**Subject: Human Anatomy II**

**Instructor: Dr. Arooba.**

**Section: B**

**June 22nd, 2020. Total marks: 50**

**Attempt the following questions. Add diagrams where needed.**

**Each carries 10 marks.**

***Name : SALMAN KHAN***

***ID:. 16411***

1. What are the major features of intracranial fossae of the skull?

***Answer:***

***Major features of intracranial fossa the skull:***

The interior of the base of the skull

is divided into three cranial fossae:

Anterior,

Middle, and

Posterior.

***Anterior cranial fossa:***

***BONES FORMING ANTERIOR CRANIAL FOSSA***

* Frontal bone
*  Ethmoid bone
*  Lesser Wing of Sphenoid bone

***SURFACES/BOUNDARIES OF ANTERIOR CRANIAL FOSSA:***

***Anteriorly:*** It is bounded by the inner surface of the frontal

bone.

 ***Posteriorly***: Its posterior boundary is the sharp lesser wing

of the sphenoid.

 ***Floor:*** The floor of the fossa is formed by

• the ridged orbital plates of the frontal bone laterally

• and by the cribriform plate of the ethmoid medially

***Frontal Crest:*** In the midline of inner surface of

frontal bone is a crest, frontal crest for the attachment

of the falx cerebri

❖The falx cerebri is a sickle-shaped fold of dura mater

that lies in the midline between the two cerebral

hemispheres.

▪ Its narrow end in front is attached to the internal

frontal crest and the crista galli.

▪ The superior sagittal sinus runs in its upper fixed

margin, the inferior sagittal sinus runs in its lower concave free margin.

 ***Crista Galli:*** The crista galli is a sharp upward projection of

the ethmoid bone in the midline for the attachment of the

falx cerebri.

 ***Anterior Ethmoidal Foramen:*** Alongside the crista galli

is a narrow slit in the cribriform plate for the passage of the

anterior ethmoidal nerve into the nasal cavity.

 The upper surface of the cribriform plate supports the

olfactory bulbs, and the small perforations in the

cribriform plate are for the olfactory nerves.

 The anterior cranial fossa lodges the frontal lobes of the cerebral hemisphere.

***Middle cranial fossa:***

BONES FORMING MIDDLE CRANIAL FOSSA

*  Sphenoid
* Temporal
*  Parietal

***SURFACES/BOUNDARIES OF MIDDLE CRANIAL FOSSA***

 The middle cranial fossa consists of a small median part formed

by the body of the sphenoid.

 And expanded lateral parts that form concavities on either side,

which lodge the temporal lobes of the cerebral hemispheres.

 ***Middle Cranial Fossa is bounded:***

• Anteriorly by the lesser wings of the sphenoid

• Posteriorly by the superior borders of the petrous parts of the

temporal bones.

• Laterally lie the squamous parts of the temporal bones, the

greater wings of the sphenoid, and the parietal bones.

• The Floor of each lateral part of the middle cranial fossa is

formed by the greater wing of the sphenoid and the squamous

and petrous parts of the temporal bone.

❖***Sphenoid Air Sinuses:*** The body of the sphenoid

contains the sphenoid air sinuses, which are lined with

mucous membrane and communicate with the nasal

cavity; they serve as voice resonators.

❖***The Foramen Ovale:*** lies posterolateral to the foramen

rotundum.

▪ It perforates the greater wing of the sphenoid and

transmits the large sensory root and small motor root of

the mandibular nerve to the infratemporal fossa; the lesser

petrosal nerve also passes through it.

❖***The Small Foramen Spinosum:*** lies posterolateral to the

foramen ovale and also perforates the greater wing of the

sphenoid.

▪ The foramen transmits the middle meningeal artery.

***Posterior Cranial fossa:***

 The posterior cranial fossa is deep and lodges the parts

of the hindbrain, namely, the cerebellum, pons,and

medulla oblongata.

***BONES FORMING POSTERIOR CRANIAL FOSSA***

*  Temporal
*  Occipital

SURFACES/BOUNDARIES OF POSTERIOR CRANIAL FOSSA

 ***Anteriorly,*** the fossa is bounded by the superior border of

the petrous part of the temporal bone.

 ***posteriorly*** it is bounded by the internal surface of the

squamous part of the occipital bone.

 The ***floor*** of the posterior fossa is formed by the basilar,

condylar, and squamous parts of the occipital bone and the

mastoid part of the temporal bone.

 The **roof** of the fossa is formed by a fold of dura, the

tentorium cerebelli,which intervenes between the

cerebellum below and the occipital lobes of the cerebral hemisphere above.

***Foramen Magnum:*** occupies the central area of the floor

of posterior cranial fossa and transmits the medulla

oblongata and its surrounding meninges, the ascending

spinal parts of the accessory nerves, and the two vertebral

arteries

 The ***hypoglossal canal*** is situated above thanterolateral

boundary of the foramen magnum and transmits the

hypoglossal nerve.

The jugular foramen lies between the lower border of the

petrous part of the temporal bone and the condylar part of the

occipital bone. It transmits the following structures from

before backward:

• ***The inferior petrosal sinus;*** the 9th, 10th,and 11th cranial

nerves; and the large sigmoid sinus.

• The inferior petrosal sinus descends in the groove on the

lower border of the petrous part of the temporal bone to reach

the foramen.

• The sigmoid sinus turns down through the foramen to

become the internal jugular vein.

• The ***internal acoustic meatus*** pierces the posterior surface of

the petrous part of the temporal bone. It transmits the

vestibulocochlear nerve and the motor and sensory roots of facial nerve.

***Sigmoid Sinus:*** The big groove behind the jugular

foramen on the inside is for the sigmoid sinus , the

main venous drainage channel for the brain.

 ***The superior petrosal sinus*** runs backward along

the upper border of the petrous bone in a narrow

groove and drains into the sigmoid sinus.

 As the ***sigmoid sinus*** descends to the jugular foramen,

it deeply grooves the back of the petrous bone and the

mastoid part of the temporal bone. Here, it lies

directly posterior to the mastoid antrum.

1. Write note on the cranial nerves.

***Answer:***

***Cranial nerves:***

The cranial nerves are 12 pairs of nerves that can be seen on the ventral (bottom) surface of the brain. Some of these nerves bring information from the sense organs to the brain; other cranial nerves control muscles; other cranial nerves are connected to glands or internal organs such as the heart and lungs.

***Cranial nerves names and it's functions:***

***Names:***

Olfactory

Optic

Oculomotor

Trochlear

Trigeminal

Abducens

Facial

Vestibulocochlear

Glossopharyngeal

Vagus

Accessory

Hypoglossal

The cranial nerves are a set of twelve nerves that originate in the brain. Each has a different function for sense or movement.

The functions of the cranial nerves are sensory, motor, or both:

Sensory cranial nerves help a person to see, smell, and hear.

Motor cranial nerves help control muscle movements in the head and neck.

Each nerve has a name that reflects its function and a number according to its location in the brain. Scientists use Roman numerals from I–XII to the cranial nerves in the brain.

***I. Olfactory nerve***

The olfactory nerve transmits information to the brain regarding a person’s sense of smell.

When a person inhales fragrant molecules, olfactory receptors within the nasal passage send the impulses to the cranial cavity, which then travel to the olfactory bulb.

Specialized olfactory neurons and nerve fibers meet with other nerves, which pass into the olfactory tract.

The olfactory tract then travels to the frontal lobe and other areas of the brain that are involved with memory and notation of different smells.

***II. Optic nerve***

The optic nerve transmits information to the brain regarding a person’s vision.

When light enters the eye, it hits the retina, which contains rods and cones. These are photoreceptors that translate signals from light into visual information for the brain.

Cones are located in the central retina and are involved with color vision. Rods are located in the peripheral retina and are involved with non-color vision.

These photoreceptors carry signal impulses along nerve cells to form the optic nerve. Most of the fibers of the optic nerve cross into a structure called the optic chiasm. Then, the optic tract projects to the primary visual cortex in the occipital lobe at the back of the brain. The occipital lobe is where the brain handles visual information.

***III. Oculomotor nerve***

The oculomotor nerve helps control muscle movements of the eyes.

The oculomotor nerve provides movement to most of the muscles that move the eyeball and upper eyelid, known as extraocular muscles.

The oculomotor nerve also helps with involuntary functions of the eye:

The sphincter pupillae muscle automatically constricts the pupil to allow less light into the eye when the light is bright. When it is dark, the muscle relaxes to allow more light to enter.

The ciliary muscles help the lens adjust to short range and long range vision. This happens automatically when a person looks at near or far objects.

***IV. Trochlear nerve***

The trochlear nerve is also involved in eye movement.

The trochlear nerve, like the oculomotor nerve, originates in the midbrain. It powers the contralateral superior oblique muscle that allows the eye to point downward and inward.

***V. Trigeminal nerve***

The trigeminal nerve is the largest cranial nerve and has both motor and sensory functions.

Its motor functions help a person to chew and clench the teeth and gives sensation to muscles in the tympanic membrane of the ear.

Its sensory division has three parts that connect to sensory receptor sites on the face:

The ophthalmic part gives sensation to parts of the eyes, including the cornea, mucosa in the nose, and skin on the nose, the eyelid, and the forehead.

The maxillary part gives sensation to the middle third of the face, side of the nose, upper teeth, and lower eyelid.

The mandibular part gives sensation to the lower third of the face, the tongue, mucosa in the mouth, and lower teeth.

Trigeminal neuralgia is a common disorder of the trigeminal nerve that can cause intense pain and facial tics.

***VI. Abducens nerve***

The abducens nerve also helps control eye movements.

It helps the lateral rectus muscle, which is one of the extraocular muscles, to turn the gaze outward.

The abducens nerve starts in the pons of the brainstem, enters an area called Dorello’s canal, travels through the cavernous sinus, and ends at the lateral rectus muscle within the bony orbit.

***VII. Facial nerve***

The facial nerve functions to produce facial expressions.

The facial nerve also has both motor and sensory functions.

The facial nerve is made up of four nuclei that serve different functions:

movement of muscles that produce facial expression

movement of the lacrimal, submaxillary, and submandibular glands

the sensation of the external ear

the sensation of taste

The four nuclei originate in the pons and medulla and join together to travel to the geniculate ganglion.

Bell’s palsy is a common disorder of the facial nerve, which causes paralysis on one side of the face and possibly loss of taste sensation.

***VIII. Vestibulocochlear nerve***

The vestibulocochlear nerve is involved with a person’s hearing and balance.

The vestibulocochlear nerve contains two components:

The vestibular nerve helps the body sense changes in the position of the head with regard to gravity. The body uses this information to maintain balance.

The cochlear nerve helps with hearing. Specialized inner hair cells and the basilar membrane vibrate in response to sounds and determine the frequency and magnitude of the sound.

These fibers combine in the pons and exit the skull via the internal acoustic meatus in the temporal bone.

***IX. Glossopharyngeal nerve***

The glossopharyngeal nerve possesses both motor and sensory functions.

The sensory function receives information from the throat, tonsils, middle ear, and back of the tongue. It is also involved with the sensation of taste for the back of the tongue.

The motor division provides movement to the stylopharyngeus, which is a muscle that allows the throat to shorten and widen.

The glossopharyngeal nerve starts in the medulla oblongata in the brain and leaves the skull through the jugular foramen, which leads to the tympanic nerve.

***X. Vagus nerve***

The vagus nerve has a range of functions, providing motor, sensory, and parasympathetic functions.

The sensory part provides sensation to the outer part of the ear, the throat, the heart, abdominal organs. It also plays a role in taste sensation.

The motor part provides movement to the throat and soft palate.

The parasympathetic function regulates heart rhythm and innervates the smooth muscles in the airway, lungs, and gastrointestinal tract.

The vagus nerve is the longest cranial nerve as it starts in the medulla and extends to the abdomen.

Doctors use vagus nerve stimulation therapy to treat various conditions, including epilepsy, depression, and anxiety. Learn more about the vagus nerve and stimulation therapy here.

***XI. Accessory nerve***

The accessory nerve provides motor function to the neck.

The accessory nerve provides motor function to some muscles in the neck:

It controls the sternocleidomastoid and trapezius muscles that allow a person to rotate, extend, and flex the neck and shoulders.

The accessory nerve separates into spinal and cranial parts.

The spinal component starts in the spinal cord and travels into the skull through the foramen magnum. From there, it meets the cranial component of the accessory nerve and exits the skull along the internal carotid artery.

The cranial part of the accessory nerve combines with the vagus nerve.

***XII. Hypoglossal nerve***

The hypoglossal nerve is a motor nerve that supplies the tongue muscles.

The hypoglossal nerve originates in the medulla.

Disorders of the hypoglossal nerve can cause paralysis of the tongue, most often occurring on one side.

1. Write note on the salient features of normal frontalis and norma occipitalis of skull.

***Answer:***

***features of normal frontalis and norma occipitalis of skull.***

Skull sutures visible from the side (norma lateralis) include the frontal, parietal, temporal, occipital, sphenoid, and zygomatic bones, while skull sutures visible from the front (norma frontalis) and above (norma verticalis) include those related to the frontal and parietal bones.

1. What do you know about the muscles of hip and knee?

***Answer:***

***Hip muscles:***

***FLEXORS:***

Primary→ iliopsoas, rectus femoris (two-joint), tensor fascia latae, sartorius.

Secondary→ pectineus, adductor longus, adductor magnus, gracilis.

***ADDUCTORS:***

Adductor longus, magnus and brevis, pectineus, gracilis (two-joint).

***EXTENSORS:***

Primary→ Gluteus maximus, hamstring (biceps femoris, semitendinosus, semimembranosus) (two-joint) may be assissted by

Gluteus medius, posterior portion of assuctor magnus and piriformis.

***ABDUCTORS:***

Primary→ Gluteus medius and minimus

Assistors→ Gluteus maximus, sartorius

***LATERAL ROTATORS:***

Primary→ Obturator internus and externus, gemellus superior and inferior, quadratus femoris, piriformis muscle.

***MEDIAL ROTATORS:***

No muscles with primary function of producing medial rotation at hip joint.

***Knee muscles:***

primary motions at tibiofemoral joint- flexion/extension

***KNEE FLEXOR GROUP:***

7 muscles

Semimembranosus(2 joint muscle)

Semitendinosus(2 joint muscle)

biceps femoris (long (2 jt muscle) and short head 1 jt muscle)

Sartorius(2 joint muscle)

Gracilis(2 joint muscle)

Popliteus(1 joint muscle)

gastrocnemius(2 joint muscle).

***MEDIAL ROTATORS:***

gracilis

Sartorius

Semitendinosus (these 3 muscle have a common tendon—pes anserinus (goose’s foot))

popliteus

Semimembranosus

***LATERAL ROTATORS:***

Biceps femoris

***KNEE EXTENSOR GROUP:***

Quadriceps femoris muscle (rectus femoris – 2 joint, rest single joint muscle).

1. Write a comprehensive note on the femoral triangle.

***Answer:***

***Femoral triangle:***

The femoral triangle (or Scarpa's triangle) is an anatomical region of the upper third of the thigh. It is a subfascial space which appears as a triangular depression below the inguinal ligament when the thigh is flexed, abducted and laterally rotated.

***The femoral triangle is bounded:***

superiorly (also known as the base) by the inguinal ligament.

medially by the medial border of the adductor longus muscle. ...

laterally by the medial border of the sartorius muscle.

***Significance of femoral triangle:***

The femoral triangle is important as a number of vital structures pass through it, right under the skin. ... Nerve to pectineus - This nerve arises from the femoral nerve just above the inguinal ligament. It passes behind the femoral sheath to reach the anterior surface of the pectineus muscle.