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38	A	B	C	D	E
39	A	B	C	D	E

PRACTICE QUESTIONS

TTBU - The Testing Board Ukraine

EPEPH

English Prof. Exam Pharmacy

EDITION

Demo

QUESTIONS

9

FORMAT

Limited Edition PDF

Before you begin

What this is

9 practice questions for TTBU - The Testing Board Ukraine **EPEPH**, 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, **EPEPH**
- the question number
- the email address on your order

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

QUESTION 1 SINGLE CHOICE

A drug binds to a receptor and produces a response equal to that of the endogenous ligand, even when the endogenous ligand is absent. Which pharmacological term best describes this drug?

- ☐ A Partial agonist
- ☐ B Competitive antagonist
- ☒ C Full agonist
- ☐ D Inverse agonist

ANSWER C

WHY A full agonist binds to the receptor and produces the maximal response of which the receptor system is capable, equivalent to the endogenous ligand. A partial agonist produces only a submaximal response, a competitive antagonist binds without activating the receptor and blocks agonist binding, and an inverse agonist produces the opposite effect to the agonist (active reduction of constitutive receptor activity).

QUESTION 2 SINGLE CHOICE

Which pharmacokinetic parameter is defined as the volume of plasma completely cleared of drug per unit time?

- ☐ A Volume of distribution (V_d)
- ☐ B Bioavailability (F)
- ☒ C Clearance (CL)
- ☐ D Area under the curve (AUC)

ANSWER C

WHY Clearance (CL) is defined as the volume of plasma from which the drug is completely removed per unit time, expressed in units of volume/time. Volume of distribution relates the amount of drug in the body to plasma concentration, bioavailability is the fraction of administered drug reaching systemic circulation, and AUC reflects total drug exposure over time.

QUESTION 3

SINGLE CHOICE

According to the Anatomical Therapeutic Chemical (ATC) classification system, drugs are divided into groups at five levels. Which of the following correctly lists these levels from the broadest (most general) to the most specific?

- ☐ A Chemical subgroup → Chemical substance → Therapeutic subgroup → Pharmacological subgroup → Anatomical main group
- ☒ B Anatomical main group → Therapeutic subgroup → Pharmacological subgroup → Chemical subgroup → Chemical substance
- ☐ C Pharmacological subgroup → Anatomical main group → Therapeutic subgroup → Chemical substance → Chemical subgroup
- ☐ D Therapeutic subgroup → Anatomical main group → Chemical substance → Pharmacological subgroup → Chemical subgroup

ANSWER B

WHY The ATC classification has five levels from broadest to most specific: (1) Anatomical main group (1 letter), (2) Therapeutic subgroup (2 digits), (3) Pharmacological subgroup (1 letter), (4) Chemical subgroup (1 letter), (5) Chemical substance (2 digits). The other options reverse the order or mix the levels incorrectly.

QUESTION 4

SINGLE CHOICE

Warfarin metabolism is strongly inhibited by several commonly co-prescribed drugs, which can lead to a marked rise in INR and bleeding risk. Which of the following drug classes is most classically associated with potentiating the anticoagulant effect of warfarin through CYP450 inhibition?

- ☐ A Proton pump inhibitors (e.g., omeprazole)
- ☒ B Macrolide antibiotics (e.g., erythromycin)
- ☐ C Oral loop diuretics (e.g., furosemide)
- ☐ D First-generation cephalosporins (e.g., cefazolin)

ANSWER B

WHY Macrolide antibiotics such as erythromycin and clarithromycin are well-known potent inhibitors of CYP3A4 and, in the case of erythromycin also CYP2C9, the enzymes responsible for warfarin metabolism. This inhibition raises plasma warfarin concentrations and INR. Furosemide and cefazolin are not classical CYP inhibitors of warfarin; PPIs have weaker, less consistent interactions.

QUESTION 5

SINGLE CHOICE

A patient requires a rapid onset of action for severe postoperative pain and cannot take medication orally due to vomiting. Which route of administration is generally associated with the most rapid systemic absorption?

- ☐ A Subcutaneous injection
- ☐ B Intramuscular injection
- ☒ C Intravenous injection
- ☐ D Rectal suppository

ANSWER C

WHY Intravenous administration delivers the drug directly into the systemic circulation, bypassing absorption barriers entirely, and therefore produces the most rapid onset of action. Subcutaneous and intramuscular injections require drug to be absorbed from tissue, and rectal absorption is variable and generally slower and less predictable.

QUESTION 6

SINGLE CHOICE

A 65-year-old patient with chronic obstructive pulmonary disease (COPD) is started on a long-acting muscarinic antagonist (LAMA) for symptom control. Which of the following best describes the mechanism by which LAMAs (e.g., tiotropium) produce bronchodilation?

- ☐ A Stimulation of M3 muscarinic receptors on airway smooth muscle
- ☐ B Reversible inhibition of phosphodiesterase-4 in bronchial smooth muscle
- ☒ C Non-selective blockade of muscarinic receptors, with predominant action at M3 receptors in airway smooth muscle
- ☐ D Direct antagonism of β_2 -adrenergic receptors on bronchial smooth muscle

ANSWER C

WHY Tiotropium and other LAMAs bind to muscarinic receptors on airway smooth muscle with kinetic selectivity for M3 receptors, blocking acetylcholine-mediated bronchoconstriction. They do not stimulate muscarinic receptors (that would cause bronchoconstriction), they are not PDE-4 inhibitors (that describes roflumilast), and they do not block β_2 receptors.

QUESTION 7

SINGLE CHOICE

A patient has a measured plasma theophylline concentration of 20 mg/L. If the patient's theophylline clearance is estimated at 2 L/h, what is the approximate theophylline infusion rate (mg/h) needed to maintain this steady-state concentration, assuming 100% bioavailability of the infused drug?

- ☐ A 10 mg/h
- ☐ B 20 mg/h
- ☒ C 40 mg/h
- ☐ D 60 mg/h

ANSWER C

WHY At steady state, infusion rate = Clearance $\times$ Steady-state concentration = 2 L/h $\times$ 20 mg/L = 40 mg/h. This is the standard maintenance-rate equation derived from the principle that rate in equals rate out at steady state.

QUESTION 8

SINGLE CHOICE

Nitroglycerin tablets for sublingual use must be stored in tightly closed, light-resistant glass containers, because the active substance is highly unstable under which of the following conditions?

- ☐ A High humidity
- ☒ B Heat, light, and contact with air (oxygen)
- ☐ C Low temperature below 0 °C
- ☐ D Alkaline pH only

ANSWER B

WHY Nitroglycerin is a volatile and chemically unstable organic nitrate that readily decomposes when exposed to heat, light, and oxygen, producing inactive breakdown products. This is why sublingual nitroglycerin tablets are packaged in small, airtight, amber glass containers with minimal headspace. Humidity is not the dominant degradation factor for nitroglycerin specifically.

QUESTION 9

SINGLE CHOICE

A drug administered intravenously has a bioavailability of 100% by definition. Which of the following routes of administration would most likely result in significantly reduced bioavailability due to extensive first-pass hepatic metabolism?

- ☐ A Sublingual
- ☐ B Intramuscular
- ☒ C Oral
- ☐ D Inhalation

ANSWER C

WHY Oral administration subjects the drug to absorption through the gastrointestinal tract and subsequent passage via the portal vein to the liver, where significant first-pass metabolism can occur before systemic circulation. Sublingual, intramuscular, and inhalation routes largely bypass the hepatic first-pass effect, so they typically preserve a much higher fraction of the administered dose.