



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF HEALTH SCIENCES**

DEPARTMENT OF NURSING AND MIDWIFERY

HIGHER DIPLOMA IN KENYA REGISTERED CRITICAL CARE NURSING

Course Unit: ACN120 Essentials of Critical Care Nursing

Date: 7th December, 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. Do not write on the question paper
- 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 PCO_2 , High PO_2
- c) Low pH, High PCO_2 , Low PO_2
- d) High pH, Low PCO_2 , High PO_2

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, dysphagia, 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, acetylcholine 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) Creatinine 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:
- Digoxin
 - Lisinopril
 - Dobutamine
 - Furosemide
48. Elective cardioversion is performed:
- To correct rapid abnormal rhythm associated with faintness and high blood pressure
 - To correct rapid abnormal rhythm associated with faintness and low blood pressure
 - To treat disturbances originating in the lower chambers of the heart
 - To treat atrial fibrillation or atrial flutter to regain a normal heart rhythm
49. In 2D mode echocardiography:
- Density and position of all tissues in the path of a narrow ultrasound beam is displayed as a scroll
 - Orientation and interpretation of spatial relationship is difficult
 - The image produced resembles an anatomic section and can easily be interpreted
 - 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:
- Mobitz type I and complete heart block
 - Prolonged asystole and symptomatic sinus bradycardia
 - First degree heart block and complete heart block
 - Complete heart block and mobitz type II

SECTION B: LONG ANSWER QUESTION (20 marks)

- 1) Mr. Brown, a 58 year-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.
- Describe how you would assess his chest pain before his collapse (3 marks)
 - Explain the in- hospital chain of survival (5 marks)
 - Discuss the Basic Life support) (BLS) steps that will be followed in his resuscitation (12 marks)