NEET PG Anatomy Sample Paper-5

Duration: 15 Minutes **Maximum Marks: 68**

Instructions

- This paper contains **17** Multiple Choice Questions.
- Each correct answer carries **+4** mark. Incorrect answer: **−1** marks. Only **one** correct option.
- Unattempted questions carry **0** marks.
- Use of mobile phones, smartwatches, or any electronic gadgets is strictly prohibited.

Q1. A 54-year-old male with a history of chronic pancreatitis presents with severe hematemesis. Upper endoscopy reveals isolated gastric varices localized exclusively to the fundus of the stomach. Angiography demonstrates complete thrombosis of a vessel traveling within the lienorenal ligament. Which of the following lymph node groups is most likely to receive primary neoplastic drainage from the exact anatomical structure harboring this thrombosed vessel?

(A) Celiac lymph nodes via the splenic artery pathway

(B) Superior mesenteric lymph nodes via the inferior pancreaticoduodenal pathway

(C) Hepatic lymph nodes via the right gastroepiploic pathway

(D) Left gastric lymph nodes via the lesser curvature pathway

Q2. During a challenging esophagectomy for a middle-third esophageal carcinoma, the surgeon accidentally shears the thoracic duct immediately superior to the aortic hiatus of the diaphragm. To safely ligate the vessel, the surgeon must identify its exact anatomical relationships at this specific caudal location. Which of the following statements accurately describes the immediate spatial boundaries of the thoracic duct as it traverses the aortic hiatus?

(A) It lies anterior to the hemiazygos vein and lateral to the left sympathetic trunk.

(B) It lies posterior to the esophagus, flanked medially by the aorta and laterally by the azygos vein.

(C) It lies between the descending thoracic aorta on its left and the azygos vein on its right.

(D) It lies directly left lateral to the inferior vena cava within the central tendon fibers.

Q3. A 62-year-old chronic smoker presents with sudden-onset down-and-out deviation of the right eye, complete right-sided ptosis, and a dilated, non-reactive right pupil. Paradoxically, the patient also exhibits a dense left-sided hemiplegia affecting both the upper and lower extremities. A high-resolution MRI of the brainstem confirms an acute ischemic infarction. Which of the following specific internal structures is most likely spared by the ischemic insult in this syndrome?

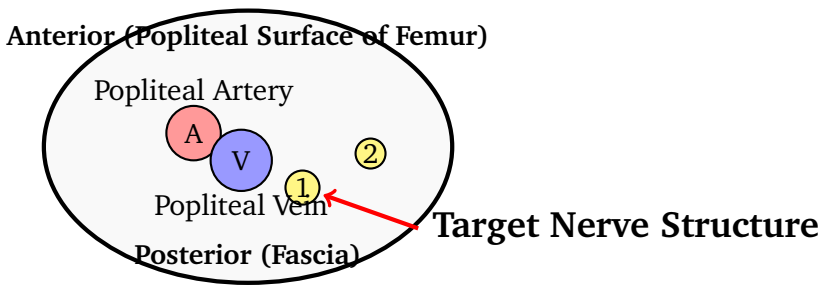
(A) Medial lemniscus of the midbrain

(B) Corticospinal tract within the crus cerebri

(C) Somatomotor fibers of the oculomotor nerve rootlets

(D) Corticonuclear fibers within the middle third of the basis pedunculi

Q4. A multi-trauma patient presents with an inability to dorsiflex the foot following a severe posterior dislocation of the knee joint. The attending orthopedic surgeon performs a detailed anatomical assessment of the popliteal fossa compartments to evaluate Neurovascular structures. Identify the specific nerve structure indicated by the bold target arrow in the schema of the popliteal cross-section below:



(A) Common fibular (peroneal) nerve

(B) Tibial nerve

(C) Saphenous nerve

(D) Posterior femoral cutaneous nerve

Q5. A 28-year-old professional baseball pitcher presents with profound weakness during forearm pronation and paresthesia over the lateral palmar aspect of the hand. On examination, the weakness is exacerbated when pronation is attempted against resistance with the elbow fully extended. However, sensation over the central palm remains completely intact. At which of the following precise anatomical constraints is this nerve most likely entrapped?

(A) Beneath the deep bicipital aponeurosis (lacertus fibrosus)

(B) Between the ulnar and humeral heads of the pronator teres muscle

(C) Within the carpal tunnel beneath the flexor retinaculum

(D) At the arcade of Frohse within the supinator canal

Q6. A 41-year-old female undergoes a total thyroidectomy for papillary thyroid carcinoma. During postoperative rounds, she complains of a distinct alteration in her voice quality, describing an inability to emit high-pitched sounds or sing her usual soprano range, though her normal conversational speech is clear. Laryngoscopy reveals asymmetric vocal fold tension during phonation. Injury to which nerve and its corresponding parent branch is responsible for this presentation?

(A) Recurrent laryngeal nerve from the vagus nerve ($CN\ X$)

(B) Internal laryngeal nerve from the superior laryngeal nerve

(C) External laryngeal nerve from the superior laryngeal nerve

(D) Main trunk of the glossopharyngeal nerve ($CN\ IX$)

Q7. A neonate born at 38 weeks gestation is evaluated for persistent cyanosis that worsens during feeding but resolves completely when the infant cries.

An attempts to pass a small-caliber nasogastric tube through both nares fails due to a rigid, impenetrable osseous obstruction. This congenital anomaly is fundamentally caused by a failure in the regression or remodeling of which embryonic structure?

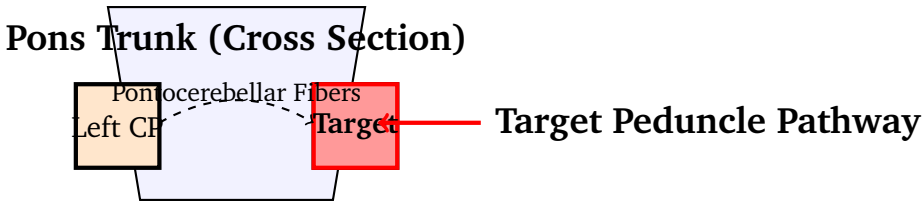
(A) First pharyngeal arch mesenchyme

(B) Oronasal membrane (Bucconasal membrane)

(C) Medial nasal processes fusion plane

(D) Primary pharyngeal membrane of the first cleft

Q8. An emergency room physician evaluates a patient who presented with broad-based gait ataxia, severe intention tremor, and dysdiadochokinesia on the right side of the body. Neuroimaging indicates a localized lesion in the cerebellar white matter processing tracts. Identify the targeted cerebellar peduncle structure highlighted in the brainstem-cerebellar network schematic below:



(A) Superior cerebellar peduncle (Brachium conjunctivum)

(B) Middle cerebellar peduncle (Brachium pontis)

(C) Inferior cerebellar peduncle (Corpus restiforme)

(D) Juxtarestiform body

Q9. A pathology resident examines a biopsy specimen from an unknown segment of the gastrointestinal tract under high-power light microscopy. She identifies an abundant arrangement of deeply branched tubuloalveolar glands situated exclusively within the submucosal layer, piercing through the muscularis mucosae to empty their highly alkaline, bicarbonate-rich secretions into the crypts. From which precise region of the tract was this specimen derived?

(A) Pyloric antrum of the stomach

(B) Terminal ileum

(C) Duodenum proximal to the major duodenal papilla

(D) Lower third of the esophagus

Q10. A 67-year-old male with a known history of severe abdominal aortic atherosclerosis undergoes an emergency laparotomy for acute, agonizing periumbilical pain out of proportion to physical findings. Exploration reveals extensive ischemic necrosis extending from the duodenojejunal flexure to the right two-thirds of the transverse colon. Which specific arterial vessel has become acutely occluded to produce this precise anatomical boundary of necrosis?

(A) Celiac trunk

(B) Superior mesenteric artery

(C) Inferior mesenteric artery

(D) Median sacral artery

Q11. A neurosurgeon is planning an approach to resect a tumor situated entirely within the boundaries of the lateral ventricles. To gain entry into the third ventricle from the lateral ventricle without destroying vital projection pathways, the surgeon guides micro-instruments through the interventricular foramen of Monro. Which of the following pair of anatomical structures directly form the rigid spatial boundaries of this specific foramen?

(A) Column of the fornix anteriorly and the anterior thalamic tubercle posteriorly

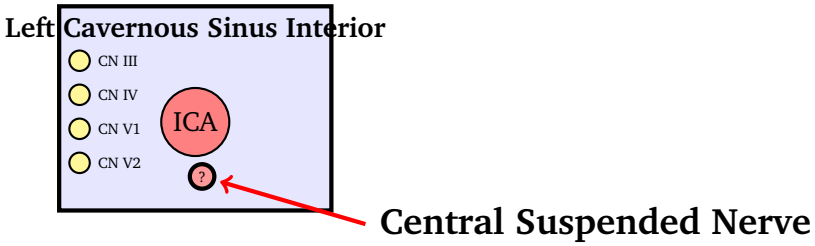
(B) Stria terminalis medially and the lamina affixa laterally

(C) Corpus callosum superiorly and the septum pellucidum medially

(D) Pulvinar of the thalamus anteriorly and the pineal body posteriorly

Q12. A 19-year-old student is rushed to the emergency department with high fever, bilateral papilledema, and a complete restriction of extraocular movements in the left eye, accompanied by loss of cutaneous sensation across the forehead. A diagnosis of cavernous sinus thrombosis originating from a facial carbuncle

is confirmed. Identify the specific cranial nerve structure running freely through the central compartment of the cavernous sinus space alongside the internal carotid artery, as indicated by the focal point in the diagram below:



(A) Oculomotor nerve ($CN\ III$)

(B) Trochlear nerve ($CN\ IV$)

(C) Abducens nerve ($CN\ VI$)

(D) Ophthalmic division of trigeminal nerve ($CN\ V_1$)

Q13. An orthopedist performs an intra-articular injection into the shoulder joint of a patient with severe adhesive capsulitis. The needle is introduced posteriorly through the soft tissue space bordered superiorly by the lower margin of the teres minor, inferiorly by the upper margin of the teres major, and medially by the long head of the triceps brachii muscle. Which neural or vascular structure runs directly inside this designated space and is at high risk of traumatic needle puncture?

(A) Circumflex scapular artery

(B) Axillary nerve

(C) Profunda brachii artery

(D) Radial nerve

Q14. A screening antenatal ultrasonography of a 22-week pregnant woman reveals a fetus with a massive, fluid-filled cystic mass protruding from the posterior cervical midline region. Postnatal assessment confirms a diagnosis of cystic hygroma. This classic anomaly is primarily caused by a failure in the developmental integration and patency of which primordial vascular network?

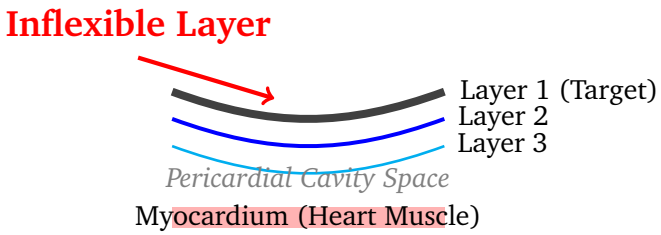
(A) Vitelline venous channels with the sinus venosus

(B) Jugular lymph sacs with the internal jugular-subclavian venous junctions

(C) Cardinal venous system with the dorsal aortae

(D) Umbilical veins with the ductus venosus network

Q15. A 33-year-old victim of a stab wound to the left parasternal fourth intercostal space presents in state of obstructive shock with distant heart sounds and engorged neck veins. Transesophageal echocardiography reveals severe hemopericardium. The trauma surgeon plans an immediate subxiphoid pericardial window. Identify the targeted layer indicated below that corresponds precisely to the outermost, unyielding wall of the pericardial sac responsible for this cardiac tamponade physiology:



(A) Visceral layer of serous pericardium (Epicardium)

(B) Parietal layer of serous pericardium

(C) Fibrous pericardium

(D) Endocardium lining membrane

Q16. An ultrastructural transmission electron micrograph of a kidney biopsy shows a structural defect in the specialized cell types that form the visceral layer of Bowman's capsule. These cells possess primary processes that branch into secondary interdigitating pedicels, which wrap around the glomerular capillaries. The filtration slits between these pedicels are bridged by an thin diaphragmatic zipper line composed principally of which protein molecule?

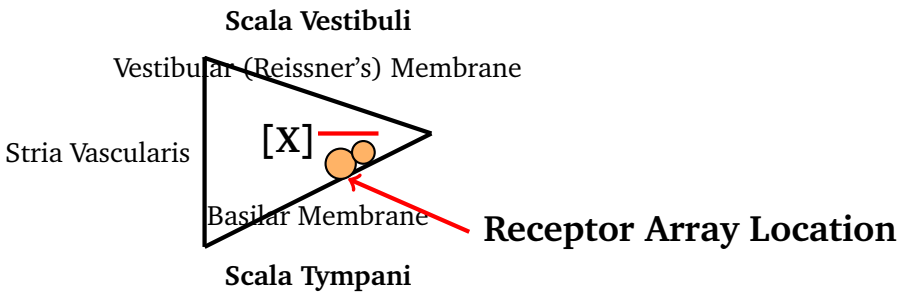
(A) Type IV Collagen alpha-chains

(B) Nephrin

(C) Podocalyxin

(D) Laminin-521 complex

Q17. A 49-year-old factory supervisor complains of progressive hearing loss and intractable tinnitus. Audiometric evaluations localized the defect to the primary sound transverting sensory organ within the bony cochlea. Examine the structural cross-section schematic of the cochlear canal shown below. Identify the designated alphanumeric zone where the mechanoreceptor specialized inner and outer hair cells reside:



(A) Inside the Scala Vestibuli compartment

(B) At the Organ of Corti array on the Basilar Membrane within the Scala Media

(C) Embedded inside the cellular margins of the Stria Vascularis wall

(D) Inside the Scala Tympani compartment fluid space

Detailed Solutions

Q1.

Solution

Concept: Chronic pancreatitis can cause inflammatory thrombosis of the **splenic vein** because it runs horizontally directly along the posterior aspect of the pancreatic body and tail. When the splenic vein becomes occluded, venous blood from the gastric fundus is diverted through the short gastric veins, resulting in isolated **left-sided portal hypertension** and isolated gastric varices located exclusively in the fundus. The splenic vein travels alongside the splenic artery within the **lienorenal (splenorenal) ligament**.

Solution:

Let's trace the lymphatic drainage of the anatomical structure harboring the thrombosed vessel:

(a) The vessel that has undergone complete thrombosis within the lienorenal ligament is the **splenic vein**.

(b) The structure harboring this vessel is the lienorenal ligament itself, which connects the hilum of the spleen to the left kidney and contains the tail of the pancreas, the splenic artery, and the splenic vein.

(c) Lymphatic vessels from the spleen, the pancreatic tail, and the associated splenic vasculature trace retrograde along the course of the **splenic artery**.

(d) This pathway drains directly into the pancreaticosplenic lymph nodes and ultimately empties into the **celiac lymph nodes**.

Final Answer: Celiac lymph nodes via the splenic artery pathway

Answer: (A)

Go Back to Question 1

Q2.

Solution

Concept: The thoracic duct is the largest lymphatic vessel in the body. It originates from the cisterna chyli in the abdomen and ascends into the posterior mediastinum of the thorax by passing through the **aortic hiatus** of the diaphragm at the level of the T12 vertebral body.

Solution:

Let's evaluate the spatial relationships of the structures passing through the aortic hiatus:

(a) The aortic hiatus transmits three primary structures: the descending thoracic aorta, the thoracic duct, and the azygos vein.

(b) Within this narrow osseofibrous opening, the **descending thoracic aorta** is situated to the left, while the **azygos vein** is situated to the right.

(c) The **thoracic duct** ascends in the intermediate position, directly bounded and flanked by the aorta on its left lateral side and the azygos vein on its right lateral side.

(d) It lies anterior to the vertebral bodies and posterior to the esophagus at this caudal location.

Final Answer: It lies between the descending thoracic aorta on its left and the azygos vein on its right.

Answer: (C)

Go Back to Question 2

Q3.

Solution

Concept: The clinical presentation describes **Weber syndrome** (superior alternating hemiplegia), which is a classic midbrain vascular stroke pattern typically resulting from occlusion of the paramedian branches of the posterior cerebral artery. This stroke damages the structures residing within the ventral midbrain (basis pedunculi).

Solution:

Let's analyze the damaged versus spared structures in Weber syndrome:

(a) **Oculomotor Nerve Deficits:** The down-and-out eye deviation, severe ptosis, and a dilated, non-reactive pupil indicate damage to the exiting somatomotor and parasympathetic preganglionic fibers of the **oculomotor nerve (*CN III*) rootlets**.

(b) **Contralateral Hemiplegia:** The dense left-sided hemiplegia is due to interruption of the descending **corticospinal and corticonuclear pathways** traveling inside the middle three-fifths of the **crus cerebri** (basis pedunculi).

(c) **Spared Structure:** The **medial lemniscus**, which carries fine touch, vibration, and conscious proprioceptive information from the contralateral side of the body, is situated dorsolaterally within the midbrain tegmentum. Because Weber syndrome selectively affects the ventral aspect of the midbrain, the tegmentum and the medial lemniscus are characteristically spared.

Final Answer: Medial lemniscus of the midbrain

Answer: (A)

Go Back to Question 3

Q4.

Solution

Concept: The sciatic nerve divides at the upper border of the popliteal fossa into two major terminal branches: the **tibial nerve** and the **common fibular (peroneal) nerve**. Within the popliteal fossa, these structures exhibit a strict and predictable superficial-to-deep relationship relative to the popliteal vessels.

Solution:

Let's interpret the axial cross-section schematic of the popliteal fossa:

(a) The most anterior structure, lying closest to the popliteal surface of the femur, is the **popliteal artery (A)**.

(b) Positioned immediately posterior (superficial) to the artery is the **popliteal vein (V)**.

(c) The most posterior (superficial) structures are the nerves, which are encountered first during a posterior surgical approach.

(d) **Structure 1**, positioned directly superficial to the popliteal vein along the central vertical axis of the fossa, is the **tibial nerve**.

(e) **Structure 2**, positioned more laterally towards the biceps femoris muscle, is the common fibular nerve. Since the arrow specifically points to the central, larger nerve trunk (Structure 1), it indicates the tibial nerve.

Final Answer: Tibial nerve

Answer: (B)

Go Back to Question 4

Q5.

Solution

Concept: The clinical presentation outlines an injury to the **median nerve** in the proximal forearm, known as **pronator syndrome**. This condition must be distinguished from carpal tunnel syndrome based on sensory distribution and specific motor testing.

Solution:

Let's localize the site of nerve entrapment based on the clinical signs:

(a) The median nerve gives off the **palmar cutaneous branch** *proximal* to the carpal tunnel. This branch passes superficial to the flexor retinaculum to supply the central palm. Because central palmar sensation is intact, entrapment cannot be within the carpal tunnel.

(b) Weakness during forearm pronation and paresthesias over the lateral fingers indicate a lesion proximal to the mid-forearm.

(c) When the elbow is fully extended, the pronator teres muscle is put on maximum stretch. Resisted pronation in this position compresses the median nerve as it passes **between the ulnar and humeral heads of the pronator teres**, which is the most common site of entrapment in pronator syndrome.

Final Answer: Between the ulnar and humeral heads of the pronator teres muscle

Answer: (B)

Go Back to Question 5

Q6.

Solution

Concept: The **superior laryngeal nerve** is a branch of the vagus nerve ($CN\ X$) that divides into an internal branch and an external branch. The **external laryngeal nerve** provides exclusive motor innervation to a single intrinsic laryngeal muscle: the **cricothyroid muscle**. This muscle acts to tilt the thyroid cartilage forward, stretching and tensing the vocal folds to allow for high-frequency vocalization.

Solution:

Let's analyze the patient's vocal deficit following thyroidectomy:

(a) During a total thyroidectomy, the external laryngeal nerve is at extreme risk of injury because it runs in close structural proximity to the **superior thyroid artery** near the upper pole of the thyroid gland.

(b) Damage to this nerve causes paralysis of the cricothyroid muscle, resulting in an inability to tense the ipsilateral vocal fold during phonation.

(c) This produces a classic clinical picture where conversational speech and airway patency are entirely preserved (since the recurrent laryngeal nerve is intact), but the patient loses the ability to produce high-pitched sounds or sing in a high range.

Final Answer: External laryngeal nerve from the superior laryngeal nerve

Answer: (C)

Go Back to Question 6

Q7.

Solution

Concept: The clinical presentation describes **choanal atresia**, the most common congenital anomaly of the nasal cavity. It is characterized by a bony (90%) or membranous (10%) septum that occludes the posterior nasal apertures (choanae), blocking communication between the nasal cavities and the nasopharynx.

Solution:

Let's examine the embryological mechanism behind this condition:

(a) During early development, the invagination of the nasal pits forms the primitive nasal cavities, which are initially separated from the oral cavity by the **oronasal (bucconasal) membrane**.

(b) Normal development requires this thin, temporary oronasal membrane to undergo spontaneous perforation and regression during the 7th week of gestation to establish the primitive posterior nares.

(c) A absolute failure in the regression, remodeling, or apoptosis of the **oronasal membrane** results in persistent occlusion, leading to choanal atresia.

(d) Because neonates are obligate nasal breathers, they present with cyclic cyanosis that worsens during feeding (when the mouth is closed around a nipple) and resolves completely when crying (as breathing shifts to the open oral pathway).

Final Answer: Oronasal membrane (Bucconasal membrane)

Answer: (B)

Go Back to Question 7

Q8.

Solution

Concept: The cerebellum is connected to the brainstem by three pairs of white matter fibers called cerebellar peduncles. The **middle cerebellar peduncle (brachium pontis)** is the largest of these pathways and connects the basal pons directly to the neocerebellum.

Solution:

Let's trace the neural circuitry highlighted in the schematic:

(a) The schematic illustrates a transverse section of the pons trunk. The **pontocerebellar fibers** originate from the pontine nuclei, cross the midline (decussate), and travel transversely into the opposite cerebellar hemisphere.

(b) These decussating fibers form the massive lateral white matter wall of the pons, which is the **middle cerebellar peduncle**.

(c) The target arrow points specifically to this large lateral bundle connecting the pons to the cerebellum.

(d) Damage to this pathway interrupts the major corticopontocerebellar input channel, resulting in classic ipsilateral cerebellar deficits such as a broad-based gait ataxia, intention tremor, and dysdiadochokinesia.

Final Answer: Middle cerebellar peduncle (Brachium pontis)

Answer: (B)

Go Back to Question 8

Q9.

Solution

Concept: The histological hallmarks of different segments of the gastrointestinal tract allow for definitive regional localization. The presence of deeply branched, tubuloalveolar, mucus-secreting glands confined entirely within the **submucosal layer** is the unique defining feature of the **duodenum** (Brunner's glands).

Solution:

Let's analyze the histological findings to pinpoint the exact location:

(a) Glands located in the submucosa are rare in the GI tract, found only in the esophagus (esophageal glands proper) and the duodenum (**Brunner's glands**).

(b) The glands described are highly branched tubuloalveolar structures that secrete a clear, bicarbonate-rich alkaline fluid (pH $8.1 - 9.3$) to neutralize acidic gastric chyme and protect the intestinal wall.

(c) These glands are concentrated most heavily in the **proximal duodenum**, specifically upstream or proximal to the opening of the major duodenal papilla (ampulla of Vater), where neutralization of gastric acid is most critical.

Final Answer: Duodenum proximal to the major duodenal papilla

Answer: (C)

Go Back to Question 9

Q10.

Solution

Concept: The gastrointestinal tract is vascularized by three major unpaired branches of the abdominal aorta, each corresponding to an embryonic division: the celiac trunk supplies the foregut, the **superior mesenteric artery (SMA)** supplies the midgut, and the inferior mesenteric artery (IMA) supplies the hindgut.

Solution:

Let's map out the ischemic boundaries to find the occluded vessel:

(a) The necrosis extends from the **duodenojejunal flexure** to the **right two-thirds of the transverse colon**.

(b) This region corresponds precisely to the anatomical derivatives of the **embryonic midgut**, which begins at the second part of the duodenum (distal to the bile duct entry) and terminates at the junction between the right two-thirds and left one-third of the transverse colon (the splenic flexure).

(c) This entire midgut territory is supplied exclusively by the **superior mesenteric artery**. Acute thrombotic or embolic occlusion of the SMA causes extensive intestinal infarction matching these exact boundaries, presenting as severe abdominal pain out of proportion to physical findings.

Final Answer: Superior mesenteric artery

Answer: (B)

Go Back to Question 10

Q11.

Solution

Concept: The two lateral ventricles communicate directly with the midline third ventricle through the paired **interventricular foramina of Monro**. This anatomical channel is a critical checkpoint for cerebrospinal fluid (CSF) circulation and is a common site of obstructive hydrocephalus due to tumors.

Solution:

Let's trace the rigid spatial boundaries that outline this foramen:

(a) **Anterior boundary:** The foramen is bounded in front by the curved reflection of the **column of the fornix** as it heads downward toward the mammillary bodies.

(b) **Posterior boundary:** The foramen is bounded behind by the smooth anterior projection of the thalamus, known as the **anterior thalamic tubercle**.

(c) This makes option A the correct anatomical pair describing the opening. The other options describe structures located further back or along different margins of the ventricular walls.

Final Answer: Column of the fornix anteriorly and the anterior thalamic tubercle posteriorly

Answer: (A)

Go Back to Question 11

Q12.

Solution

Concept: The cavernous sinus is a large dural venous sinus situated on either side of the sella turcica. It has a complex internal anatomy, containing specific cranial nerves embedded within its lateral dural wall, and a single cranial nerve that runs suspended freely within its central venous venous space.

Solution:

Let's analyze the positions of the nerves shown in the diagram:

(a) **Lateral wall structures:** From superior to inferior, the lateral dural wall contains the oculomotor nerve ($CN\ III$), the trochlear nerve ($CN\ IV$), the ophthalmic nerve ($CN\ V_1$), and the maxillary nerve ($CN\ V_2$).

(b) **Central compartment structure:** The **internal carotid artery (ICA)** curves through the center of the sinus. Positioned immediately inferolateral to the ICA within the central venous vascular space is the **abducens nerve ($CN\ VI$)**.

(c) Because the abducens nerve runs freely through the center of the sinus rather than being protected within the fibrous lateral wall, it is the first nerve compressed or injured during a progressive cavernous sinus thrombosis or by an expanding internal carotid artery aneurysm, leading to isolated lateral rectus muscle palsy.

Final Answer: Abducens nerve ($CN\ VI$)

Answer: (C)

Go Back to Question 12

Q13.

Solution

Concept: The posterior scapular and axillary regions contain three distinct, clinically important intermuscular spaces that transmit neurovascular bundles: the quadrangular space, the triangular space, and the triangular interval.

Solution:

Let's evaluate the boundaries specified in the prompt to identify the correct space:

(a) **Boundaries:** The space is bounded superiorly by the lower margin of the **teres minor**, inferiorly by the upper margin of the **teres major**, and medially by the **long head of the triceps brachii**.

(b) This combination of boundaries defines the **triangular space** (medial triangular space).

(c) **Contents:** The triangular space transmits the **circumflex scapular artery** as it curves around the lateral border of the scapula to participate in the scapular anastomotic network.

(d) **Differential Diagnosis:** The *quadrangular space* is bounded laterally by the surgical neck of the humerus and transmits the axillary nerve and posterior circumflex humeral artery. The *triangular interval* is located lower down and transmits the radial nerve and profunda brachii artery.

Final Answer: Circumflex scapular artery

Answer: (A)

Go Back to Question 13

Q14.

Solution

Concept: A cystic hygroma (cystic lymphangioma) is a benign, multi-loculated cystic mass that develops most commonly within the posterior triangle of the neck (75%). It is a developmental anomaly linked to Turner syndrome ($45, XO$), Down syndrome, and Edwards syndrome.

Solution:

Let's look at the embryological origin of this lymphatic malformation:

(a) During the 5th to 6th week of embryonic development, the lymphatic system begins as six primary lymph sacs. The most cranial pair are the **jugular lymph sacs**, located near the junction of the developing internal jugular and subclavian veins.

(b) Normally, these sacs establish patent communications with the venous system to allow lymph to drain into the systemic circulation.

(c) If these jugular lymph sacs **fail to integrate or achieve patency** with the local venous junctions, lymphatic drainage from the head and neck is blocked.

(d) The trapped lymph causes severe dilation of the isolated lymphatic channels, producing large, fluid-filled cystic spaces that present as a posterior cervical midline mass (cystic hygroma).

Final Answer: Jugular lymph sacs with the internal jugular-subclavian venous junctions

Answer: (B)

Go Back to Question 14

Q15.

Solution

Concept: The pericardial sac surrounding the heart is composed of two primary structural layers: an outer tough connective tissue layer called the **fibrous pericardium** and an inner double-layered membrane called the **serous pericardium** (which is divided into a parietal layer and a visceral layer).

Solution:

Let's analyze the layers from superficial to deep as illustrated in the schematic:

(a) **Layer 1 (Target):** This is the outermost layer of the sac, known as the **fibrous pericardium**. It is composed of dense, unyielding fibrous connective tissue that anchors the heart to the sternum and diaphragm. Because it is highly inelastic and inflexible, any rapid accumulation of fluid within the deeper space exerts severe pressure on the heart, leading to cardiac tamponade physiology.

(b) **Layer 2:** This is the parietal layer of the serous pericardium, which is fused directly to the inner surface of the fibrous pericardium.

(c) **Layer 3:** This is the visceral layer of the serous pericardium (epicardium), which covers the surface of the myocardium.

Final Answer: Fibrous pericardium

Answer: (C)

Go Back to Question 15

Q16.

Solution

Concept: The glomerular filtration barrier is composed of three layers: the fenestrated capillary endothelium, the glomerular basement membrane (*GBM*), and the visceral epithelium of Bowman's capsule, formed by highly specialized cells called **podocytes**.

Solution:

Let's examine the molecular architecture of the podocyte filtration slits:

(a) Podocytes extend primary and secondary extensions called pedicels (foot processes) that interdigitate tightly around the glomerular capillaries.

(b) The gaps between adjacent foot processes are called **filtration slits**, which are bridged by a thin, zipper-like extracellular structure termed the **slit diaphragm**.

(c) The major structural and functional transmembrane protein that forms the core framework of this slit diaphragm is **nephrin**.

(d) Mutations in the *NPHS1* gene, which encodes nephrin, lead to a total failure of the slit diaphragm mechanism, presenting clinically as Congenital Nephrotic Syndrome of the Finnish type, characterized by massive, life-threatening proteinuria.

Final Answer: Nephrin

Answer: (B)

Go Back to Question 16

Q17.

Solution

Concept: The bony cochlea contains the cochlear canal, which is divided into three distinct fluid-filled fluid compartments: the upper scala vestibuli, the lower scala tympani, and the intermediate **scala media (cochlear duct)**.

Solution:

Let's locate the sensory receptor apparatus within the schematic cross-section:

(a) The intermediate triangular space labeled **[X]** represents the **scala media**, which is filled with potassium-rich endolymph.

(b) The floor of the scala media is formed by the **basilar membrane**. Resting directly on top of this basilar membrane is the **Organ of Corti**, which is the primary sensory organ for hearing.

(c) The Organ of Corti contains the specialized mechanoreceptor inner and outer hair cells. Sound waves induce vibrations of the basilar membrane, causing the hair cell stereocilia to shear against the overlying tectorial membrane, converting mechanical sound energy into electrochemical neural signals.

Final Answer: At the Organ of Corti array on the Basilar Membrane within the Scala Media

Answer: (B)

Go Back to Question 17

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	C	3	A	4	B	5	B
6	C	7	B	8	B	9	C	10	B
11	A	12	C	13	A	14	B	15	C
16	B	17	B						