syndrome
d) Parkisons disease

30. The antidote that is indicated for a patient who presents with altered level of consciousness due to use of morphine is

a) Acetylcysteine
b) Naloxone
c) Flumazenil
d) Glucagon

31. Stroke volume is a function of:

a) Contractility, heart rate, afterload
b) Preload, blood pressure, heart rate
c) Contractility, afterload, preload
d) Preload, blood pressure, contractility

32. Regarding the cardiac action potential:

a) Phase 0 involves opening of the fast sodium channels
b) Phase 2 is responsible for the QRS complex on the ECG
c) Phase 3 involves slow inward movement of calcium causing cardiac contraction
d) When depolarization occurs, the inside of the cell is said to be more negative

33. Period during which some cardiac cells have depolarized to their threshold potential and can respond to a stronger than normal stimulus is:

a) Refractoriness
b) Absolute refractory
c) Repolarization
d) Relative refractory

34. During resuscitation of a patient with ventricular fibrillation, epinephrine is administered after how many shocks:

a) One
b) Two
c) Three
d) Four

35. Amiodarone dose for a patient with ventricular tachycardia with a pulse is:

a) 300 mgs IV/IO
b) 540 mgs IV
c) 150 mgs IV/IO
d) 360 mgs IV

36. In the pacing code, the third letter indicates:

a) Generator response to a sensed signal
b) Chamber being paced
c) Chamber being sensed
d) Rate modulation

37. The lumen used for central venous pressure monitoring is:

a) Proximal
b) Distal
c) Medial ^{1}
d) Medial ^{2}

38. The cardiac biomarker for heart failure is:

a) Troponin
b) Cretinine phosphokinase (CPK)
c) B type Natriuretic Peptide (BNP)
d) Myoglobin

39. Calculate the flow rate in mls/hour for an 80kg male patient receiving 10mcg/kg/min of double strength dopamine infusion:

a) 9
b) 12
c) 3
d) 6

40. Match the items in column A with the corresponding response from column B:

Column A

i. Bicuspid valve

ii. Tricuspid Valve

Column B

a) Located between the right ventricle and the pulmonary artery
b) Located between the left ventricle and left atrium
c) Located between the aorta and the left ventricle
d) Located between the right ventricle and right atrium

41. The premature beat that is followed by a full compensatory pause is:

a) Premature atrial contraction (PAC)
b) Premature junctional contraction (PJC)
c) Premature ventricular contraction (PVC)
d) Interpolated premature contraction

42. Calculate the heart rate in beats per minute on a six second electrocardiogram strip where the R to R interval is regular and there are four (4) big boxes between them:

a) 100
b) 60
c) 75
d) 120

43. Increased pulsation of the jugular veins is suggestive of:

a) Systemic hypertension
b) Increased right atrial pressure
c) Increased cardiac output
d) Increased left ventricular pressure

44. The following ECG changes can occur in hyperkalemia:

a) Shortening of the PR interval
b) Tall peaked T waves
c) Widening of the QRS complex
d) Asystole

45. The cardiac rhythm changes that maybe normal in an athlete is:

a) Atrial flutter
b) Atrial fibrillation
c) Sinus bradycardia
d) Sinus arrest

46. In pacing, the pacing code VVI stands for:

a) Ventricular pacing, atrial sensing, inhibited response to sensed QRS complexes
b) Atrial pacing, ventricular sensing, inhibited response to sensed QRS complexes
c) Ventricular pacing, ventricular sensing, inhibited response to sensed QRS complexes
d) Atrial pacing, atrial sensing, inhibited response to sensed QRS complexes

47. A 60 year old woman is admitted to the hospital with acute heart failure and pulmonary edema. The most useful drug in treating the pulmonary edema is:

a) Digoxin
b) Lisinopril
c) Dobutamine
d) Furosemide

48. Elective cardioversion is performed:

a) To correct rapid abnormal rhythm associated with faintness and high blood pressure
b) To correct rapid abnormal rhythm associated with faintness and low blood pressure
c) To treat disturbances originating in the lower chambers of the heart
d) To treat atrial filtration or atrial flutter to regain a normal heart rhythm

49. In 2D mode echocardiography:

a) Density and position of all tissues in the path of a narrow ultrasound beam is displayed as a scroll
b) Orientation and interpretation of spatial relationship is difficult
c) The image produced resembles an anatomic section and can easily be interpreted
d) There is slow repetitive scanning along many different radius with an area in the shape of fan

50. Transcutaneous pacing is indicated in patients with:

a) Mobitz type I and complete heart block
b) Prolonged asystole and symptomatic sinus bradycardia
c) First degree heart block and complete heart block
d) Complete heart block and mobitz type II

SECTION B: LONG ANSWER QUESTION (20 marks)

1) Mr. Brown, a 58 yr old with known diabetes and hypertension has suddenly collapsed in the emergency department after presenting with retrosternal chest pain for the last 4 hours radiating to the back.
   a) Describe how you would assess his chest pain before his collapse (3 marks)
   b) Explain the in hospital chain of survival (5 marks)
   c) Discuss the Basic Life support) (BLS) steps that will be followed in his resuscitation (12 marks)