

**UNIVERSITY OF ESWATINI  
FACULTY OF HEALTH SCIENCES  
DEPARTMENT OF GENERAL NURSING**

**MAIN EXAMINATION, NOVEMBER 2018**

**COURSE TITLE: PATHOPHYSIOLOGY**

**COURSE CODE: GNS 603**

**TIME ALLOCATED: THREE (3) HOURS**

**MARKS ALLOCATED: 100**

**INSTRUCTION:**

- **ANSWER ALL QUESTIONS**
- **ANSWER ALL QUESTIONS IN THE SEPARATE ANSWER-BOOKLET PROVIDED**
- **THERE ARE FOUR (4) QUESTIONS, EACH WORTH 25 MARKS**
- **THERE ARE EIGHT (8) PRINTED PAGES EXCLUDING COVER PAGE**

**DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO  
BY THE INVIGILATOR**

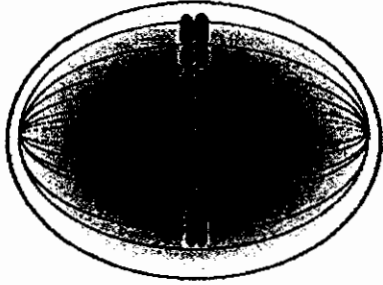
## QUESTION 1

**Instruction:** For each part-question, 1.1 – 1.20, choose the most appropriate response and write in your answer booklet the corresponding letter only, in **capital letters**, e.g. 26 B. Each correct response carries 1 mark.

- 1.1 The nurse practitioner orders a patient with suspected iron deficiency anaemia a blood smear test to assess the quality of the red blood cells. How would the red blood cells appear if the patient has iron-deficiency anaemia?
- A. Hyperchromic and macrocytic
  - B. Hypochromic and microcytic
  - C. Hyperchromic and microcytic
  - D. Hypochromic and macrocytic
- 1.2 A 14 year old patient presents to his nurse practitioner with a three day history of wheezing, and increased difficulty breathing at night. Physical exam reveals adenopathy, pallor and petechiae. The chest x-ray reveals a mediastinal mass. The most likely diagnosis for this patient is
- A. Burkitts lymphoma
  - B. Tcell lymphoma
  - C. Burkittsleukemia
  - D. T cell leukemia
- 1.3 Hypertrophy may occur as the result of normal physiologic or abnormal pathologic conditions. Which of the following describes compensatory hypertrophy?
- A. When the body increases its major organs during times of malnutrition
  - B. When one kidney is removed, the remaining kidney enlarges
  - C. When the body controls myocardial growth by stimulating actin expression to enlarge the heart
  - D. When the body stimulate gene expression to begin a progressive decrease in left ventricular muscle mass

- 1.4 Which of the following is a key cause of immortalization of cancer cells in many tumours?
- A. Complete loss of telomeres
  - B. Inactivation of telomerase enzymes
  - C. Reactivation of the telomerase enzyme
  - D. Shortening of telomerase
- 1.5 A patient in stage 5 chronic kidney disease reports to your office with extreme pruritus and has several areas of crystallised deposits on the skin. which of the following substances is responsible for the patient's symptoms?
- A. Calcium
  - B. Urea
  - C. Phosphate
  - D. Erythropoietin
- 1.6 A patient is brought to your office with complaints of palpitations, excessive sweating, and inability to tolerate heat. The patient also voices concerns about how her appearance has changed over the past year. The patient presents with protruding eyeballs and pretibial myxedema on the legs and feet. Which of the following is the likely cause of the patient's symptoms?
- A. Thyroiditis
  - B. Deficiency of iodine consumption
  - C. Grave's disease
  - D. Hypothyroidism

1.7 Which phase of the cell cycle is depicted in the picture below?



- A. Prophase
- B. Anaphase
- C. Metaphase
- D. Telophase

1.8 Which of the following cells of the body enter the  $G_0$  phase of cell division and never re-enter the cell cycle?

- A. Intestinal cell
- B. Liver cells
- C. Cells of the central nervous system
- D. Skin cells

1.9 Which of the following types of proteins can be coded as a tumour-suppressor gene?

- A. A protein that forms part of the growth factor signalling pathway
- B. A protein that codes for a DNA repair enzyme
- C. A protein that helps prevent apoptosis
- D. A protein that controls progression through the cell cycle

1.10 A 12-year-old child is brought to your office with history of oliguria and cola-coloured urine. The past medical history indicates that the child had tonsillitis 2 weeks ago. Which of the following conditions would you suspect in this client?

- A. Acute urinary tract infection
- B. Dehydration
- C. Acute glomerulonephritis
- D. Renal calculi

- 1.11 Which of the following denotes correct nucleotide base pairing during the process of transcription
- A. Cytosine (C) and Uracil (U)
  - B. Adenine (A) and Thymine (T)
  - C. Guanine (G) and Thymine (T)
  - D. Adenine (A) and Uracil (U)
- 1.12 Which of the following best describes a codon in genetics? It is a \_\_\_\_\_
- A. chemicals that code enzymes to start the process of transcription
  - B. set of three genes that determine the sequence of amino acids in a protein
  - C. sequence of three nucleotide bases which codes for a specific amino acid
  - D. segment of DNA which codes for a specific protein
- 1.13 Regarding the structure and function of DNA:
- A. The basic structural unit is a gene
  - B. The basic structural unit is a nucleotide
  - C. The basic structural and functional unit is codon
  - D. The basic structural and functional unit is chromosome
- 1.14 What is the genetic basis of down syndrome?
- A. Mutation of a gene on a sex chromosome, resulting in manufacturing of defective enzymes
  - B. Non-disjunction during meiosis, resulting in an extra autosomal chromosome
  - C. Environmental mutagens during pregnancy, resulting in reduced expression or penetrance of some other vital genes
  - D. A. and B.

- 1.15 A tidal volume volume of about 500ml in pulmonary function tests is a indication of \_\_\_\_\_
- A. Normal pulmonary function
  - B. Bronchoconstriction as in Asthma of Chronic Obstructive pulmonary disorder
  - C. Dysfunction of intercostal muscles and/or the diaphragm
  - D. Depression of the inspiratory and expiratory centres in the medulla as in general anaesthesia
- 1.16 Most premature infants suffer from respiratory distress syndrome mainly because \_\_\_\_\_
- A. Their respiratory muscles are still too weak to sustain breathing.
  - B. There is ineffective function of the apneustic and pneumotaxic centres in the medulla because of their immaturity.
  - C. There is insufficient surfactant due to immaturity of type II alveoli cells
  - D. Their lungs are still too small and their vital capacity cannot sustain life.
- 1.17 When people advance in age, both men and women, they often develop kyphosis (anterior concavity of thoracic vertebra). This condition is a result of \_\_\_\_\_
- A. Reduced elasticity of anterior intervetebral ligaments due to age
  - B. Collapse of vertebral bodies due to osteoporosis.
  - C. Stiffness of muscles of the back due to lack of exercise
  - D. Increased weight of the skull due to calcification
- 1.18 Which of the following is correct about musculoskeletal tuberculosis
- (i). Tuberculin skin test will always be negative
  - (ii). It does not show any signs
  - (iii). Its treatment requires a longer duration than pulmonary TB.

(iv). Its treatment requires different drugs from those use in pulmonary TB

- A. iii & iv
- B. i & ii
- C. iii only
- D. i, iii & vi

1.19 If a client is complaining of severe pain secondary to burns on the skin, it is highly likely that \_\_\_\_\_

- A. Both the dermis and the epidermis have been totally destroyed.
- B. The dermis has been destroyed but the epidermis may still be intact.
- C. The epidermis has been destroyed but the dermis may still be intact.
- D. No part of the skin has been extensively damaged.

1.20 In albinism, the client lacks \_\_\_\_\_

- A. The epidermal layer of the skin
- B. Keratinocytes
- C. Melanocytes
- D. The enzyme for producing melanin

**Instruction:** For each of the statements 1.21 – 1.25 below, write down the most appropriate word or phrase to fill in the blank space

1.21 A pair of genes occupying the same locus on a pair of chromosome are known as \_\_\_\_\_

1.22 Glaucoma is a result of reduced drainage of aqueous humour through the \_\_\_\_\_

1.23 Inflammatory mediators that are capable of stimulating nociceptors are known as \_\_\_\_\_

1.24 The layer of the skin that has mitotic cells and responsible for replacing skin cells is called the \_\_\_\_\_

1.25 In pulmonary function tests, the amount of air that can be forced out of the lungs after a normal expiration is referred to as \_\_\_\_\_

## QUESTION 2

- 2.1. Explain why duodenal ulcers are more common among the younger people whereas gastric ulcers are more common among the elderly. [5]
- 2.2. Mr X is a 65 year old lady who has, of late, started to complain of blurred vision. No other abnormality was observed on examination, neither was there a chronic illness noted on history taking. Following further examination, a decision to give her contact lenses was made. Notably, available lenses were either: (1) Divergent lenses, (2) Convergent lenses or (3) Bifocal lenses. Based on the given information and your knowledge of visual disorders attempt the following questions
- (a) State the following:
- (i). The medical term (diagnosis) used to describe the condition of this client. [1]
  - (ii). The cause of the condition [1]
- (b) Which of the available lenses would you consider as likely to be the best for this client? Discuss your choice of the lens pathophysiologically [6]
- 2.3. A client bled profusely and ended up with a BP of 90/55mmHg.
- (a) Discuss the body's compensatory response mechanism to restore a homeostatic balance. [10]
  - (b) Explain why this client may end up sweating, warranting fan [2]



### QUESTION 3

3.1. Describe the following cell communication mechanisms, provide examples along with your description

- (a) Endocrine signalling [2]
- (b) Autocrine signalling [2]

3.2. Cells in the body may be injured by a number of mechanisms. Discuss the following mechanism and explain how they lead to cellular death

- (a) Free radicals [5]
- (b) Impaired calcium homeostasis [5]
- (c) Hypoxia [5]

3.3. Mrs Zulu has been living with diabetes mellitus for the past 10 years. On her recent visit to your office she complained of fatigue, difficulty breathing and itching skin. On examination: BP 140/90mmHg, skin: dull with uremic deposits. You determine that Mrs Zulu has a kidney problem. Her glomerular filtration rate is estimated at 29mL/min/1.73m<sup>2</sup>

- (a) State the stage of chronic kidney disease which Mrs Zulu is at [1]
- (b) Explain the relationship between diabetes mellitus and kidney disease [5]

### QUESTION 4

4.1. Describe and explain the genetic bases as well as the patterns of inheritance and phenotypic manifestation for each of the following conditions:

- (a) Occulocutaneous albinism [4]
- (b) Haemophilia A [5]

4.2. Carcinogenesis is a multi-step mechanism. Describe the three (3) stages by which carcinogenesis takes place [6]

4.3. Discuss the five [5] stages of the natural course of disease in the pathogenic phase [10]