



Answer all questions.

Part A

- 1. A person started to expire forcefully against closed glottis and continued it for 20 seconds.
  - 1.1. State sequentially the expected physiological changes in the cardiovascular system during this 20 second period. (40 marks)
  - 1.2. If this person has an autonomic dysfunction, what differences in the changes described in 1.1 are expected? (30 marks)
  - 1.3. At the end of 20 seconds he stops this procedure and begins to breathe normally. Describe the expected changes in his blood pressure and pulse during the next few minutes. (30 marks)
  
- 2. A 25 year-old male was admitted to hospital with an episode of bronchial asthma. His difficulty in breathing was worse in early morning. He was treated with salbutamol (a  $\beta$  stimulant). During his stay in the ward his peak expiratory flow rate was monitored. A spirometry test was also performed.
  - 2.1. List 3 changes that may occur in his tracheobronchial tree during the episode of bronchial asthma. (15 marks)
  - 2.2. State the possible reason for worsening of difficulty in breathing in early morning. (20 marks)
  - 2.3. Explain why salbutamol was given to him as a treatment. (15 marks)
  - 2.4. Explain why his peak expiratory flow rate was monitored. (30 marks)
  - 2.5. State the expected findings in his spirometry test. (20 marks)
  
- 3. Kidney can change the concentration and volume of urine depending on the state of hydration.
  - 3.1. Describe how (a) counter current mechanism and (b) ADH helps in concentrating urine. (50 marks)
  - 3.2. State 4 disease conditions that cause polyuria. (10 marks)
  - 3.3. Explain how you would differentiate the conditions stated in 3.2 from one another using physiological principles. (40 marks)

Part B

- 4. Explain the physiological basis of the following.
  - 4.1. Tendon reflexes are absent in lower motor neuron lesions. (30 marks)
  - 4.2. Vertigo is a feature of semicircular canal lesions. (35 marks)
  - 4.3. Anticholinesterase is given as a treatment in myasthenia gravis. (35 marks)
  
- 5. Write short notes on
  - 5.1. Gaussean distribution. (25 marks)
  - 5.2. Mountain sickness. (25 marks)
  - 5.3. Treatment of peptic ulcer. (25 marks)
  - 5.4. Insulin therapy in diabetic ketoacidosis. (25 marks)