

## Mid-Term Assignment

Course Title: **Human Physiology II**

**Rad 2<sup>nd</sup> semester section A**

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**Marks: 30**

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**Note:**

- Attempt all questions, all questions carry equal marks.
- Answer Briefly and to the point, avoid un-necessary details

**Q1:** (A) A post stroke patient come to clinic, during examination you found that patient is unable to speak nor understand, what you are talking (Global Aphasia), in such case which lobes of brain could be involved?

**ANS:-**

Post stroke patitens have difficulty in walking mostly problems with balance and have termor is caused by the damage in cereblum part of the brain.

Explain that lobes and write down its function

**(A)**

- **Global Aphsia can occur when there is damage in left hemisphere of the brain .if damage encompasses both wernicke's and broca's areas on the hemispheres, gglobel Aphia can occur in this case, all aspects of speech and language are affected patients can say a few words at most and understand only a few words and phrases. They usally cannot carry out commonds or name objects.**
- **The lobes located in the front and side of your brain, the frontal lobes and the temporal lobes are primarily involved in speech formations and understanding.**

**Broca's area:-**

- Broca's area is located in the front part of the left hemisphere of your brain. It is an important role in turning your ideas and thoughts into actual spoken words.

### **Wernicke's area:-**

\*Wernicke's area is mainly involved in the understanding and processing speech and written language. Wernicke's area was first discovered by Karl Wernicke in 1876. It is located in the temporal lobe just behind your ears. The temporal lobe is also the region where sound is processed.

### **(B)**

- Part of the brain responsible for the walking balance is cerebellum.

### **Cerebellum:-**

- The cerebellum is located behind the top part of the brain stem (where the spinal cord meets the brain) and is made of two hemispheres (halves).

### **Functions of the Cerebellum:-**

- Maintenance of the balance and posture. The cerebellum is important for making postural adjustment and posture to maintain balance. Through its input from vestibular receptors and proprioceptors, it modulates commands to motor neurons to compensate for shifts in body position or changes in load upon muscles. Patients with cerebral damage suffer balance disorder and they often develop stereotyped postural strategies to compensate for this problem (e.g., a wide-based)

### **Motor learning**

- The cerebellum is important for motor learning. The cerebellum plays a major role in adapting and fine-tuning motor programs to make accurate movement through a trial-and-error process (e.g. learning to hit a baseball).

### **Anatomy:-**

- The cerebellum consists of two hemispheres which are connected by the vermis, a narrow midline area. Like other structures in the central nervous system, the cerebellum consists of grey matter and white matter:

### **Grey matter :-**

- Located on the surface of the cerebellum. It is tightly folded, forming the cerebral cortex.

### **White matter:-**

- Located underneath the cerebral cortex. Embedded in the white matter are the four cerebellar nuclei (the dentate, emboliform, globose, and fastigi nuclei.)
- There are three ways that the cerebellum can be subdivided – anatomical lobes, zones and functional divisions.

### **Anatomical Lobes:-**

- There are three anatomical lobes that can be distinguished in the cerebellum; the anterior lobe, the posterior lobe and the flocculonodular lobes. These lobes are divided by two fissures – the primary fissure and posterolateral fissures.

### **Zones:-**

- There are three cerebellum zones. In the midline of the cerebellum is the vermis. Either side of the vermis is the intermediate zone. Lateral to the intermediate zone are the lateral hemispheres. There is no difference in gross structure between the lateral hemispheres and intermediate zones.
- Cognitive functions. Although the cerebellum is most understood in terms of its contributions to motor control, it is also involved in certain cognitive functions, such as language. Thus, like the basal ganglia, the cerebellum is historically considered as part of the motor system, but its functions extend beyond motor control in ways that are not yet well understood.

(B) A post stroke patient comes to clinic, during examination you found that patient has difficulty in walking including problem with balance and also has tremor. Which part of brain could be involved in this patient? Explain that part and write down its function.

**Q 2:** (A) During assessment of post stroke patient, you found that patient has sensory loss over skin of forehead, eye lids and nose as well as teeth of upper jaw, moreover also has motor loss in mylohyoid muscle and in anterior belly of digastric. Which cranial nerve is involved in this patient?

**ANS:-**

Cranial nerve III oculomotor nerve, V Trigeminal nerve and X Vagus nerve are involved.

Write down function and its different components.

### **Functions of the Glossopharyngeal nerve :**

#### **Function**

- There are a number of functions of the glossopharyngeal nerve. It controls muscles in the oral cavity and upper throats as well as part of the sense of taste and the production of saliva.

- Along with taste the glossopharyngeal nerve relays general sensation from the pharyngeal walls. The various functions of the glossopharyngeal nerve are that:
- It receives general sensory fibers (ventral trigeminothalamic tract) sensory from the tonsils the pharynx, the middle ear, and the posterior 1/3 of the tongue.
- It receives the special sensory fibers (taste) From the posterior 1/3 of the tongue..
- It received visceral sensory fibers from the carotid bodies, carotid sinus.
- It contributes to the pharyngeal plexus.

#### **Five Functional Components:-**

- The glossopharyngeal nerve consists of five components with distinct functions.

#### **Branchial motor (special visceral efferent)**

- Supplies the stylopharyngeus muscles.

#### **Visceral motor (general visceral efferent):**

- Provide parasympathetic innervation of the parotid gland.

#### **Visceral sensory (general visceral afferent)**

- Carries visceral sensory information from the carotid sinus and body.

#### **General sensory (general somatic afferent):**

- Provides general sensory information from the skin of the external ears, internal surface of the tympanic membrane upper pharynx and the posterior 1/3 of the tongue.

(B) Post stroke patient come to clinic, during assessment you found that patient have lost general and taste sensation in posterior 1/3 of tongue. Which cranial nerve involve?

Write down its function and components.

**ANS:-B) cranial nerve IX Glossopharyngeal nerve involves in function of 1/3 part of the tongue.**

#### **The Glossopharyngeal Nerve IX:**

- **The glossopharyngeal nerve (cranial nerve IX) serves many distinct functions including providing sensory innervation to various head and neck structure.**

#### **Structure:-**

The glossopharyngeal nerve is the ninth of 12 pairs of cranial nerves. It exits the brainstem out from the sides of the upper medulla, just rostral (closer to the nose) to the vagus nerve.

### **Glossopharyngeal nerve:**

- Image of head structures including the glossopharyngeal nerve.
- The motor division of the glossopharyngeal nerve is derived from the basal plate of the embryonic medulla oblongata, while the sensory division originates from the cranial neural crest.

**Q3:** (A) What is accommodation in eye and explain its relation with lens of eye?

**ANS:-** (A)

### **Accommodation in the Eye:-**

Accommodation is the process in which the eyes see objects at different distance and maintain clear images of the objects by the convergence and divergence of light.

- Structures glossopharyngeal Accommodation

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- kim Bengochea Kim Bengochea, Regis University, denver.

### **Accommodation:-**

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Accommodation is the process in which the eye see objects at different distances and maintain clear images of the objects by the convergence and divergence of light.

### **Lens :-**

- This is a transparent structures in the eye, it is biconvex in shape (both surfaces are shaped like the exterior of a circle). It is bordered anteriorly (in front) by a ring it forms with the posterior side of the iris. The lens is held by the suspensory ligament

and has a diameter of 10 mm and a night of a 4mm in an adult these measurement due to chnge in the lens structure during accommodation and aging.

### **Pupil:-**

- The pupil is located in the middle of the eyes, it is black in color and constrict to prevent light rays that have diverge from touching the rretina and causing blood vission

(B) How stimulus of light goes through eye ball and reach up to Brain? Explain in detail?

### **(B)**

- The path of light through the eye begins with the objects voved and how they produce, reflect are alter light in various ways. Whren your eyes reciveds light it begins a second journey through the eyes opticals parts that adjust and focus light to the nerves that carry image to your brain. Standings outdoora's. **For example**, a night seven maybe light by strength, light from passing cars and the moon. Light allows you to see the sources themselves and the items they illuminate.

### **Entering the Cornea:**

The first thing light encounters when it enters the eye is the cornea, a protective clearly covering over the pupil and Aris. The cornea bends the light and beings to form an image.

### **Pupil:**

#### **The Gatekeeper.**

- Light passes from the cornea to the pupil, the dark circle in the center of the aris which is the colored portion of the eye . the pupil regulates the amount of lights that will enter the inner eye based on environmental conditions: it dilates, growing Niger to receives more ligjt under dim lighting conditions, and shrinks and response to bright light. This responsebis quicker in young individuals and tends to slow with increasing age.

### **Through the Lens:**

From the pupil, light waves travels to the lens of the eye. The lens is a clear, flexible structure that focuses in upside-image down onto the retina. It is flexible so that it can focus images that are close are far away. Eye injuries, normwl variations in the eye and age can disorder the lens making it difficult to focuss on nearby or faraway objects – you see the objects, but details are hazy. Late in life, the lens can also become coulded and form characteristics tthat make imges seem hazy and dim.

### **Optic Nerve and Brain:**

- Ince the retina sens the image, it sends impulses to the opitics nrve at the back of the eye. The opitiv nerve then transmits them to special aareas in brain.which automatically flips the upside-diwn images so that it becomes upright again. Diseases or injuries can damage the optic nerve, resukting in vaying degrees of blindness.