

01	A	B	C	D	E
02	A	B	C	D	E
03	A	B	C	D	E
04	A	B	C	D	E
05	A	B	C	D	E
06	A	B	C	D	E
07	A	B	C	D	E
08	A	B	C	D	E
09	A	B	C	D	E
10	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E

14	A	B	C	D	E
15	A	B	C	D	E
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E
21	A	B	C	D	E
22	A	B	C	D	E
23	A	B	C	D	E
24	A	B	C	D	E
25	A	B	C	D	E
26	A	B	C	D	E

27	A	B	C	D	E
28	A	B	C	D	E
29	A	B	C	D	E
30	A	B	C	D	E
31	A	B	C	D	E
32	A	B	C	D	E
33	A	B	C	D	E
34	A	B	C	D	E
35	A	B	C	D	E
36	A	B	C	D	E
37	A	B	C	D	E
38	A	B	C	D	E
39	A	B	C	D	E

PRACTICE QUESTIONS

TTBU - The Testing Board Ukraine

1MDE

Krok 1 Medicine (English)

EDITION

Demo

QUESTIONS

9

FORMAT

Limited Edition PDF

Before you begin

What this is

9 practice questions for TTBU - The Testing Board Ukraine **1MDE**, each with its answer key and an explanation. Answer a question before you read its key — the explanation is worth more once you have committed.

If something looks wrong

Send us three things and we will check it:

- the exam code, **1MDE**
- the question number
- the email address on your order

Write to **support@mometrix.net**. We reply within one business day.

QUESTION 1

MULTIPLE CHOICE

A patient sustained a fracture of the surgical neck of the humerus. Which of the following structures is most likely to be damaged? (Choose two.)

- ☒ **A** Axillary nerve
- ☐ **B** Radial nerve in the radial groove
- ☒ **C** Posterior circumflex humeral artery
- ☐ **D** Median nerve in the cubital fossa
- ☐ **E** Ulnar nerve at the medial epicondyle

ANSWER A - C

WHY The surgical neck of the humerus lies in close proximity to the axillary nerve and the posterior circumflex humeral artery. Injury at this site classically damages both structures, producing deltoid paralysis and loss of sensation over the lower lateral aspect of the shoulder ('regimental badge' area). The radial nerve is vulnerable more distally in the radial (spiral) groove, the median nerve lies medially in the cubital fossa, and the ulnar nerve passes behind the medial epicondyle — none of which are adjacent to the surgical neck.

QUESTION 2

MULTIPLE CHOICE

Which of the following statements correctly describe the central chemoreceptors involved in the control of ventilation? (Choose two.)

- ☒ **A** They are located in the ventrolateral medulla near the ventrolateral surface of the brainstem
- ☐ **B** They are stimulated primarily by a fall in arterial PO₂
- ☐ **C** They are surrounded by cerebrospinal fluid and respond to changes in H⁺ concentration in the CSF
- ☒ **D** They are stimulated by an increase in PCO₂ acting via carbonic anhydrase-dependent reactions
- ☐ **E** They are innervated by the vagus nerve and fire synchronous with each inspiration

ANSWER A • D

WHY Central chemoreceptors lie in the ventrolateral medulla on the ventrolateral surface of the brainstem and are excited mainly by an increase in arterial PCO₂ via acidification of the CSF ($\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{H}^+ + \text{HCO}_3^-$). Peripheral (carotid/aortic body) chemoreceptors — not central ones — respond to a fall in PO₂. Option C describes CSF buffering but the central chemoreceptors respond to CSF H⁺ generated from CO₂, not directly to CSF H⁺ as a primary stimulus in the wording given; the test's standard correct pair is location plus CO₂ sensitivity. Central chemoreceptors are not innervated by the vagus — that description fits pulmonary stretch receptors.

QUESTION 3

SINGLE CHOICE

In the classic hepatic lobule, which cell type lines the sinusoids and represents the largest population of non-parenchymal cells in the liver?

- ☐ A Hepatocytes
- ☒ B Kupffer cells
- ☐ C Pit cells
- ☐ D Stellate (Ito) cells
- ☐ E Endothelial cells of the central vein

ANSWER B

WHY Kupffer cells are resident hepatic macrophages that line the sinusoids and account for the largest population of non-parenchymal liver cells. They belong to the mononuclear phagocyte system and phagocytose aged erythrocytes and bacteria delivered via the portal circulation. Hepatocytes are the parenchymal (epithelial) cells, not non-parenchymal; Pit cells are liver-specific NK cells; stellate (Ito) cells store vitamin A in the space of Disse.

QUESTION 4 SINGLE CHOICE

Which amino acid is the principal carrier of ammonia from peripheral tissues to the liver for the synthesis of urea?

- ☐ A Glutamate
- ☒ B Glutamine
- ☐ C Aspartate
- ☐ D Alanine
- ☐ E Glycine

ANSWER B

WHY Glutamine is the major transport form of ammonia in the blood. Peripheral tissues (especially skeletal muscle and brain) use glutamine synthetase to 'trap' free ammonia into glutamine, which circulates to the liver and kidney. In the liver mitochondria, glutaminase releases NH_3 , which then enters the urea cycle. Alanine also carries nitrogen from muscle to liver via the glucose-alanine cycle, but glutamine is the principal, quantitatively dominant carrier for ammonia transport.

QUESTION 5 SINGLE CHOICE

Which of the following is the earliest vascular event in acute inflammation?

- ☐ A Increased vascular permeability with exudation of plasma proteins
- ☐ B Margination of leukocytes along the endothelium
- ☒ C Transient vasoconstriction of arterioles followed by vasodilation
- ☐ D Emigration of neutrophils through the vessel wall
- ☐ E Stasis (cessation of blood flow) in the capillary bed

ANSWER C

WHY The classical sequence described by Cohnheim begins with a brief (seconds-to-minutes) arteriolar vasoconstriction, followed by vasodilation (causing redness and warmth), then increased permeability, then stasis, then margination and emigration of leukocytes. Vasoconstriction is the earliest vascular event, although it is often missed because of its short duration.

QUESTION 6

SINGLE CHOICE

Gram-positive bacteria differ from Gram-negative bacteria in that their cell wall:

- ☐ A Contains an outer membrane rich in lipopolysaccharide
- ☐ B Has a thinner peptidoglycan layer and lacks teichoic acids
- ☒ C Has a thick peptidoglycan layer and contains teichoic and lipoteichoic acids
- ☐ D Lacks peptidoglycan entirely
- ☐ E Is composed mainly of porins embedded in a lipid matrix

ANSWER C

WHY Gram-positive bacteria possess a thick, multilayered peptidoglycan cell wall that, in most species, is decorated with teichoic and lipoteichoic acids anchored in the peptidoglycan. They lack the outer membrane found in Gram-negative organisms. The Gram-negative wall is thinner, surrounded by an outer membrane whose outer leaflet contains lipopolysaccharide (endotoxin), and the periplasmic space is bridged by porins.

QUESTION 7

SINGLE CHOICE

Which mechanism is the principal way in which the kidneys exert long-term control of arterial blood pressure?

- ☐ A Release of renin from juxtaglomerular cells in response to decreased renal perfusion
- ☒ B Pressure natriuresis and regulation of extracellular fluid volume
- ☐ C Direct sympathetic innervation of systemic arterioles
- ☐ D Secretion of erythropoietin by peritubular interstitial cells
- ☐ E Activation of 1α -hydroxylase in proximal tubules

ANSWER B

WHY The Guyton model identifies pressure natriuresis — the relationship in which an increase in arterial pressure leads to greater renal sodium and water excretion — as the body's ultimate, long-term controller of arterial pressure and extracellular fluid volume. Renin release initiates the renin–angiotensin–aldosterone system, which is one of several mechanisms that shift the pressure–natriuresis curve, but the actual final common pathway for long-term pressure homeostasis is the kidney's handling of sodium and water.

QUESTION 8

SINGLE CHOICE

In hypovolemic (hemorrhagic) shock, the earliest and most reliable compensatory response that maintains cerebral and coronary perfusion is:

- ☐ A Activation of the parasympathetic nervous system causing bradycardia
- ☒ B Selective vasoconstriction of skin, splanchnic and renal beds via sympathetic discharge
- ☐ C Release of atrial natriuretic peptide causing venodilation
- ☐ D Increased release of vasopressin causing generalized vasodilation
- ☐ E Decreased secretion of aldosterone with subsequent loss of sodium and water

ANSWER B

WHY Acute blood loss triggers the baroreceptor-mediated sympathetic fight-or-flight response with tachycardia and selective α_1 -mediated vasoconstriction of cutaneous, splanchnic and renal vessels. This shunts the reduced circulating volume preferentially to the brain and heart, which have limited vasoconstrictor capacity. Vasopressin release also occurs, but it causes vasoconstriction, not vasodilation; aldosterone is part of the slower volume-restoring response; and ANP would worsen, not help, hypovolemia.

QUESTION 9

SINGLE CHOICE

Non-selective β -blockers are contraindicated in patients with bronchial asthma because they may precipitate bronchospasm by:

- ☐ A Blocking β_1 receptors in bronchial smooth muscle
- ☒ B Blocking β_2 receptors in bronchial smooth muscle and abolishing sympathetic bronchodilation
- ☐ C Stimulating unopposed α_1 -mediated contraction of airway smooth muscle
- ☐ D Inhibiting the release of acetylcholine from vagal nerve endings
- ☐ E Increasing histamine release from mast cells via a direct membrane effect

ANSWER B

WHY Bronchial smooth muscle expresses predominantly β_2 receptors, whose stimulation by circulating adrenaline produces bronchodilation. A non-selective β -blocker (e.g., propranolol) antagonises β_2 as well as β_1 , removing this protective sympathetic bronchodilator tone and leaving unopposed vagal/cholinergic and mast-cell-mediated constriction, which can precipitate severe bronchospasm in asthmatic patients. β_1 -selective blockers are therefore preferred when β -blockade is required in such patients.