

**KISII UNIVERSITY**  
**UNIVERSITY EXAMINATIONS**

**SECOND YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF**  
**BACHELOR OF MEDICINE AND BACHELOR OF SURGERY [MBChB]**  
**END YEAR 2022/2023**  
**[MAY-AUGUST, 2023]**

**MEDS 211: MEDICAL PHYSIOLOGY I**  
**PAPER I**

**STREAM: Y2S3**

**TIME: 3 HOURS**

**DAY: TUESDAY, 9:00 – 12:00 PM**

**DATE: 22/08/2023**

**INSTRUCTIONS**

***1. Do not write anything on this question paper.***

**ANSWER ALL QUESTIONS (1 MARK EACH)**

1. A rise in the osmolality of extracellular fluid may lead to?
  - A. Increased water reabsorption in the proximal convoluted tubules.
  - B. Inhibition of vasopressin.
  - C. A rise in intracellular fluid volume.
  - D. Suppression of sweat secretion.
  - E. All the above are incorrect
  
2. Which of the following is not a steroid?
  - A. 17 $\alpha$ -hydroxyprogesterone
  - B. Estrone
  - C. Relaxin
  - D. Pregnenolone
  
3. A neuroscientist is studying communication between the hypothalamus and pituitary in a rat model. She interrupts blood flow through the median eminence and then measures circulating levels of pituitary hormones following appropriate physiologic stimulation. Secretion of which of the following hormones will be unaffected by the experimental manipulation?
  - A. Growth hormone
  - B. Prolactin
  - C. TSH
  - D. Vasopressin

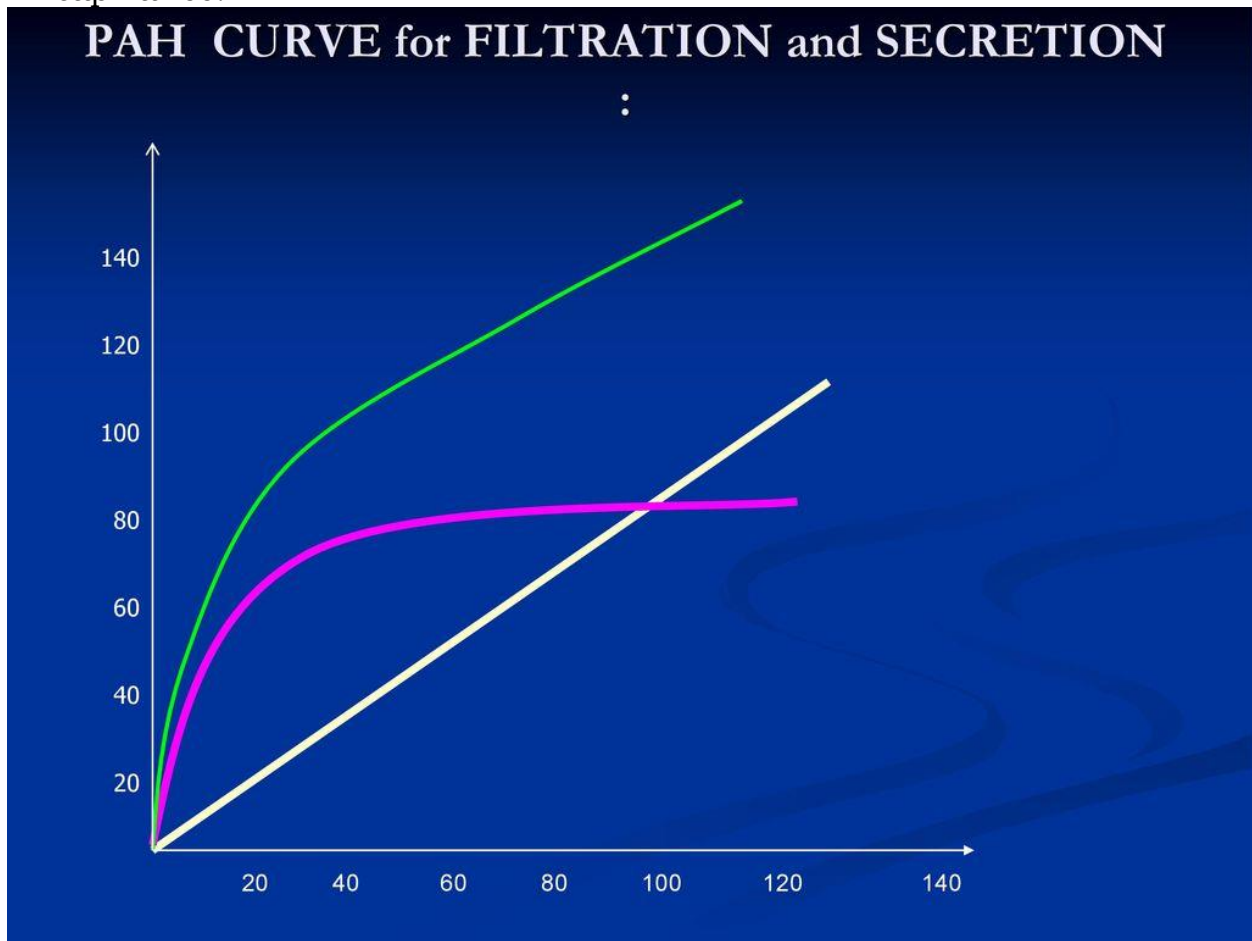
4. Glomerular filtration rate (GFR):
- A. Is independent of the size of the capillary bed
  - B. Depends only on the hydrostatic and osmotic pressure differences across the capillary
  - C. Is never influenced by the Bowman's capsule oncotic pressure
  - D. None of the above
5. The normal hemoglobin concentration is about 14 g/dl blood, while the plasma protein concentration is about 7 g/dl of plasma. From these values we would conclude that the concentration of hemoglobin in blood is about:
- A. the same as that of plasma proteins
  - B. twice that of plasma proteins
  - C. three times that of plasma proteins
  - D. four times that of plasma proteins
6. which of the following is false concerning isometric contraction of the ventricle? There is no change
- A. in ventricular Volume
  - B. in ventricular shape
  - C. in all the four heart valves
  - D. in ventricular content of blood
7. Identify the false statement. Information about stimulation of olfactory mucosa:
- A. travels in the olfactory tract
  - B. does not relay in the thalamus
  - C. projects to the prepyriform cortex
  - D. has important interactions with feeding and reproductive behaviour
8. In an experiment, a rat is infused with a small volume of a calcium chloride solution. which of the following would result from the calcium load?
- A. Bone demineralization
  - B. Increased formation of 1,25-dihydroxycholecalciferol
  - C. Decreased secretion of calcitonin
  - D. Increased formation of 24,25-dihydroxycholecalciferol
9. Loss of which of the following pituitary hormones might be expected to increase responses to painful stimuli?
- A.  $\alpha$ -Melanocyte-stimulating hormone ( $\alpha$ -MSH)
  - B. ACTH
  - C. Growth hormone
  - D.  $\beta$ -Endorphin
10. Atrial contraction

- A.** is indispensable for ventricular filling
- B.** accounts for about two-thirds of ventricular filling
- C.** accounts for about one-third of ventricular filling
- D.** is not associated with the fourth heart sound.

**11.** Stomach has:

- A.** a thick muscular coat
- B.** Brunner's glands
- C.** Both A and B
- D.** Neither A nor B

**12.** A substance is freely filtered then resorbed up to its transport maximum in the kidney. The Y-axis represents the filtered load in mg/min while the X-axis represents the plasma concentration in mg/ml. Which curve represents levels of this substance in plasma exiting the nephron from the peritubular capillaries?



- A.** Extreme left with a peak value at 140
- B.** Middle graph which plateaus at 65
- C.** Lowest graph that is straight
- D.** None of the above

**13.** According to the tubuloglomerular feedback theory, an increase in tubular fluid NaCl concentration near the macula densa will result in which of the following?

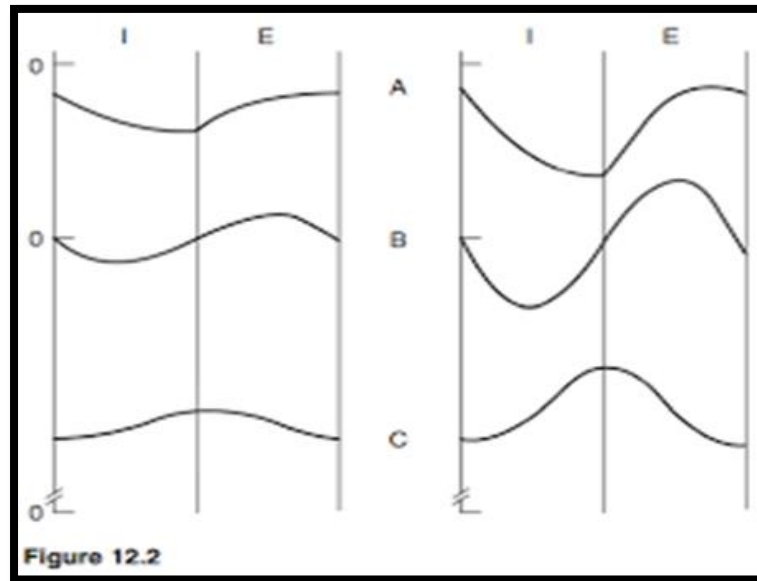
- A.** A decrease in the glomerular filtration rate of the same nephron
- B.** An increase in renal blood flow to the glomerulus of the same nephron
- C.** Activation of the renal sympathetic nerves
- D.** An increase in proximal tubule solute and water reabsorption
- E.** An increase in renin secretion

**14.** Microvilli:

- A.** increase the absorptive surface area
- B.** possess digestive enzymes
- C.** show contractile motion
- D.** all of the above

**15.** Figure 12.2 indicates some events during two respiratory cycles, where I is inspiration and E is expiration. In the second cycle, tidal volume was three times that in the first cycle. Expiration was not forced. It can be concluded that:

- A.** Record A shows there is no change in intrapleural pressure.
- B.** Record B shows the changes in intrapulmonary pressure.
- C.** Record C shows the rate of gas flow into and out of the lungs.
- D.** The compliance of the lungs and chest wall is increased markedly in the second cycle.
- E.** Maximum airflow occurs at the end of inspiration.



**16.** A substance (Y) is found in the plasma at a concentration of 2 mg/dL. A 24-hour urine collection is done to determine the renal clearance of Y. The following data are obtained: Urine volume: 1.44 L and the Urine [Y]: 500 mg/L. What is the renal clearance of Y?

- A. 5 mL/min
- B. 25 mL/min
- C. 36 mL/min
- D. 100 mL/min
- E. 250 mL/min

17. The digestive action of salivary amylase is not of much importance because of the unfavorable pH of:
- A. gastric juice
  - B. saliva
  - C. food
  - D. A and C but not B
18. The growth hormone receptor?
- A. activates Gs
  - B. requires dimerization to exert its effects.
  - C. must be internalized to exert its effects.
  - D. resembles the IGF-I receptor.
  - E. resembles the ACTH receptor.
19. The kidneys maintain a constant plasma  $[Na^+]$  by regulating the excretion of ?
- A. Urea
  - B. Water
  - C. Creatinine
  - D. Protein
  - E. Albumin
20. The velocity of blood flow?
- A. is higher in the capillaries than the arterioles.
  - B. is higher in the veins than in the venules.
  - C. falls to zero in the descending aorta during diastole.
  - D. is reduced in a constricted area of a blood vessel.
21. When the radius of the resistance vessels is increased, which of the following is increased?
- A. Systolic blood pressure
  - B. Diastolic blood pressure
  - C. Viscosity of the blood
  - D. Capillary blood flow
22. Much of the salivary secretion associated with a palatable meal is due to:
- A. sympathetic stimulation
  - B. parasympathetic stimulation
  - C. increased blood flow
  - D. release of catecholamines

- 23.** Which of the following responses to a fall in arterial pressure accounts for the ability of the kidneys to autoregulate GFR?
- A.** Decreased resistance of the efferent arteriole
  - B.** Increased delivery of fluid to the end of the proximal tubule
  - C.** Increase resistance of the afferent arteriole
  - D.** Increased [NaCl] in tubular fluid at the macula densa
  - E.** Decreased in resistance of the afferent arteriole
- 24.** The process of swallowing is:
- A.** voluntary
  - B.** involuntary
  - C.** partly voluntary and partly involuntary
  - D.** involuntary to start with, but later voluntary
- 25.** A 56-year-old man was admitted to the hospital with a myocardial infarction. At admission, his serum creatinine was 1.2 mg/dL, and his creatinine clearance was 100 mL/min. Over the next 3 days, he had several periods of hypotension, and his serum creatinine increased to 3.6 mg/dL. Assuming that he is in steady-state balance for creatinine (i.e., amount excreted = amount produced), what is his predicted creatinine clearance?
- A.** 10 mL/min
  - B.** 33 mL/min
  - C.** 50 mL/min
  - D.** 66 mL/min
  - E.** 100 mL/min
- 26.** During swallowing, swinging backward of the epiglottis:
- A.** prevents food from entering the posterior nares
  - B.** Prevents food from entering the larynx
  - C.** is responsible for the stoppage of breathing during swallowing
  - D.** all of the above
- 27.** Surfactant:
- A.** Is produced by type 1 pneumocytes
  - B.** Acts like detergent in water
  - C.** Reduces the amount of negative intrapleural pressure
  - D.** Increases pulmonary compliance
- 28.** GFR will decrease in which of the following conditions?
- A.** Dilation of the afferent arteriole
  - B.** Decrease in renal nerve activity
  - C.** Decrease in plasma oncotic pressure
  - D.** Increase in hydrostatic pressure in Bowman's space
  - E.** Increase in renal blood flow
- 29.** Which statement is incorrect. Secretion of testosterone
- A.** Depresses pituitary secretion of LH.
  - B.** Causes the epiphyses of long bones to unite.

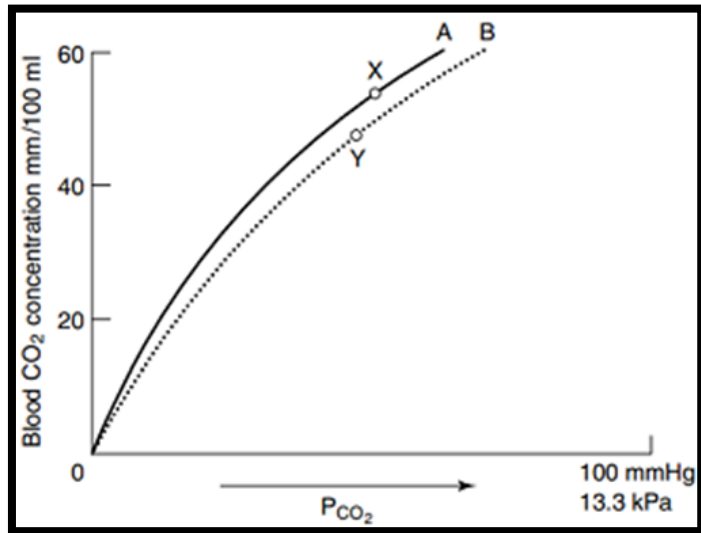
- C.** May lead to a negative nitrogen balance.  
**D.** Stimulates growth of body hair.
- 30.** Swallowing is associated with:  
**A.** separation of vocal cords  
**B.** downward movement of larynx  
**C.** apnoea  
**D.** all of the above
- 31.** Which of the following structures is a barrier to the filtration of proteins across the glomerulus?  
**A.** Capillary endothelial cells  
**B.** Basement membrane  
**C.** Lacis cells  
**D.** Parietal epithelial cells
- 32.** Peripheral chemoreceptors:  
**A.** In the carotid sinus  
**B.** Have glomus cells  
**C.** Innervated by glossopharyngeal nerve  
**D.** Blood flow of 200mls/G/min
- 33.** From childhood to old age which of the following does not occur?  
**A.** There is a steady decrease in total sleeping time per day.  
**B.** Deep (stage 4) sleep increases as a percentage of total daily sleep.  
**C.** Body water decreases as a percentage of body mass.  
**D.** Sleep becomes less aggregated into a single sleeping period.
- 34.** Primary peristalsis and secondary peristalsis of the esophagus are different in that the former:  
**A.** is more rapid  
**B.** is independent of neural control  
**C.** is initiated by swallowing  
**D.** is confined to the upper esophagus
- 35.** Which of the following statements regarding the GFR is false?  
**A.** Net filtration pressure decreases from the afferent to the efferent end of the capillary  
**B.** Net filtration pressure increases from the afferent to the efferent end of the capillary  
**C.** Filtration occurs at the afferent end and reabsorption at the efferent end of the capillary  
**D.** Plasma oncotic pressure decreases along the length of the glomerular capillary  
**E.** All the above

- 36.** The mixing and propulsive type of gastric movements differ principally in their
- A.** amplitude
  - B.** frequency
  - C.** rhythmicity
  - D.** electrical correlates
- 37.** Increase in GFR occurs with?
- A.** Increased sympathetic stimulation
  - B.** Decreased renal blood flow
  - C.** Low plasma Na<sup>+</sup> concentration
  - D.** Ureteric obstruction
- 38.** A respiratory therapist was giving a lecture on how the body responds to changes in arterial blood gases. As part of her lecture, she explained homeostasis as follows.
- A.** Homeostasis prevents blood gases from deviating from normal values for even brief periods of time.
  - B.** Homeostasis maintains blood gases in a normal range by activation of chemoreceptors that sense the deviation from normal and then engages a positive feedback system to return blood gases to a normal level.
  - C.** Homeostasis maintains blood gases in a normal range by activation of sympathetic and parasympathetic chemoreceptors that then stimulate increased respiratory activity.
  - D.** Homeostasis maintains blood gases in a normal range by activation of chemoreceptors that sense the deviation from normal and then engages a negative feedback system to return blood gases to a normal level.
- 39.** Distension of the rectum reflexly brings about
- A.** increased motor activity of the whole colon
  - B.** increased motor activity of the proximal colon but decreased activity of the distal colon
  - C.** decreased motor activity of the proximal colon but increased activity of the distal colon
  - D.** none of the above
- 40.** Pressure diuresis is?
- A.** Due to decreased reabsorption of Na<sup>+</sup> & water in peritubular capillaries
  - B.** Regulated by macula densa
  - C.** Due to increase in ADH
  - D.** Due to increase in angiotensin



41. A 48-year-old man was undergoing a thorough neurological exam after falling from a construction platform. The test included an evaluation of his deep tendon reflex. What are the elements of the deep tendon reflex?
- A. Golgi tendon organ, group Ib afferent fibers, spinal inhibitory interneuron, contralateral  $\alpha$ -motor neuron, and extrafusal fibers of the skeletal muscle
  - B. Golgi tendon organ, group II afferent fibers, spinal inhibitory interneuron, ipsilateral  $\alpha$ -motor neuron, and intrafusal fibers of the skeletal muscle
  - C. Group Ia sensory fibers originating in the contractile portion of the intrafusal fibers of the muscle spindle, spinal dorsal horn neuron, ipsilateral  $\alpha$ -motor neuron, and extrafusal fibers of the skeletal muscle
  - D. Group Ia sensory fibers originating in the central portion of the intrafusal fibers of the muscle spindle, ipsilateral  $\alpha$ -motor neuron, and extrafusal fibers of the skeletal muscle
42. Identify the incorrect choice? Compared with the adult, the newborn has less ability to
- A. Excrete bilirubin.
  - B. Maintain a constant body temperature.
  - C. Tolerate brain hypoxia.
  - D. Manufacture antibodies.
43. With increasing age there is?
- A. A fall in the arterial pulse pressure.
  - B. A fall in the ability of the kidneys to concentrate urine.
  - C. A fall in the residual volume of the lungs.
  - D. A fall in the fasting blood glucose concentration.
44. The Valsalva maneuver is followed by
- A. A decrease in intrapleural pressure.
  - B. An increase in intra-abdominal pressure.
  - C. A decrease in **cardiac** output.
  - D. A decrease in arterial **blood** pressure.
45. The increase in blood flow to muscle in an exercising limb is related to arise in all the following except?
- A. Local PCO<sub>2</sub>.
  - B. Local H<sup>+</sup> concentration.
  - C. Local muscle temperature.
  - D. Arterial pressure.

- 46.** A 35-year-old woman in whom multiple system atrophy was diagnosed had symptoms indicative of failure of sympathetic nerve activity. List expected findings resulting from failure of sympathetic nerve activity to the ventricle of the heart, bronchial smooth muscle, sweat glands, and blood vessels.
- A.** Bradycardia, bronchial dilation, reduced sweating, and vasodilation.
  - B.** Decreased ventricular contractility, bronchial constriction, profuse sweating, and vasodilation.
  - C.** Tachycardia, bronchial constriction, reduced sweating, and vasoconstriction.
  - D.** Decreased ventricular contractility, bronchial constriction, reduced sweating, and vasodilation.
- 47.** Human chorionic gonadotrophic hormone (HCG)
- A.** Is a steroid.
  - B.** Acts directly on the uterus to maintain the endometrium.
  - C.** Blood level rises steadily throughout pregnancy.
  - D.** All the above are incorrect
- 48.** Which statement is incorrect? The Fick principle enables
- A.** Blood flow through an organ to be calculated if organ uptake (U), arterial concentration and venous concentration (V) are known for a given substance.
  - B.** Cardiac output to be calculated by injecting an indicator into the pulmonary artery and monitoring its concentration downstream in a systemic artery.
  - C.** Renal plasma flow to be calculated using PAH as the substance measured.
  - D.** Cardiac output to be estimated using the lungs as the organ and carbon dioxide as the substance measured.
- 49.** In the figure below showing blood carbon dioxide dissociation curves:
- A.** A fall in blood PO<sub>2</sub> would shift the curve from A to B.
  - B.** If point X represents the situation at the venous end of systemic capillaries, then point Y represents the situation of the same blood at the venous end of the pulmonary capillaries.
  - C.** A rise in blood PCO<sub>2</sub> would shift the curve from B to A.
  - D.** The decrease in the slope of the curves as PCO<sub>2</sub> rises is related to the saturation of plasma with CO<sub>2</sub> as PCO<sub>2</sub> rises.
  - E.** At a PCO<sub>2</sub> of 50 mmHg, the amount of CO<sub>2</sub> in solution is lower in curve B than in curve

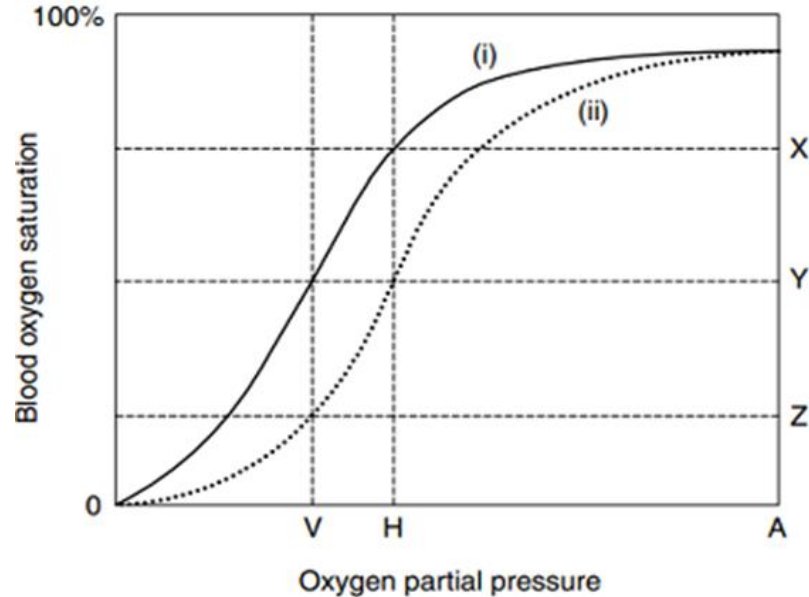


50. During early inspiration?
- There is a decrease in Heart rate.
  - There is an increase in Central venous pressure.
  - There is an increase in Intrapulmonary pressure.
  - There is an increase in Afferent impulse traffic in the vagus nerves.
51. On lying down?
- There is a decrease in the central venous volume.
  - There is an increase in the total systemic peripheral resistance.
  - There is a decrease in the ventilation/perfusion ratio in lung apices.
  - There is an increase in the vital capacity.
  - There is a decrease in the rate of formation of urine
52. Which of the following statements is false concerning ingestion of protein?
- Raises metabolic rate more than ingestion of equally calorific amounts of fat or carbohydrate.
  - Tends to lower the pH of urine.
  - Yields more toxic metabolites than fat or carbohydrate.
  - Should exceed 2 g/kg body weight/day to satisfy normal body requirements.
53. Drinking a litre of water?
- Increases secretion of antidiuretic hormone.
  - Causes more osmolar change in portal venous than in systemic venous blood.
  - Causes body cells to shrink.
  - Decreases the specific gravity of the body.

54. Metabolic functions of the lung include which one of the following?  
**A.** Inactivates ADH  
**B.** Converts Angiotensin II to Angiotensin I  
**C.** Inactivates bradykinin  
**D.** Activation of prostaglandins
55. Rapid eye movement (REM) sleep is?  
**A.** Associated with EEG waves of high amplitude.  
**B.** More common after a period of sleep deprivation.  
**C.** Associated with a high level of general muscle tone.  
**D.** A more frequent component of sleep in the elderly than in the young.
56. Obesity can be treated successfully by?  
**A.** Diuretic drugs.  
**B.** Supplementing the normal diet with slimming foods.  
**C.** Confining the diet to foods of low calorific value.  
**D.** Reducing food intake relative to energy expenditure.
57. Which statement is false? In percentage terms, arterial PCO<sub>2</sub> is more affected than arterial O<sub>2</sub> content by  
**A.** Anemia.  
**B.** A 20 per cent fall in inspired PO<sub>2</sub>.  
**C.** Ascent to 2000 metres (about 6500 feet) above sea level.  
**D.** Increasing the oxygen pressure in the air breathed to three atmospheres.
58. Restoration of the blood volume after haemorrhage is aided by?  
**A.** Contraction of venous reservoirs.  
**B.** A fall in capillary pressure in certain vascular beds.  
**C.** Mobilization of intracellular fluid into the circulation.  
**D.** An increase in the osmotic pressure of the plasma proteins
59. When a patient inherits a disease as a recessive autosomal character?  
**A.** One of the parents of the patient will exhibit the disease.  
**B.** All of the children of the patient will exhibit the disease.  
**C.** Both parents of the patient must carry the recessive character.  
**D.** Subsequent siblings have a 50 per cent risk of the disorder.
60. Sudden complete obstruction of the respiratory tract causes?  
**A.** A fall in **blood** pressure.  
**B.** Inhibition of central chemoreceptors.  
**C.** **Reflex** apnoea.  
**D.** Dilatation of the pupils.
61. Infants differ from adults in that their?  
**A.** Nitrogen balance is normally positive.  
**B.** Blood contains reticulocytes.

- C.** Total peripheral resistance is lower.
  - D.** Brown fat stores are relatively small
  
- 62.** Inherited diseases associated with sex-linked recessive genetic disorders
  - A.** Involve the Y rather than the X chromosome.
  - B.** Are more common in females than in males.
  - C.** Are transmitted by the female but not by the male.
  - D.** May fail to manifest themselves in female carriers.
  
- 63.** Identify the incorrect statement. The muscle fibres adapted to endurance running?
  - A.** Are classified as slow rather than fast.
  - B.** Have a relatively high myoglobin content.
  - C.** Are red rather than white.
  - D.** Have a relatively high mitochondria content.
  - E.** Are classified as anaerobic rather than aerobic
  
- 64.** Gastric pressures seldom rise above the levels that breach the lower esophageal sphincter, even when the stomach is filled with a meal, due to which of the following processes?
  - A.** Peristalsis
  - B.** Gastroileal reflex
  - C.** Stimulation of the vomiting center
  - D.** Receptive relaxation
  
- 65.** The physiological gastric pressure response to feeding described in Question 62 could be partly inhibited experimentally by all of the following treatments except
  - A.** cholinergic antagonist.
  - B.** nitric oxide synthase inhibitor.
  - C.** cholecystokinin antagonist.
  - D.** histamine antagonist.
  - E.** VIP antagonist.
  
- 66.** The figure below shows two blood oxygen dissociation curves. 'A' represents the oxygen partial pressure in normal alveoli, 'H' the lowered alveolar oxygen pressure in hypoxic lungs due to high altitude or pulmonary disease and 'V' the mixed systemic venous oxygen pressure in the person suffering from hypoxia. Concerning this diagram which statement is incorrect?
  - A.** If (i) is a normal person's curve, then (ii) is the hypoxic person's curve, rather than vice versa.
  - B.** The blood in curve (i) has a higher red cell level of 2,3 diphosphoglycerate (2,3-DPG).
  - C.** The O<sub>2</sub> saturation of blood leaving the hypoxic lungs is lower with curve (ii) than with curve (i).

- D.** The oxygen extracted by the tissues equals oxygen uptake in the lungs for both curves in both people, other things being equal.
- E.** The curve labelled (i) is more suitable for fetal conditions than the curve labelled (ii).



- 67.** The most abundant protein inside the human cell is ?
- Actin
  - Collagen
  - Titin
  - Dystrophin
- 68.** Carbon dioxide dissolved in blood follows which law?
- Charles law
  - Avogadro's law
  - Henry's law
  - Dalton's law
  - Boyles law
- 69.** In infants, defecation often follows a meal. The cause of colonic contractions in this situation is?
- histamine.
  - increased circulating levels of CCK.
  - the gastrocolic reflex.
  - increased circulating levels of somatostatin.
  - the enterogastric reflex
- 70.** For laminar flow in blood vessels:
- Decreased by increased pressure
  - Influenced by viscosity
  - Influenced by density
  - Proportional to length to 4th power

- 71.** Maternal-fetal ABO incompatibility is less common than Rhesus incompatibility because:
- A.** Fetal antibodies to ABO are less developed
  - B.** Maternal ABO antibodies do not cross the placenta
  - C.** Maternal ABO antigens do not cross the placenta
  - D.** Fetal ABO antigens are less immunogenic
- 72.** Contraction in smooth muscle is different from skeletal muscle?
- A.** Source of  $\text{Ca}^{++}$  is different
  - B.** Unable to produce same force of contraction
  - C.** Unable to maintain same duration of contraction
  - D.** Has prolonged latency
  - E.** A and D are correct
- 73.** G protein coupled receptors.
- A.** Seven transmembrane components
  - B.** C. Extracellular portion for phosphorylation
  - C.** D. G protein has intrinsic GTPase activity
  - D.** E. The receptor is a heterotrimeric protein
  - E.** Both A and C are correct
- 74.** Which hormone causes increased protein anabolism & increased plasma FFA?
- A.** Cortisol
  - B.** Parathyroid hormone
  - C.** Growth hormone
  - D.** Insulin
- 75.** An MD/PhD candidate was doing research on the generation of changes in the membrane potential of cochlear inner hair cells. What steps are involved in this process?
- A.** When the shorter stereocilia are pushed toward the taller ones, the channel open time is increased, and  $\text{K}^+$  and  $\text{Ca}^{2+}$  enter via the channel and induce hyperpolarization.
  - B.** When the shorter stereocilia are pushed toward the taller ones, the channel open time is increased, and  $\text{K}^+$  and  $\text{Ca}^{2+}$  enter via the channel and induce depolarization.
  - C.** When the taller stereocilia are pushed toward the shorter ones, the channel open time is increased, and  $\text{Na}^+$  and  $\text{Ca}^{2+}$  exit via the channel and induce hyperpolarization.
  - D.** When the stereocilia move toward the sound source, the channel open time is decreased, and  $\text{K}^+$  and  $\text{Cl}^-$  exit via the channel and induce depolarization.
- 76.** Blood viscosity:
- A.** Is independent of the white cell count
  - B.** Falls as hematocrit rises
  - C.** Is independent of vessel diameter

- D.** D. Falls as flow rate rises
- E.** E. Is independent of fibrinogen concentration

- 77.** Speed of delivery of nutrients from stomach to small intestine (Carbohydrates-CHO):
- A.** CHO>fat>protein
  - B.** CHO>protein>fat
  - C.** Protein>CHO>fat
  - D.** Fat>protein>CHO
- 78.** Release of which ONE of the following increases the pH of duodenal contents?
- A.** Secretin
  - B.** Cholecystokinin
  - C.** Intrinsic factor
  - D.** Gastrin
  - E.** Both A and B
- 79.** A medical student was doing research in a sensory neurophysiology laboratory. In preparation for his research, the principal investigator of the laboratory asked him to compare the four basic attributes of a stimulus to sensory receptors. The four attributes of sensory coding are?
- A.** modality, adequate threshold, sensitivity, and location.
  - B.** adequate threshold, receptive field, adaptation, and projection.
  - C.** specific energy, adequate threshold, sensation, and duration
  - D.** sensitization, discrimination, energy, and projection
  - E.** modality, location, intensity, and duration
- 80.** The clearance (or 'renal regulation') of which ONE of the following is NOT regulated by a hormone:
- A.** Sodium
  - B.** Potassium
  - C.** Calcium
  - D.** Phosphate
  - E.** Sulphate
- 81.** Arterial baroreceptor afferents?
- A.** Reach spinal cord via sympathetic nerves
  - B.** Utilize glycine as a neurotransmitter
  - C.** Primary synapse in C1 area of the medulla
  - D.** Activate GABA inhibitory interneurons
- 82.** In governing peristalsis, which of the following directions of nerve impulses and neurotransmitter is correctly matched?
- A.** Retrograde; VIP
  - B.** Retrograde; nitric oxide
  - C.** Anterograde; glutamate
  - D.** Anterograde; nitric oxide
  - E.** Anterograde; acetylcholine



- 83.** In a normal cardiac cycle?
- A.** RA systole precedes LA systole
  - B.** RV ejection precedes LV ejection in expiration
  - C.** RV contraction precedes LV contraction in inspiration
  - D.** Pulmonary valve and aortic valves close simultaneously in inspiration
- 84.** In the lung, airway resistance?
- A.** Is regulated at the primary bronchioles
  - B.** Varies with change in lung volume
  - C.** Increased by stimulation of adrenergic receptors
  - D.** D Can be measured by flow rate divided by pressure difference between mouth and alveolus
- 85.** A meal rich in proteins containing the amino acids that stimulate insulin secretion but low in carbohydrates, does not cause hypoglycemia because?
- A.** the meal causes a compensatory increase in T4 secretion.
  - B.** cortisol in the circulation prevents glucose from entering muscle.
  - C.** glucagon secretion is also stimulated by the meal
  - D.** the amino acids in the meal are promptly converted to glucose.
  - E.** insulin does not bind to insulin receptors if the plasma concentration of amino acids is elevated.
- 86.** The peripheral chemoreceptors are located:
- A.** Carotid sinus
  - B.** Carotid bodies
  - C.** The vasomotor centre
  - D.** In the internal jugular vein
- 87.** A 28-year-old man was seen by a neurologist because he had experienced prolonged episodes of tingling and numbness in his right arm. He underwent a neurologic exam to evaluate his sensory nervous system. Which of the following cutaneous mechanoreceptors is correctly paired with the type of stimulus to which it is most apt to respond?
- A.** Pacinian corpuscle and rapid vibration
  - B.** Meissner corpuscle and skin stretch
  - C.** Merkel cells and slow vibration
  - D.** Ruffini corpuscles and sustained pressure
- 88.** A 30-year-old patient comes to her primary care clinician complaining of headaches and vertigo. A blood test reveals a hematocrit of 65%, and a diagnosis of polycythemia is made. Which of the following would also be increased?
- A.** Mean blood pressure
  - B.** Radius of the resistance vessels
  - C.** Central venous pressure
  - D.** Capillary blood flow

- 89.** The correct sequence of events involved in phototransduction in rods and cones in response to light is?
- A.** activation of transducin, decreased release of glutamate, structural changes in rhodopsin, closure of cGMP-gated cation channels, and decrease in intracellular cGMP.
  - B.** decreased release of glutamate, activation of transducin, closure of cGMP-gated cation channels, decrease in intracellular cGMP, and structural changes in rhodopsin.
  - C.** structural changes in rhodopsin, decrease in intracellular cGMP, decreased release of glutamate, closure of cGMP-gated cation channels, and activation of transducin.
  - D.** structural changes in rhodopsin, activation of transducin, decrease in intracellular cGMP, closure of cGMP-gated cation channels, and decreased release of glutamate.
- 90.** Activation of a sensory nerve from the muscle spindle caused contraction of the extensor muscle and relaxation of the flexor muscle. The relaxation of the flexor muscle is an example of?
- A.** negative feedback inhibition.
  - B.** postsynaptic inhibition.
  - C.** Renshaw cell-mediated inhibition.
  - D.** presynaptic inhibition.
- 91.** The pressure in a capillary in skeletal muscle is 35 mm Hg at the arteriolar end and 14 mm Hg at the venular end. The interstitial pressure is 0 mm Hg. The colloid osmotic pressure is 25 mm Hg in the capillary and 1 mm Hg in the interstitium. The net force producing fluid movement across the capillary wall at its arteriolar end is?
- A.** 3 mm Hg out of the capillary.
  - B.** 3 mm Hg into the capillary.
  - C.** 10 mm Hg out of the capillary.
  - D.** 11 mm Hg out of the capillary.
  - E.** 11 mm Hg into the capillary
- 92.** A 65-year-old man had an acute injury to the utricle of the inner ear, causing problems with balance. In the utricle, tip links in hair cells are involved in?
- A.** formation of perilymph
  - B.** depolarization of the stria vascularis.
  - C.** movements of the basement membrane.
  - D.** perception of sound
  - E.** regulation of distortion-activated ion channels.

- 93.** Why is the dilator response to injected acetylcholine changed to a constrictor response when the endothelium is damaged?
- A.** More Na<sup>+</sup> is generated.
  - B.** More bradykinin is generated.
  - C.** The damage augments the production of endothelin by the endothelium.
  - D.** The damage interferes with the production of NO by the endothelium.
- 94.** Which of the following are incorrectly paired?
- A.** B cells: insulin
  - B.** D cells: somatostatin
  - C.** Pancreatic ductal cells: chymotrypsinogen E.
  - D.** A cells: glucagon
- 95.** When the plasma glucose concentration falls to low levels, a number of different hormones help combat the hypoglycemia. After intravenous administration of a large dose of insulin, the return of a low blood sugar level to normal will be delayed in?
- A.** adrenal medullary insufficiency.
  - B.** glucagon deficiency.
  - C.** combined adrenal medullary insufficiency and glucagon deficiency.
  - D.** thyrotoxicosis.
  - E.** Acromegaly
- 96.** In infants, defecation often follows a meal. The cause of colonic contractions in this situation is?
- A.** histamine.
  - B.** increased circulating levels of CCK.
  - C.** the gastrocolic reflex.
  - D.** the enterogastric reflex
- 97.** 1,25-Dihydroxycholecalciferol affects intestinal Ca<sup>2+</sup> absorption through a mechanism that?
- A.** includes alterations in the activity of genes.
  - B.** activates adenylyl cyclase.
  - C.** decreases cell turnover.
  - D.** changes gastric acid secretion.
  - E.** involves degradation of apical calcium channels.
- 98.** . Cells responsible for innate immunity are activated most commonly by?
- A.** glucocorticoids
  - B.** pollen
  - C.** carbohydrate sequences in bacterial cell walls
  - D.** eosinophils
  - E.** thrombopoietin

- 99.** The action potential of skeletal muscle?
- A.** has a prolonged plateau phase.
  - B.** spreads inward to all parts of the muscle via the T tubules.
  - C.** causes the immediate uptake of  $\text{Ca}^{2+}$  into the lateral sacs of the sarcoplasmic reticulum.
  - D.** is longer than the action potential of cardiac muscle.
- 100.** The functions of tropomyosin in skeletal muscle include?
- A.** sliding on actin to produce shortening.
  - B.** binding to myosin during contraction.
  - C.** acting as a “relaxing protein” at rest by covering up the sites where myosin binds to actin.
  - D.** generating ATP, which it passes to the contractile mechanism.