Subject h10 Date No.

* We should know that the nervous system whether sensory or motor it doesn't include only peripheral part but also it contains center (nervous system) → part of sensory and center part of motor → may be present in the cerebral cortex in hypothalamus and in the spinal cord while the peripheral part include the receptor that is present in the body that carry the information through the sensory nerve fiber to the higher center

* The sensory system → Functionally speaking responsible carry information from (external + internal) to CNS

like → increase or decrease in the blood pressure and this will produce stimulation of sensory receptor and sending impulses to CNS

external means → change in temprture that may occur in the external environment

* sensation → will inform the brain about the changes in internal + external environment and accordingly the body will react voluntarly to this external+internal environment so that

Subject Date No.

if the stimulus is weak it will reflex activity and this reflex activity will response of changes in body

* Reflex → occurs at lower level like the spinal cord and since it occur in spinal cord it occur without orientation.

It occurs in:

A.N.S → - if there is increase in temperature of the environment then this will stimulate the thermoreceptor and sending the impulse to the Spinal cord and this will stimulate the ANS Specificly the sympathetic N.S and this will produce Stimulation of the sweat gland and Sweating will occur

- (↑ heart rate + ↑ blood pressure) if this occur ↓ heart rate ↓ B.pr then the decrease in the B.pr will stimulate the baroreceptor and baro receptor will trans the impulses to the brain stem and this produce Stimulation of the sympathetic N.S that will Cause increase heart rate + ↑ B.pr and correct them.

- (urination + defecation) this autonomic reflex that occur through the stimulation of parasympathetic N.S: if there is full of urinary bladder it will Send impulses to the spinal cord

and at the sacral region of spinal cord and this will produce reflex produce urination. Fulling of the colon will stimulate sensory nerve fibor sending impulse to sacral region and this will produce defecation.

Reaction of pupil → occur through external changes and occur through parasympathetic nervous system if someone go from a dark place when we have dilutation of the pupil to bright place this bright light will stimulate the optic nerve and this will produce reflex activity through the parasymplathetic N.S and constrection of the pupil will occur.

→ S.N.S → painful reflex; if there is painful stimulation for example heat of a candle that stimulate finger and this will send impulses to the spinal cord to the related signal of the spinal cord and this will produce contraction of the muscles and pulling the finger away from the site of the stimulation.

→ Tendon jerk → if we heat the patella tendon by tendon jerk this will stimulate the sensory nerve fiber and this will produce contraction of the quartor muscle through the stimulation that occur in the lumber segment of spinal cord

and this will produce movement of the lower limb

→ Blinking → occur as a result of any moving object in front of the eye this will stimulate the optic nerve and will send impulses to the eye laid muscle to produce contraction and closer of the eye according to the stimului

* Sensation

(Thalamus + cerebral cortex) will be able to produce orientation which means that describe partly the type of the stimulus whether it is painful stimulus or heating stimulus, cold.

→ Sensation will produce response from the body which occur in order to produce a reaction in the body according to the types of stimulus, we should differentiate between sensation and perception

perception	②	①
if you have meaningful interpretation + full appreciation it is called perception for e.g → if you hear a sound and you describe this sound as a music or it is a sound of male or female and understand the langunge	if there is painful stimulus to the hand and you can't decribe the character of this painful stimulation you will have sensation	it is partly decribe the stimulus for example if you hear a sound and you didn't understand what does this sound mean it is called → sensation

Subject Date No.

→ You should know the charecter of the sound of the specific car and when you hear this sound and you are completely orientation about the sound of this car you can even describe the type of car whether it is big car or small car it is normal sound of a car or abnormal sound of the car and this need memory, thinking and need higher Function. The Stimulus that reach higher center either produce sensation if there is incompletely describtion of stimulus or perception when there is complete describtio of the type of the stimulus

→ mechanism of the sensory nerve system

sensory Neuron → it send 2 branches one to higher center that in the second order neuron or inter connecting neuron and one which is periphral branch and this will pass to the different part of the body reach the receptor which is situated on the skin or on the deep tissue or on the visceral (splanchnic) organ, accordingly the sensory neuron contain 2 branches.

Subject Date No.

unicellular (uni axon) or bi axon both of them can be describe functionally as the neuron that collect the impulses from the periphry to the higher center and this occur by orthodromic direction of the response or the stimulus → the orthodromic direction → starting from the receptor in it will go to the cell body and from the cell body it will go to the higher center so both of them either [redacted] toward the cell body or away from cell body bothe of them are going to higher center and this is called the O.D

On the other hand motorneuron which have a star shape neuron cell body and contain many dendrit that is attach to many cell in the CNS and one single axon which is extended to the Skeletal muscle and the O.D always from the cell body toward to the Skeletal muscle where it do it's function so that this is presenting the difference between the sensory neuron and motor neuron

* Receptor classification (A) physiological classification
(1) According to energy and the mechanism of transduct

NOTEBOOK

Subject Date No.

according to energy → ① mechanoreceptor that response to mechanical energy ② thermal receptor that response to heat energy or thermal energy ③ nociptors ~~receptor~~ receptor and these response to damaging stimulus this could response to damaging heat damaging mechanical stimului damaging electrmechenic + chemical stimului + once the stimulus is very strong that will produce damage of the tissue it will produce stimulation of nociptor rather than thermoreceptor or mechanoreceptor ④ electro-receptors this are response to electromaghebic wave like eye which is responding to

⑤ chemo receptors these are responding to chemical stimului

⊕ mechanical deformation
even hearing receptors are related to mechanical because sound will produce streching of the sound receptor and this will produce increase in permapility of the membrave opening of the channel ion.

⊕ electromagnetic wave and this occur in eye in photoreceptor this electromagnetic waves will lead to permeability of the membrane and action potential will occur sending the impulse to higher center.

NOTEBOOK

Date No.

(B) structural calssification → depend on histological receptor

① Naked nerve ending → Simplest one which is formed of free nerve end sensory neuron

② corpuscles → more complex structure in which the free nerve ending is surrounded by capsule which is formed of fibrous tissue or elastic tissue

③ muscle → Complicated this are present in the muscle + Formed of intrafusal muscle Fiber and it is surrounded by membrane and they are containg motor fiber in addition of sensory nerve fiber ④ vestibular Contain labyrinth which is membranous labyrinth or bone labyrinth it is contain fluid inside the receptor and this is responsible for magerment of the equillabrum or moremenb of the body.

⑤ Special senses : most structure like eye which responsible for visun and this is formed of many tissue, layer, vitreous body humerous body it Contain the iris which formed of smooth muscle it contain many structure more complex than other type of receptor.

Subject Date No.

① Naked Nerve Ending → have nerve fiber with isn't cover by myelin sheath and it is distributed in the skin forming a specific receptor called Free nerve ending ⟹ this not specific to the type of the stimului for e.g Free nerve ending is a receptor for pain sensation and this the Principle Function of the F.N.E but there are another type of sensation which is carry by Free nerve ending on Naked like therm sensation or heat sensation it is carried by Ruffini's end organ and this is Formed of free N.E but they are forming meshwork in state of F.N.E distributed in the skin meshwork that serve as heat receptor

② Corpuscle → at its end it will be F.N.E but not contain myelin sheath but it is surrounded by Fiberous tissue and elastic tissue + connective tissue Forming → corpuscle like pacinian which is responsible for pressure + Meissner → tactile Sensation + End-bulb of Krause → cold all these 3 type are corpuscle contain fiberous tissue.

③ muscle spindle → present in the tendon of the muscle and responding to mechanical stimuli it contian intrafusal muscle fiber which of 2 type either bag or chain it contain many different types of N.F some of them are sensory nerve fiber + motor

④ vestibular → it is formed of 3 SCCs (canal) and contain bony labyrinth it contain fluid inside labyrinth and it also contain different structure.

⑤ special sense → most complex type of receptor like visun → which is in eye + (hearing receptor) → responding of the sound + test receptor → chemical receptor present in the tongue in oral cavity

*clinical classification

① superficial receptor → it include all the type of the receptor that responding to external stimuli like heat receptor, strech + pressure

② Deep : golgi organ which are responsible for mechanical movement in the body

③ viseeral receptor → in GIT or urinary system or any organ in the body, sense distention of the stomach or colon that produce this type of sensation + distention of the bladder →

Subject Date No.

that will produce urination

* properties of the receptors *

① specificity and adequate stimulus → each receptor specific for certin stimulus and responding to certin stimulus for e.g → we have pressure, toch, heat thermoreceptor, painful. the specific energy that produce stimulation is called as an adequate stimulus

* if we press in the eye strongly it may lead to appearance of bright spot in the eye this means that mechanical stimulus may produce excitabion of electromagnetic energy but this stimulus should be very high it is more than usual threshold that produce excitation of electromagnetic stimulus to produce a respond so that adequate stimulus represent the specific energy that produce respond in the specific receptor with minumm amount of energy.

* Transduction of sensory stimuli

* if we give energy to a receptor it will be converted into electrical stimulus →

Subject Date No.

2 type

this stimulus in the receptor is of either receptor potential or Generator potential

If we give very weak stimulus to a receptor it will produce local response called local potential If the stimulus is very strong this will produce an A.P and this will pass from receptor to the N.F so it is called (Generator potential.

When we talk about excitability of nerve fiber we said that if we give very weak stimulus less than threshold then it will produce local response and this we call it as cut electrotonic and electrotonic potential and if the stimulus is more than the threshold we said that it produce A.p in N.F

→ #In the receptor if we give weak stimulus it will produce receptor potential which is local changes in the receptor, it produce local changes in the receptor if it is less than the threshold and this L.C doesn't transmit to the N.F it occur. locally in receptor we can't record response in the N.F related to that receptor. If the stimulus is more than the threshold then it will produce an A.P and this is called (Generator Potential) that can pass from the receptor to the N.F So that the response of the receptor could be either local or propagated potential

NOTEBOOK

Subject Date No.

* Labelled line principle → describe that for each modal of sensation there is specific receptor specific N.F specific pathway and specific localized area in cerebral cortex

* localization of sensation

If we toch the area of skin specific area of the skin like the hand or the forearm or the sholdur it will send the impulses through the nerve fiber to specific area in the cerebral cortex and that area is responsible to sensation of the that area of skin but some time ~~as~~ → it may be affected by experience → if some one got chest pain → this may occur as a result of spasm of the muscle of the chest or might be from myocardic infection which present in the heart or due to inflamation of pleural tissue or the lung all of them feeled as a chest pain if some one got chest pain for the first time he will describe it as chest pain and then he go to the doctor → the doctor found that this pain is originated from the heart due to myo cardiac infaction the second time he will go to doctor and he will say that he got myocardial infaction or he got muscle spasm he has experience and understand whate character of pain

NOTEBOOK

Subject Date No.

Phantom syndrome → feeling of certain sensation in an amputated organ of the body this means that there are some pateint who got amputation of lowe limb from the knee and after period this patein may feel that there is pain sensation in the lowe limb which is not present at the time being in amputated previously.

* How can the subject feel that there is pain sensation in the big too and this isn't present in the body → this occur due to the pathway of that sensation there is specific nerve fiber which is previously responsible for each sensation in bigtoo

* Recruitment

* not all of perception we describe are correct → in phantom syndrome that is perception of sensation in an amputated limb or the perception could be affected by many factor according to the a previous experence and according to pathway and many character of the receptor