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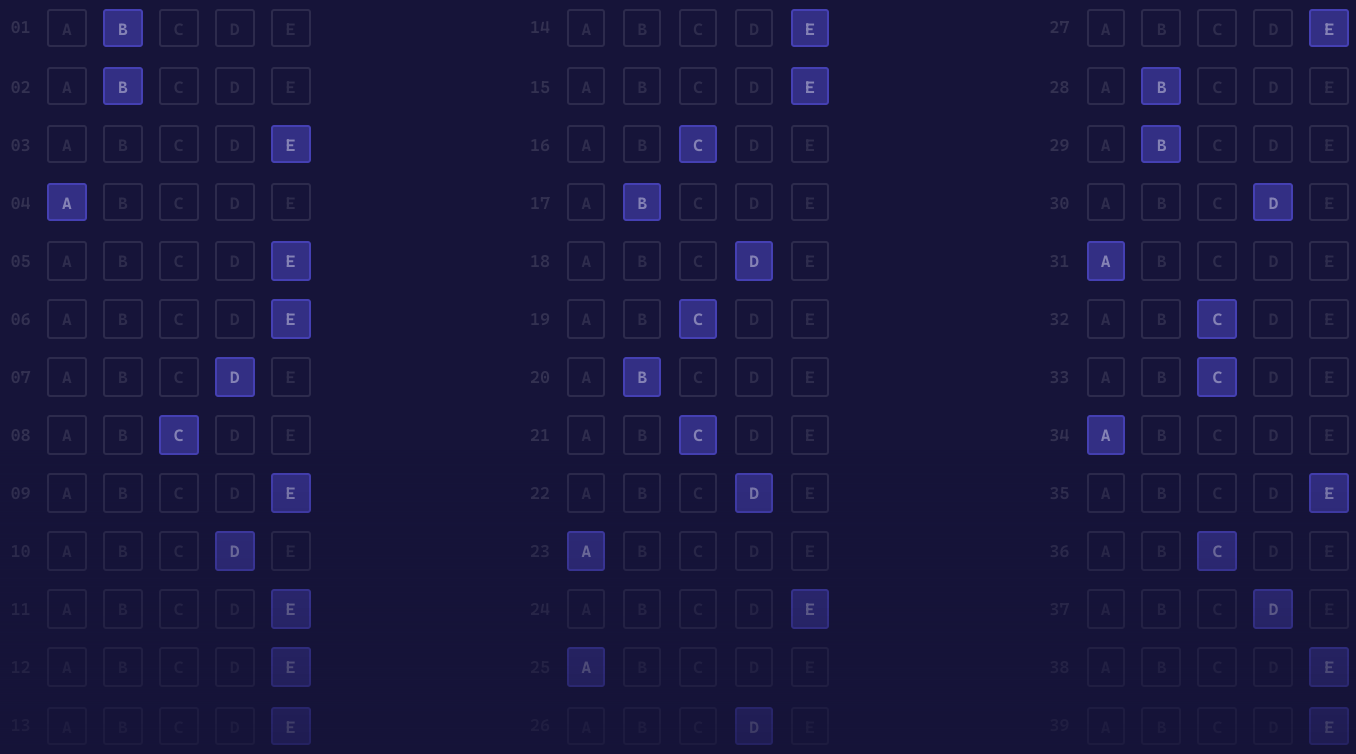

PRACTICE QUESTIONS

NBME® Subject Examination Program, Medical School Services (MSS), including International Foundations of Medicine (IFOM)

IBSEE

IFOM-Basic Sciences Examination - English

EDITION	QUESTIONS	FORMAT
Demo	9	Limited Edition PDF

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Before you begin

What this is

9 practice questions for NBME® Subject Examination Program, Medical School Services (MSS), including International Foundations of Medicine (IFOM) `IBSEE`, 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, `IBSEE`
- the question number
- the email address on your order

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

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QUESTION 1 SINGLE CHOICE

A patient sustains a fracture of the surgical neck of the humerus. Which nerve is most likely injured, and what clinical deficit would you expect?

A **Axillary nerve – weakness of arm abduction beyond 15 degrees and loss of sensation over the lateral shoulder ('regimental badge' area)**

B Musculocutaneous nerve – weakness of elbow flexion and loss of sensation over the medial forearm

C Radial nerve – wrist drop and loss of sensation over the dorsum of the hand

D Median nerve – inability to oppose the thumb and loss of sensation over the lateral three and a half digits

ANSWER **A**

WHY The axillary nerve wraps around the surgical neck of the humerus together with the posterior circumflex humeral artery and is therefore the most commonly injured nerve with fractures at this site. It innervates the deltoid (responsible for arm abduction beyond the initial 15 degrees provided by the supraspinatus) and the teres minor, and supplies the skin over the inferior portion of the deltoid — the 'regimental badge' area. The other nerves listed are injured at different anatomical sites (e.g., radial nerve at the mid-shaft of the humerus, median nerve at the wrist or cubital fossa depending on the lesion).

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QUESTION 2 SINGLE CHOICE

Which of the following best describes the function of RNA polymerase II in eukaryotic cells?

A Synthesis of 28S, 18S, and 5.8S rRNA

B Synthesis of tRNA and 5S rRNA

C **Synthesis of messenger RNA and most small nuclear RNAs**

D Synthesis of telomeric DNA repeats

ANSWER C

WHY Eukaryotic RNA polymerases have distinct roles: RNA polymerase I transcribes the large rRNA precursor (28S, 18S, and 5.8S), RNA polymerase III transcribes tRNA, 5S rRNA, and other small RNAs, and RNA polymerase II transcribes all protein-coding genes (pre-mRNA), most small nuclear RNAs (snRNAs), and microRNAs. Telomerase, not RNA polymerase II, synthesizes telomeric DNA repeats.

QUESTION 3 SINGLE CHOICE

During isovolumetric ventricular contraction, which of the following is true?

A The aortic and pulmonary valves are open, allowing ejection of blood from the ventricles.

B **The mitral and tricuspid valves are closed and the aortic and pulmonary valves are also closed, so ventricular volume remains constant while pressure rises sharply.**

C The mitral and tricuspid valves are open, allowing rapid filling of the ventricles from the atria.

D All four cardiac valves are closed because the heart is in diastole.

ANSWER B

WHY Isovolumetric (isovolumic, isometric) ventricular contraction begins when ventricular pressure exceeds atrial pressure, causing closure of the mitral and tricuspid valves (producing the first heart sound, S1). Until ventricular pressure exceeds aortic and pulmonary arterial pressures, the semilunar valves remain closed as well. Because all four valves are closed, ventricular volume cannot change (hence 'isovolumetric') while intraventricular pressure rises sharply. Ejection occurs once the semilunar valves open.

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QUESTION 4 SINGLE CHOICE

Which histologic feature most reliably distinguishes coagulative necrosis from liquefactive necrosis?

A **Coagulative necrosis preserves the basic tissue architecture (an outline of cells persists) for several days, whereas liquefactive necrosis results in complete digestion of dead cells into a viscous liquid mass.**

B Coagulative necrosis shows abundant neutrophil infiltration with pus formation, whereas liquefactive necrosis is acellular.

C Coagulative necrosis is seen only in the brain, whereas liquefactive necrosis occurs in all other organs.

D Coagulative necrosis is caused exclusively by bacterial infection, whereas liquefactive necrosis is caused exclusively by ischemia.

ANSWER **A**

WHY Coagulative necrosis — the typical pattern of ischemic injury in solid organs such as the heart, kidney, and spleen — denatures structural proteins and lysosomal enzymes, so the underlying tissue architecture (e.g., glomerular outlines, myocardial fiber outlines) is preserved for days until leukocytes arrive to phagocytose the dead cells. Liquefactive necrosis, characteristic of ischemic injury in the CNS and of bacterial (and some fungal) infections, involves rapid enzymatic digestion of dead cells into a viscous liquid mass, often with abundant neutrophils and pus.

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QUESTION 5 SINGLE CHOICE

A 65-year-old man with benign prostatic hyperplasia is started on tamsulosin. Which mechanism best describes its therapeutic action?

A Non-selective alpha-adrenergic antagonist that reduces smooth muscle tone in the prostate and bladder neck

B Selective alpha-1A adrenergic antagonist that relaxes smooth muscle in the prostate and bladder neck without substantially lowering systemic blood pressure

C 5-alpha-reductase inhibitor that decreases conversion of testosterone to dihydrotestosterone

D Muscarinic receptor agonist that increases detrusor contractility

ANSWER B

WHY Tamsulosin is a selective antagonist at alpha-1A adrenergic receptors, the subtype predominant in prostatic and bladder neck smooth muscle. This produces relaxation of those tissues and improves urinary outflow in BPH. Because tamsulosin is relatively selective for alpha-1A over alpha-1B receptors (which mediate vascular smooth muscle contraction), it causes less orthostatic hypotension than non-selective alpha-blockers such as terazosin or doxazosin. Finasteride/dutasteride are 5-alpha-reductase inhibitors, and muscarinic agonists (e.g., bethanechol) increase detrusor tone rather than relieving outflow obstruction.

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QUESTION 6 SINGLE CHOICE

A sexually active adult presents with painless genital ulcers and inguinal lymphadenopathy. Darkfield microscopy of ulcer exudate shows motile spirochetes. Which organism is the most likely cause?

A Haemophilus ducreyi

B Treponema pallidum

C Chlamydia trachomatis serovars L1–L3

D Herpes simplex virus

ANSWER B

WHY Primary syphilis presents classically with a single, painless, indurated genital ulcer (chancre) and regional (typically inguinal) lymphadenopathy. The causative agent, Treponema pallidum, is a thin spirochete that cannot be cultured on standard media and is visualized by darkfield microscopy of lesion exudate. Haemophilus ducreyi causes painful, soft, ragged ('school of fish' on Gram stain) chancroid ulcers; Chlamydia trachomatis L1–L3 cause lymphogranuloma venereum with transient ulceration followed by tender buboes; HSV causes painful vesicular/ulcerative lesions.

QUESTION 7 SINGLE CHOICE

In a cohort study of 1,000 smokers and 1,000 non-smokers followed for 10 years, 200 smokers and 20 non-smokers develop lung cancer. What is the relative risk of lung cancer for smokers compared with non-smokers?

A 10

B 9

C 0.1

D 180

ANSWER A

WHY Relative risk (RR) = incidence in exposed / incidence in unexposed. Incidence in smokers = 200/1,000 = 0.20; incidence in non-smokers = 20/1,000 = 0.02. RR = 0.20 / 0.02 = 10. Therefore smokers in this cohort are 10 times as likely to develop lung cancer as non-smokers over the 10-year follow-up.

QUESTION 8 SINGLE CHOICE

Which immunoglobulin is the first to be produced in a primary humoral immune response and is also the most abundant immunoglobulin in normal human serum?

A IgG

B IgM

C IgA

D IgE

ANSWER B

WHY IgM is the first antibody secreted during a primary humoral immune response, expressed as a pentamer on the B-cell surface before class switching occurs, and is the natural antibody of the primary response. However, the question's second qualifier refers to the most abundant serum immunoglobulin in normal adults, which is IgG. Because only one option can be correct here, the intended best single answer is IgM, which uniquely satisfies the 'first produced in a primary response' criterion that no other class satisfies, and the question stem is best read as testing the primary response (IgM) property — IgG dominates the secondary response and total serum concentration.

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QUESTION 9 MULTIPLE CHOICE

Which of the following congenital heart defects are classified as cyanotic (right-to-left shunting) lesions? (Choose two.)

A **Tetralogy of Fallot**

B Patent ductus arteriosus (large, unrepaired)

C **Transposition of the great arteries**

D Ventricular septal defect (uncomplicated)

ANSWER **A · C**

WHY Cyanotic congenital heart disease is characterized by right-to-left shunting of deoxygenated blood into the systemic circulation. Tetralogy of Fallot (pulmonary stenosis, overriding aorta, VSD, right ventricular hypertrophy) and transposition of the great arteries (aorta arising from the right ventricle, pulmonary artery from the left) are classic cyanotic lesions. A large patent ductus arteriosus and a simple VSD typically produce left-to-right shunts and are acyanotic unless pulmonary hypertension reverses the shunt (Eisenmenger syndrome develops late, not as the initial presentation).

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