

## Mid-Term Assignment

Course Title: **Human Physiology II**

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

**Instructor: Dr. M .Shahzeb khan (PT)**

**Student Name: Iazaz Ahmad**

**ID # 16604**

**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?**

**Explain that lobes and write down its function.**

**Ans: Part A**

- The patient we found who is unable to speak nor understand, at that condition the both Frontal and Trigeminal lobes are involved.

**Stroke:** Decreased blood flow due to the blockage of the vessels in the brain.

**Aspaghia:** Inability of person to talk.

**Global Aspaghia:**

- Global aspaghia is due to the occlusion of middle cerebral artery which affect the large portion of the artery.

**Brain lobes involved in condition:**

- The Frontal lobes and Temporal lobes are primarily involved in the speech formation and understanding.

**Explanation nd Fuctions of Lobes :**

- There is two types of lobes involved in such condition
  1. Frontal Lobe
  2. Temporal lobe

### **1: Frontal Lobe:**

- The frontal lobe is the largest of the four major lobes of the brain in mammals, and is located at the front of each hemisphere. It is separated from the parietal lobe by a groove between tissue called **central sulcus**, and from the temporal lobe by a deeper groove called **lateral sulcus**. The most anterior rounded part of the frontal lobe is known as the **frontal pole**.
- The Frontal lobe is covered by the **frontal cortex**. The frontal cortex includes the **premotor cortex**, and the **primary motor cortex**-cortical parts of the **motor cortex**. The front part of the frontal lobe is covered by the **prefrontal cortex**

### **Function:**

- It controls emotional expression problem solving, memory, language, judgement and Sexual behaviours

### **2.Temporal lobe:**

- It is one of the four major lobes of the cerebral cortex in the brain of mammals. The temporal lobe is located beneath the **lateral fissure** on both **cerebral hemispheres** of mammalian brain.
- The temporal lobe are involved in processing sensory input into derived meaning for the appropriate retention of visual memory, language comprehension, and emotion association.

### **Function:**

- It controls emotion, language and visual perception.

**Q:1 (B) A post stroke patient come to clinic, during examination you found that patient have difficulty in walking including problem with balance and also have tremor. Which part of brain could be involved in this patient? Explain that part and write down its function**

### **Part B:**

- Inability to walk and loss of balance and co-ordination is due to problem in the parts of the brain called Cerebellum and Vertibular system.

### **Explanation:**

- The cerebellum is Latin word which mean **Little brain**.
- It is a major feature of the hindbrain of all vertebrates. Although usually smaller than the cerebrum, in some animals.
- Cerebellum consist of two hemisphere right and left.

### **Function:**

- Cerebellum control the voluntary muscle activity.
- Responsible for walking and balancing of posture
- It play important role in motor control
- It may also be involved in some cognitive functions **such as**; Attention and language.

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

Write down function and its different component.

**Ans: (Part A)**

- The cranial nerve which is involved in that patient who have sensory lossover skin of forehead,eye lids and nose as well as teeth of upper jaw is the **Trigeminal nerve**.

**Components and Funtions of Trigeminal Nerve:**

- The trigeminal nerve consist of three components or branches;
  1. Ophthalmic nerve
  2. Maxillary nerve
  3. Mandibullar nerve

**• Ophthalmic nerve:**

- Ophthalmic nerve supply are sensory, which are from the forehead, eye-lids, cornea, cilliarly body Iris and to the lacrimal gland and conjunctiva.

**• Maxillary nerve:**

- Maxillary nerve control sensory supply of the maxillary bones, the cheeks, upper lip, upper gum and alveolar process eytc

**• Mandibullar nerve:**

- Mandibullar nerve consist of both sensory and motor supply,
- **Sensory supply** is to lower lip, chin, lower gum and lower alveolar process etc
- **Motor supply** is to the mylohyoid and anterior belly of diagastric muscle.

**Q:2(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: (PART B)**

- The general and taste sensation pf posterior 1/3 is control by **glossopharyngeal nerve**.
- The ninth cranial nerve (CN IX), is a mixed nerve that carries afferent sensory and efferent motor information is known as **Glossopharyngeal nerve**.

- The glossopharyngeal nerve carries sensory, efferent motor and parasympathetic fibers.
- It is noted as both sensory and motor, the **Sensory** division of glossopharyngeal nerve originates from **cranial neural crest**, while the motor division is derived from the basal plate of the **embryonic medulla oblongata**.

#### **Function and components:**

- Its branches consist of tympanic, tonsillar, stylopharyngeal, carotid sinus nerve, branches of the tongue, lingual branches, and a communicating branch to **cranial nerve X (Vagus nerve)**.
- **Function:**

There are a number of functions of the glossopharyngeal nerve:

- It receives general somatic sensory fibers from the **tonsils**, the **pharynx**, the **middle ear** and posterior 1/3 of the tongue.
- It receives special visceral sensory fibers (taste) from the posterior 1/2 of the tongue.
- It supplies parasympathetic fibers from the carotid gland via the otic ganglion.
- It supplies motor fibers to stylopharyngeus muscle, the only motor component of this cranial nerve.
- It contributes to the **pharyngeal plexus**.

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

**Ans:** The ability of eye to change its focus from distance to near object and near to distant object.

#### **Explanation:**

- Accommodation is the process by which the **vertebrate eye** changes optical power to maintain a clear image or focus on an object as its distance varies. In this, distances vary for individuals from far points- the maximum distance from the eye for which a clear image of an object can be seen, to the near point- the maximum distance for a clear image. Accommodation usually acts like a reflex, including as part of the accommodation-vergence reflex, but it can also be consciously controlled.
- Mammals, birds and reptiles vary the optical power by changing the form of elastic lens using the ciliary body—(in Human up to **15 dioptres**)
- Fish and amphibians vary power by changing distance between a rigid lens and retina with muscles.
- The young eye can change focus from distance to as near 6.5cm from the eye.

#### **Relation with lens of eye:**

- The process of accommodation is achieved by the lens changing its shape.
- Accommodation is the adjustment of optics of the eye to keep an object in focus on the retina as its distance from the eye varies.

**Q:3(B) How stimulus of light goes through eye ball and reach up to Brain? Explain in detail**

**Ans:**

- Stimulus of light goes through eye ball and reach upto brain through a special pathway called **Visual pathway**.
  - Light passes through the front of the eye (cornea) to the lens. The cornea and the lens help to focus the light rays onto the back of the eye (retina). The cells in the retina absorb and convert light to electrochemical impulses which are transferred along the optic nerve and then to the brain.
  - The path of light through the eye begins with the object viewed and how they produce reflect or alter light in various ways. When your eyes receive light, it begins second journey through the eye's optical parts that adjust and focus light to nerves and carries image to our brain. Standing outdoors
- **Example:** A night time may be lit by street light, light from passing cars and the moon. Light allows us to see the sources themselves and the items they illuminate.
- **Entering the cornea:** the first thing light encounters when it enters the cornea. A protective clear covering over the **pupil** and iris. The cornea bends the light and begins to form an image.

❖ **Visual pathway:**

- When light strikes the retina the stimulus goes into optic nerve, from there up to optic chiasm, and then into the optic tract, after this it passes into the lateral geniculate nucleus and then through optic radiation goes into **cortex** of the brain.

✓ **Sketch:**

Light > Retina > Optic nerve > Optic Chiasm > Optic Tract > Lateral geniculate nucleus > Optic Radiation > **Cortex of Brain**