

UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

FINAL EXAMINATION DECEMBER 2017

TITLE OF PAPER: PATHOPHYSIOLOGY

COURSE CODE: GNS 603

TIME ALLOWED: THREE (3) HOURS

PAGES 13 INCLUDING COVER PAGE

MARKS: 100

INSTRUCTIONS:

1. THERE ARE FIVE (5) QUESTIONS IN THIS PAPER
2. ANSWER FOUR (4) QUESTIONS IN TOTAL
3. QUESTIONS 1, 2, AND 3 ARE COMPULSORY
4. CHOOSE EITHER QUESTION 4 OR 5

WRITE LEGIBLY

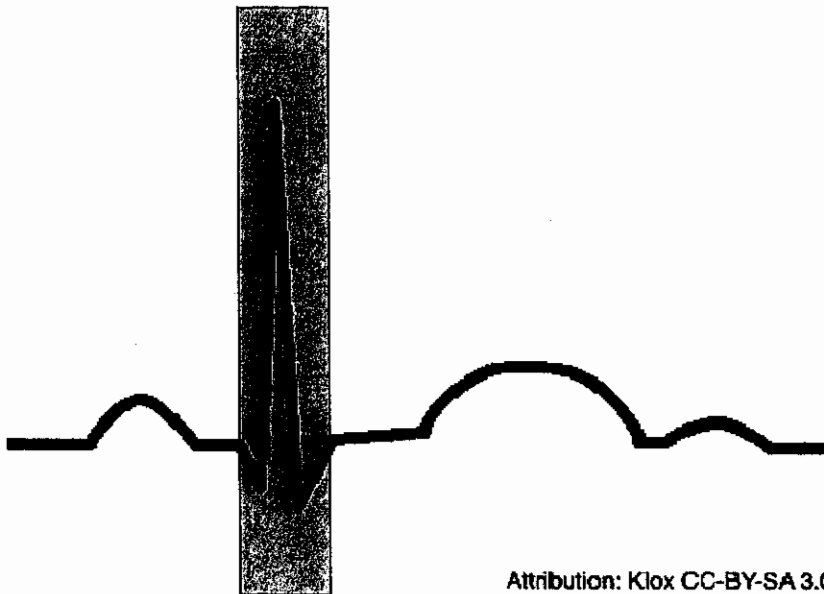
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QUESTION 1

INSTRUCTIONS:

For each of the following questions/statements choose and write CLEARLY the letter that corresponds with the most appropriate response in your answer sheet e.g. 1. B.

1. The Family Nurse Practitioner is teaching a student about the cardiac cycle and how it relates to the electrocardiogram (EKG). What will the Family Nurse Practitioner tell the student about the cardiac events that occur during the waveform contained in the shaded area of the EKG?



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- A. "This represents early repolarization of right and left ventricles."
- B. "The repolarization of the His Purkinje system happens here."
- C. "Ventricular depolarization and atrial repolarization occur during this time."
- D. "Atrial depolarization and AV node stimulation are occurring during this time."

2. When caring for a patient with a cardiac dysrhythmia, which laboratory value is a priority for the Nurse Practitioner to monitor?
 - A. BUN and creatinine
 - B. Sodium, potassium, and calcium
 - C. Hemoglobin and hematocrit
 - D. PT and INR

3. What is the ultimate effect of the renin-angiotensin-aldosterone system?
 - A. Improved control of hypertension
 - B. Vasoconstriction
 - C. Hypotension
 - D. Decrease stroke volume

4. A 40-year-old male is seen in the community clinic for the first time and his blood pressure is 150/92. He does have a history of diabetes. What is the next best step?
 - A. Begin treatment for hypertension
 - B. Recheck blood pressure in one week. If BP is still elevated, will begin treatment for hypertension
 - C. Check for elevated blood pressure on at least three more visits before diagnosing with hypertension
 - D. Review Dietary Approaches to Stop Hypertension (DASH) diet

5. The Family Nurse Practitioner is teaching a group of senior citizens about risk factors for heart failure. Which of these factors will the Nurse Practitioner include in the teaching?
- (i) Hypertension
 - (ii) Increased high density lipoproteins (HDL)
 - (iii) Obesity
 - (iv) High sodium intake
- A. i, ii, and iii.
 - B. ii, iii, and iv
 - C. i, iii, and iv
 - D. i, ii, iii, and iv
6. A patient diagnosed with right ventricular failure presents to the clinic with bilateral pitting edema. Which of the following circulatory changes does the Family Nurse Practitioner conclude are responsible for this patient's clinical presentation?
- A. Decreased lymphatic return to the heart
 - B. Decreased plasma colloidal pressure
 - C. Increased right atrial pressure
 - D. Venous valvular competence
7. The Family Nurse Practitioner is administering an angiotensin converting enzyme (ACE) inhibitor to a patient diagnosed with heart failure. Which of the following describe the ways in which the ACE inhibitor is therapeutic for the patient who has heart failure?
- A. Decreases myocardial remodeling
 - B. Increases myocardial contractility
 - C. Increases heart rate
 - D. Decreases cardiac preload and afterload

8. Which of the following individuals is at the least risk for developing pneumonitis?
- A. 40-year-old gym instructor
 - B. 22-year-old poultry handler
 - C. 37-year-old housekeeper
 - D. 57-year-old corn farmer
9. A 32-year-old man has been admitted to the emergency department with complaints of chest pain, shortness of breath and a fever for the last 3 days. Upon assessment, the Nurse Practitioner notes the patient has a productive cough with pus-like sputum. What is the most appropriate conclusion a Family Nurse Practitioner can infer from this data?
- A. Impaired gas exchanged related to pulmonary abscess
 - B. Chest pain related to pneumonitis
 - C. Ineffective breathing related pleural effusion
 - D. Decreased appetite related to pneumonia
10. A patient has been diagnosed with right lower lobe pneumonia. Upon auscultation of this lung field, the Family Nurse Practitioner would expect to hear which breath sound?
- A. Rhonchi
 - B. Stridor
 - C. Crackles
 - D. Wheezes

11. The Family Nurse Practitioner understands that which of the following patients is most at risk for developing pneumocystis carinii pneumonia (PCP)?
- A. 45-year-old man who smokes two (2) packs of cigarettes a day
 - B. A 50-year-old woman with human immunodeficiency virus (HIV)
 - C. A 22-year-old man with a history of asthma
 - D. A 36-year-old man who works in a coal mine
12. A Nurse Practitioner is treating a patient with chronic alcohol abuse with liver failure. Which change associated with the liver failure may require adjustment of blood pressure medication?
- A. Hypoalbuminemia
 - B. Increased capillary permeability
 - C. Abnormal peripheral vasodilation
 - D. Splenomegaly
13. Dark, tarry stools indicate bleeding in which location of the GI tract?
- A. Upper colon
 - B. Lower colon
 - C. Upper GI tract
 - D. Small intestine
14. Which action in the muscular cell causes contraction?
- A. Influx of sodium and calcium ions into the cell and resultant voltage change across the cell membrane
 - B. Influx of negative ions, creating a negative charge within the cell
 - C. The influx of potassium ions into the cell
 - D. Extrusion of albumin into the intravascular system

15. At the most basic level, a seizure can be defined as
- A. An imbalance between the excitation and inhibition of impulses in the central nervous system.
 - B. A disturbance in communication between the peripheral and central nervous systems.
 - C. An abnormal motor response due to the disruption in efferent signals from the spinal column.
 - D. The abnormal response of skeletal muscles to nerve stimulation.
16. *Helicobacter pylori* infection can cause chronic gastritis, which can lead to:
- A. Decreased risk of gastric adenocarcinoma
 - B. Decreased risk of low-grade B-cell gastric lymphoma
 - C. Duodenal ulcer
 - D. Gastric ulcer
17. During a fever, more oxygen is
- A. Dissolved in the plasma and therefore O₂ saturation will be higher.
 - B. Bound to haemoglobin, and therefore O₂ saturation will measure low.
 - C. Made available to tissues and therefore O₂ saturation may measure falsely low.
 - D. Exhaled and therefore is not measurable.

18. Which are characteristics of febrile seizures in children?
- i. They occur in children aged 6 months to five years.
 - ii. They predict the development of epilepsy in later childhood.
 - iii. They are associated with high fever in a child with an immature nervous system
 - iv. Risk factors include lowered seizure threshold associated with fluid and electrolyte imbalances (especially hyponatremia), viral infection, and recent immunization.
- A. i. and ii.
 - B. i., ii., and iii
 - C. i. iii., and iv.
 - D. i., ii., iii., and iv.
19. Which of the following is **NOT** a major neurotransmitters (neuromediators)?
- A. Dopamine
 - B. Gamma-aminobutyric acid (GABA)
 - C. Succinylcholine
 - D. Serotonin
20. Anemia resulting from blood loss will reverse if the source of the loss is rectified. How long does it take for the blood count to return to normal?
- A. 8-10 days
 - B. 3-4 weeks
 - C. 10-4 days
 - D. 5-6 weeks

21. Allergic contact dermatitis is a common inflammation of the skin. It produces lesions in the affected areas. What do these lesions look like?
- A. Papules
 - B. Papulosquamous pustules
 - C. Vesicles
 - D. Ulcers
22. Atopic dermatitis, or eczema, occurs at all ages and in all races. What happens in dark-skinned people who have eczema?
- A. Hyperpigmentation of skin
 - B. Papules over area affected
 - C. Erythema
 - D. Loss of pigmentation from lichenified skin
23. What factors contribute to the development of acne?
- A. Decrease sebum production
 - B. Colonization of staphylococcus aureus
 - C. Genetics
 - D. Decrease of keratinizing epidermal cells
24. The development of esophageal varices and caput medusae in liver disease relates to:
- A. Portosystemic shunting of blood
 - B. Splenomegaly
 - C. Ascites
 - D. Release of unmetabolized ammonia

25. When alcohol becomes toxic to the liver, the liver initially reacts by releasing:
- A. Bilirubin
 - B. Ammonia
 - C. Cytokines
 - D. Fibrin
26. While Diabetes Mellitus is a disorder of insulin availability, Type I differs from Type II in that Type I diabetes:
- A. Has a stronger genetic component
 - B. Involves autoimmune destruction of beta cells of pancreas
 - C. Manifests as insulin resistance
 - D. The body continues to produce insulin
27. Gynecomastia and testicular atrophy in men with liver disease is related to:
- A. Disorders of excretion of steroid hormones
 - B. Drug toxicities
 - C. Impaired fat absorption
 - D. Increased aldosterone
28. What coaching would be most important for a 35-year-old Swazi woman whose mother was diagnosed with diabetes when she was 40 years old?
- A. Have hemoglobin A1C checked annually
 - B. Exercise three times per week
 - C. Avoid sugar in diet
 - D. Maintain normal weight

29. Persons with liver disease may be asymptomatic until what percentage of the liver is non-functioning?
- A. 20%
 - B. 40%
 - C. 60%
 - D. 80%
30. What is cross-bridging in a muscle fiber?
- A. The cross-bridge interaction between myosin and acton causes muscle contraction through the sliding filament mechanism.
 - B. The action of a skeletal muscle sliding over bone.
 - C. The interaction between a skeletal muscle and the ligament attachment.
 - D. The intersection of two crossing muscle groups.

TOTAL: 30 MARKS

QUESTION 2

A. (i) Differentiate afterload from preload. (5)

(ii) How does reducing afterload with medication affect heart function in a person suffering from a failing heart? (5)

B. Mr. JG, age 54, is at the clinic for monitoring of his hypertension. He has had hypertension for a least 10 years. On his last clinic visit his blood pressure was 124/84 mm Hg. Since his blood pressure was within limits he felt that his hypertension must be cured, so he has not been taking his medicine regularly. Today he complains that he cannot walk to buy groceries without becoming winded. When he returns home he must rest. He awakes at night short of breath. His blood pressure is 190/110 mm Hg.

Which signs and symptoms indicate that he has developed heart failure? List at least 5 and indicate at least one physiological basis for each.

(i) Physical signs and symptoms (5)

(ii) Physiological basis (5)

TOTAL = 20 MARKS

QUESTION 3

A. Nono is a 25-year-old female patient who present to the out-patient department with a swollen right foot and leg following a thorn prick. Discuss the following events associated with the inflammatory process

(i) Vascular events (9)

(ii) Cellular events (9)

B. Draw a diagram of the four target cells affected by angiotensin II. Include the two additional hormones that are released in the process. (7)

TOTAL = 25 MARKS

QUESTION 4

SITUATION: Kidney transplants are effective and efficient but not without complications. About 7% to 12% of kidney transplants fail within a year and rates of failure increase over time. Graft failure can have profound effects, often resulting in grief, depression and, occasionally, suicidal feelings.

- A. Which are the four (4) risk factors for kidney graft rejection? (4)
 B. Describe the mechanism of kidney graft rejection. (8)
 C. After Mr. X was done a kidney transplant he received the following:

mTOR inhibitor: Sirolimus;

Steroids: Prednisone;

Calcineurin Inhibitors: Tacrolimus and Cyclosporine; and

Antiproliferative agents: Mycophenolate Mofetil, Mycophenolate Sodium and Azathioprine

Considering Mr. X condition, what are the two (2) key benefits and four (4) long-term risks of receiving:

Prednisone (6)

- D. A client who has undergone kidney transplant is at high risk for developing stress ulcer. Describe how the gastric mucosa is protected from developing stress ulcer disease. (7)

TOTAL = 25 MARKS

OR

QUESTION 5

- A. Explain why HIV is classified as a retrovirus. (2)
 B. Describe the key components of the HIV structure. (5)
 C. Discuss the mechanism by which HIV impairs the immune response. (8)
 D. Describe the process by which HIV replicates itself. (10)

TOTAL = 25 MARKS