Neural Control and Coordination

Question1

Match List-I with List -II

	List-I		List-II
A.	Schwann cells	I	Neurotransmitter
B.	Synaptic knob	II	Cerebral cortex
C.	Bipolar neurons	III	Myelin sheath
D.	Multipolar neurons	IV	Retina

Choose the correct answer from the options given below:

[NEET 2024 Re]

Options:

A.

A-III, B-I, C-IV, D-II

B.

A-I, B-IV, C-II, D-III

C.

A-IV, B-III, C-II, D-I

D.

A-II, B-III, C-I, D-IV

Answer: A

Solution:

The correct answer is option (1) because

• The myelinated nerve fibres are enveloped with Schwann cells, which form a myelin sheath around the axon. So, (A) matches with (III)

• Synaptic knob possess synaptic vesicles containing chemicals called neurotransmitters. So, (B) matches with (I)

• Bipolar neurons have one axon and one dendrite, found in the retina of eye. So, (C) matches with (IV)

• Multipolar neurons have one axon and two or more dendrites, found in the cerebral cortex. So, (D) matches with (II)

Option (2), (3) and (4) are incorrect as they have mismatches for (A), (B), (C) and (D)

Question2

Match List I with List II :

	List-I		List-II
A.	Pons	I.	Provides additional space for Neurons, regulates posture and balance.
B.	Hypothalamus	II.	Controls respiration and gastric secretions.
C.	Medulla	III.	Connects different regions of the brain.
D.	Cerebellum	IV.	Neuro secretory cells

Choose the correct answer from the options given below :

[NEET 2024]

Options:

A.

A-II, B-III, C-I, D-IV

B.

A-III, B-IV, C-II, D-I

C.

A-I, B-III, C-II, D-IV

D.

A-II, B-I, C-III, D-IV

Answer: B

Solution:

The correct answer is option (2) as

A.	Pons	-	Part of hindbrain, it connects different regions of the brain.
B.	Hypothalamus	-	Also have neuro secretory cells which secrete hormones.
C.	Medulla	-	Part of hindbrain which controls respiration and gastricsecretions.
D.	Cerebellum	-	Part of hindbrain with convoluted surface which provides additional space for neurons, also regulates posture and balance.

Question3

Given below are two statements:
Statement I: The cerebral hemispheres are connected by nerve tract known as corpus callosum.
Statement II: The brain stem consists of the medulla oblongata, pons and cerebrum.

In the light of the above statements, choose the most appropriate answer from the options given below:

[NEET 2024]

Options:

A.

Both Statement I and Statement II are correct.

B.

Both Statement I and Statement II are incorrect.

C.

Statement I is correct but Statement II is incorrect.

D.

Statement I is incorrect but Statement II is correct.

Answer: C

Solution:

The correct answer is option (3) as statement I is correct but statement II is incorrect.

In human brain, a deep cleft divides the cerebrum longitudinally into two halves, which are termed as the left and right cerebral hemispheres. The cerebral hemispheres are connected by a tract of nerve fibres called corpus callosum.

Three major regions make up the brain stem i.e. mid brain, pons and medulla oblongata.

Cerebrum is a part of forebrain which does not form brain stem.

Options (1), (2) and (4) are incorrect.

Question4

Match List I with List II with respect to human eye.

List I	List II
A. Fovea	I. Visible coloured portion of eye that regulates diameter of pupil.
B. Iris	II. External layer of eye formed of dense connective tissue.
C. Blind spot	III. Point of greatest visual acuity or resolution.
D. Sclera	IV. Point where optic nerve leaves the eyeball and photoreceptor cells are absent.

Choose the correct answer from the options given below: [NEET 2023]

Options:

A.

A-IV, B-III, C-II, D-I

B.

A-I, B-IV, C-III, D-II

C.

A-II, B-I, C-III, D-IV

D.

A-III, B-I, C-IV, D-II

Answer: D

Solution:

- (i) Fovea is the point of greatest visual acuity or resolution.
- (ii) Iris is the visible coloured portion of the eye that regulates diameter of pupil.
- (iii) Blind spot is the point where optic nerve leaves the eye-ball and photoreceptor cells are absent.
- (iv) Sclera is the external layer of eye formed of dense connective tissue.

Question5

The parts of human brain that helps in regulation of sexual behaviour, expression of excitement, pleasure, rage, fear etc. are:

[NEET 2023]

Options:

A.

Corpora quadrigemina and hippocampus

B.

Brain stem and epithalamus

C.

Corpus callosum and thalamus

D.

Limbic system and hypothalamus

Answer: D

Solution:

Option (4) is the correct answer because limbic system along with hypothalamus regulate the sexual behaviour, expression of excitement, pleasure, rage, fear, etc.Option (1), (2) and (3) are not correct because corpora quadrigemina is a part of the midbrain and consists of four round swellings. Corpus callosum is a tract of nerve fibres that connects right and left cerebral hemispheres. Thalamus is a major coordinating centre in the forebrain for sensory and motor signalling. Midbrain, pons and medulla oblongata together form the brain stem.

Question6

Given below are two statements :

Statement I :-

The nose contains mucus - coated receptors which are specialised for receiving the sense of smell and are called olfactory receptors.

Statement II :-
Wall of the eye ball has three layers. The external layer is called choroid (dense connective tissue), middle layer is sclera (thin pigmented layer) and internal layer is retina (ganglion cells, bipolar cells and photoreceptor cells).

In the light of the above statements, choose the correct answer from the options given below:

[NEET 2023 mpr]

Options:

A.

Statement I is true but statement II is false

B.

Statement I is false but Statement II is true

C.

Both Statement I and Statement II are true

D.

Both Statement I and Statement II are false.

Answer: A

Solution:

Explanation :

Statement I : This is correct. The olfactory receptors are specialized cells in the nasal cavity that are responsible for the sense of smell. They are coated with mucus which helps to dissolve odor molecules, making them easier to detect.

Statement II : This statement is incorrect due to a mix-up in the description of the layers. The wall of the eyeball indeed has three layers but they are as follows:
1. The external layer is the sclera, which is a dense, tough white connective tissue that gives the eye its shape and protects the inner components.
2. The middle layer is the choroid, which is a thin pigmented layer that provides oxygen and nourishment to the outer layers of the retina.
3. The internal layer is the retina, which contains photoreceptor cells (rods and cones), bipolar cells, and ganglion cells, and is responsible for detecting light and transmitting these signals to the brain through the optic nerve.

Question7

Brainstem of human brain consists of :

[NEET 2023 mpr]

Options:

A.

Mid-brain, Pons and Medulla Oblongata

B.

Forebrain, Cerebellum and Pons

C.

Thalamus, Hypothalamus and Corpora quadrigemina

D.

Amygdala, Hippocampus and Corpus Callosum

Answer: A

Solution:

The brainstem is the posterior part of the brain that connects the cerebrum and cerebellum with the spinal cord. It consists of three major parts :

Midbrain (Mesencephalon) : The most superior portion of the brainstem. It contains the cerebral peduncles, which are nerve tracts that connect the cerebrum to the pons and medulla. The midbrain is involved in functions such as vision, hearing, eye movement, and body movement.

Pons : The middle portion of the brainstem located between the midbrain and the medulla oblongata. It is involved in the regulation of breathing, communication between different parts of the brain, and sensations such as hearing, taste, and balance.

Medulla Oblongata : The most inferior portion of the brainstem. It is continuous with the spinal cord at the foramen magnum of the skull. The medulla oblongata controls autonomic functions such as breathing, heart rate, and blood pressure.

Therefore, the correct answer is Option A : Mid-brain, Pons, and Medulla Oblongata.

Question8

Identify the region of human brain which has pneumotaxic centre that alters respiratory rate by reducing the duration of inspiration. [NEET Re-2022]

Options:

A. Cerebrum

B. Medulla

C. Pons

D. Thalamus

Answer: C

Solution:

Pneumotaxic centre present in the pons region of the brain can moderate the functions of the respiratory rhythm

centre. Neural signal from this centre can reduce the duration of inspiration and thereby alter the respiratory rate.

Question9

List – I	List – 11
(a) Multipolar	(i) Somatic neural neuron system
(b) Bipolar neuron	(ii) Cerebral cortex
(c) Myelinated	(iii) Retina of Eye nerve fibre
(d) Unmyelinated	(iv) Spinal nervesnerve fibre

[NEET Re-2022]

Options:

A. (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)

B. (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

C. (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)

D. (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)

Answer: A

Solution:

Solution:

Mutipolar Neurons (with one axon and two or more dendrites ; found in the cerebral cortex)

Bipolar (with one axon and one dendrite , found in the retina of eye)

Myelinated nerve fibres - found in spinal and cranial nerves

Unmyelinated nerve fibres - found in autonomous and the somatic neural system

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Question10

Select the incorrect statement regarding synapses : [NEET-2022]

Options:

A. The membranes of presynaptic and postsynaptic neurons are in close proximity in an

electrical synapse.

B. Electrical current can flow directly from one neuron into the other across the electrical synapse.

C. Chemical synapses use neurotransmitters

D. Impulse transmission across a chemical synapse is always faster than that across an electrical synapse.

Answer: D

Solution:

Solution:

Option (4) is the correct answer as impulse transmission across an electrical synapse is always faster than that across a chemical synapse.

→ Chemical synapses use chemicals for transmission which are known as neurotransmitters.

→ The membranes of presynaptic and postsynaptic neurons are in close proximity in an electrical synapse.

→ In an electrical synapse, the transmission of the impulse occurs in the form of an electrical current from one neuron to the next neuron

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Question11

Match the following columns and select the correct option.

Column-I	Column-II
(a) Organ of Corti	(i) Connects middle ear and pharynx
(b) Cochlea	(ii) Coiled part of the labyrinth
(c) Eustachian tube	(iii) Attached to the oval window
(d) Stapes	(iv) Located on the basilar membrane

[2020]

Options:

A. (A) (B) (C) (D)
(iii) (i) (iv) (ii)

B. (A) (B) (C) (D)
(iv) (ii) (i) (iii)

C. (A) (B) (C) (D)
(i) (ii) (iv) (iii)

D.
(A)	(B)	(C)	(D)
(ii)	(iii)	(i)	(iv)

Answer: B

Solution:

Option (b) is correct because organ of Corti is located on the basilar membrane, thus (a) in column-I matches with (iv) in column-II. Cochlea, so (b) matches with (ii) in. The coiled portion of the labyrinth is called column II.

These three bones, often referred to as the ossicles, serve a crucial role in moving sound waves from your outer ear to your inner ear. Without your ossicles, you wouldn't be able to hear as you do now. All sound starts as sound waves. When a sound wave reaches your ear, it pushes up against the eardrum as vibrations.

Question12

Which of the following statements is not correct ? [2019]

Options:

A. In the knee-jerk reflex, stimulus is the stretching of muscle and response is its contraction.

B. An action potential in an axon does not move backward because the segment behind is in a refractory phase.

C. Depolarisation of hair cells of cochlea results in the opening of the mechanically gated potassium-ion channels.

D. Rods are very sensitive and contribute to daylight vision.

Answer: D

Solution:

Solution:
Rods and cones are two types of photoreceptor in human retina. Cones are very sensitive to operate in day light. They are capable of colour vision and responsible for high spatial acuity. Rods are very sensitive in dim light and do not mediate colour vision and have a low spatial acuity.

Question13

Which of the following structures or regions is incorrectly paired with its functions? [2018]

Options:

A. Medulla oblongata : controls respiration and cardiovascular reflexes.

B. Limbic system : consists of fibre tracts that interconnect different regions of brain; controls movement.

C. Corpus callosum : band of fibers connecting left and right cerebral hemispheres.

D. Hypothalamus : production of releasing hormones and regulation of temperature, hunger and thirst.

Answer: B

Solution:

Solution:
The limbic system (emotional motor system) is responsible for the experience and expression of emotion but not movement. It is located in the core of the brain and includes the amygdala, hippocampus and hypothalamus.

Question14

Nissl bodies are mainly composed of [2018]

Options:

A. Proteins and lipids

B. DNA and RNA

C. Free ribosomes and RER

D. Nucleic acids and SER

Answer: C

Solution:

Solution:
Nissl bodies are present in the soma or cell body of a neuron. When observed under electron microscope, they appear to be composed of rough endoplasmic reticulum (RER) and free ribosomes hence help in protein synthesis.

Question15

The transparent lens in the human eye is held in its place by [2018]

Options:

A. ligaments attached to the ciliary body

B. ligaments attached to the iris

C. smooth muscles attached to the ciliary body

D. smooth muscles attached to the iris

Answer: A

Solution:

The muscles that move the eyeball are attached to the sclera. Suspensory ligament of lens - a series of fibers that connect the ciliary body of the eye with the lens, holding it in place.

Question16

Myelin sheath is produced by (NEET 2017)

Options:

A. astrocytes and Schwann cells

B. oligodendrocytes and osteoclasts

C. osteoclasts and astrocytes

D. Schwann cells and oligodendrocytes

Answer: D

Solution:

Solution:
(d) : Schwann cells and oligodendrocytes form myelin sheath around the axon. Myelin sheath serves as an insulating layer, preventing loss of energy of the nerve impulse during its passage along the fibre.

Question17

Receptor sites for neurotransmitters are present on (NEET 2017)

Options:

A. pre-synaptic membrane

B. tips of axons

C. post-synaptic membrane

D. membranes of synaptic vesicles

Answer: C

Solution:

(c) : Neurotransmitter is a chemical substance responsible for transmission of nerve impulse across synapse. It is released by synaptic vesicle into the synaptic cleft. Neurotransmitter binds with protein receptor molecule present on post synaptic membrane causing its depolarisation and generation of action potential.

Question18

Good vision depends on adequate intake of carotene rich food. Select the best option from the following statements.
(1) Vitamin A derivatives are formed from carotene.
(2) The photopigments are embedded in the membrane discs of the inner segment.
(3) Retinal is a derivative of vitamin A.
(4) Retinal is a light absorbing part of all the visual photopigments.
(NEET 2017)

Options:

A. (1),(3) and (4)

B. (1) and (3)

C. (2),(3) and (4)

D. (1) and (2)

Answer: A

Solution:

Solution:
(a) Carotene is the source of retinal which is involved in formation of rhodopsin of rod cells. Retinal, a derivative of vitamin A, is the light absorbing part of all visual photopigments. Photopigments are occur entirely on the surface of membrane disc.

Question19

Choose the correct statement.
(NEET II 2016)

Options:

A. Nociceptors respond to changes in pressure.

B. Meissner's corpuscles are thermoreceptors.

C. Photoreceptors in the human eye are depolarised during darkness and become hyperpolarised in response to the light stimulus.

D. Receptors do not produce graded potentials.

Answer: C

Solution:

Solution:
(c) : Photoreceptors in human eye are unique because they are only type of sensory cells that are relatively depolarised (about -35 mV) when it is at rest (i.e., in the dark), and hyperpolarised (to about 70 mV) in response to adequate light stimulus. Nociceptors respond to potentially damaging stimuli that result in pain. Meissner's corpuscles are a type of mechanoreceptor, responsible for touch sensitivity. Receptors generally produce graded potentials called receptor potentials.

Question20

Photosensitive compound in human eye is made up of (NEET I 2016)

Options:

A. opsin and retinol

B. transducin and retinene

C. guanosine and retinol

D. opsin and retinal

Answer: D

Solution:

(d) : The rods contain a photosensitive pigment called the rhodopsin. Rhodopsin is composed of opsin and retinene. The opsin is a protein and is called scotopsin in rhodopsin. The retinene is an aldehyde of vitamin A and is called retinal.

Question21

Destruction of the anterior horn cells of the spinal cord would result in loss of (2015)

Options:

A. commissural impulses

B. integrating impulses

C. sensory impulses

D. voluntary motor impulses

Answer: D

Solution:

(d) : The anterior horns of spinal cord contains cells with fibres that form the anterior (motor) root end and are essential for the voluntary and reflex activity of muscles they innervate. If the anterior horn motor cells are destroyed, the nerves cannot regenerate and muscles are never useful again.

Question22

In mammalian eye, the 'fovea' is the center of the visual field, where (2015)

Options:

A. only rods are present

B. more rods than cones are found

C. migh density of cones occur, but has no rods

D. the optic nerve leaves the eye

Answer: C

Solution:

Solution:
(c) : A small oval, yellowish area of the retina lying exactly opposite the centre of the cornea is named the macula lutea or yellow spot which has at its middle a shallow depression, the fovea centralis. The fovea centralis has cone cells only. It is devoid of rods and blood vessels. The fovea centralis is the place of most distinct vision.

Question23

A gymnast is able to balance his body upside down even in the total darkness because of (2015 Cancelled)

Options:

A. tectorial membrane

B. organ of corti

C. cochlea

D. vestibular apparatus

Answer: D

Solution:

Solution:
(d) : Vestibular apparatus is a part of inner ear which is located above the cochlea. It consists of three semicircular canals, which detect movements of the head, and the utriculus and sacculus which detect the position of head. It does not play any role in hearing, but is responsible for maintaining the balance of the body and posture.

Question24

Which of the following regions of the brain is incorrectly paired with its function?
(2015 Cancelled)

Options:

A. Corpus callosum - communication between the left and right cerebral cortices

B. Cerebrum - calculation and contemplation

C. Medulla oblongata - homeostatic control

D. Cerebellum - language comprehension

Answer: D

Solution:

Solution:
(d) : Language comprehension is a function of cerebrum. Cerebellum coordinates and controls rapid muscular activities such as running, typing etc. Although it does not initiate such voluntary movements, but it is an important centre for coordinating movements and for controlling posture and balance. Cerebellum's function is almost exclusively motor; but it is also implicated in some forms of learning.

Question25

Injury localized to the hypothalamus would most likely disrupt
(2014)

Options:

A. short - term memory

B. co− ordination during locomotion

C. executive functions, such as decision making

D. regulation of body temperature

Answer: D

Solution:

(d) : Hypothalamus lies at the base of the thalamus. It provides anatomical connection between the nervous and endocrine systems by its relationship to the pituitary gland. Hypothalamus is thermoregulatory centre. Hence, it is called "thermostat" of the body. It keeps body temperature at roughly 37˚C by means of a complex thermostat system. Any localised injury to hypothalamus will, hence, disrupt regulation of body temperature.

Question26

Which one of the following statements is not correct? (2014)

Options:

A. Retinal is the light absorbing portion of visual photo pigments.

B. In retina the rods have the photopigment rhodopsin while cones have three different photopigments.

C. Retinal is a derivative of vitamin C.

D. Rhodopsin is the purplish red protein present in rods only

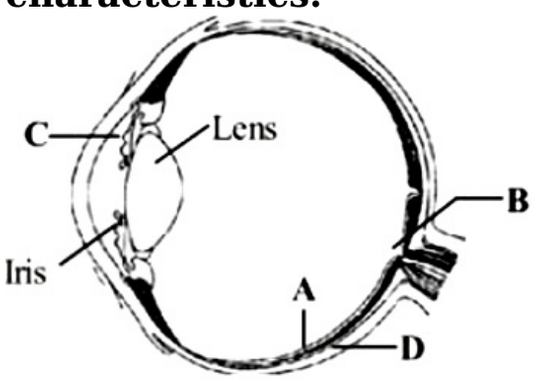
Answer: C

Solution:

Solution:
(c) : Retinal pigment is an aldehyde of vitamin A

Question27

Parts A, B, C and D of the human eye are shown in the diagram. Select the option which gives correct identification along with its functions/ characteristics.



(NEET 2013)

Options:

A. C-Aqueous chamber-Reflects the light which does not pass through the lens.

B. D - Choroid - Its anterior part forms ciliary body.

C. A - Retina - Contains photoreceptors i.e., rods and cones.

D. B - Blind spot-Has only a few rods and cones.

Answer: C

Solution:

Solution:
(c) : In the given figure, A is retina which is the innermost layer, containing photoreceptors rods and cones. B is blind spot. Optic nerves pierce through retina at blind spot. It has no visual cells. C is aqueous humor. It nourishes cornea and lens both of which are avascular. D is sclera. It is the outermost covering and maintains shape of eyeball. It also protects inner layers of the eye.

Question28

The most abundant intracellular cation is (NEET 2013)

Options:

A. H^+

B. K^+

C. Na^+

D. Ca^{++}

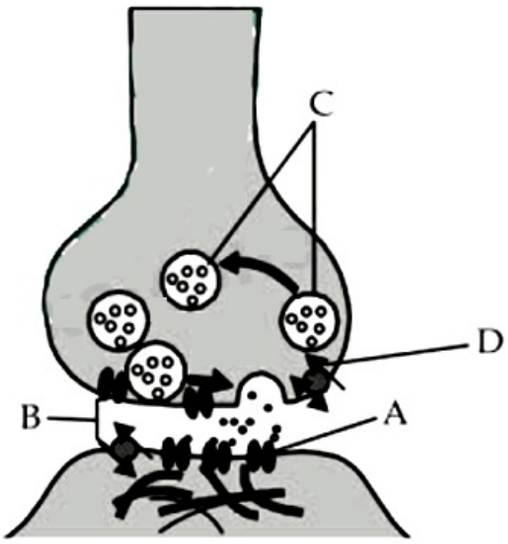
Answer: B

Solution:

Solution:
(b) : K^+ ions predominate in the intracellular fluid whereas Na^+ ions predominate in extracellular fluid.

Question29

A diagram showing axon terminal and synapse is given. Identify correctly at least two of A – D



(NEET 2013)

Options:

A. A - Neurotransmitter, B - Synaptic cleft

B. C - Neurotransmitter, D − Ca^{++}

C. A - Receptor, C - Synaptic vesicles

D. B - Synaptic connection, D − K^{+}

Answer: C

Solution:

Solution:
(d) A-Receptor, C-Synaptic vesicles B is synaptic cleft. A synapse is formed by the membranes of a synaptic neuron and post synaptic neuron, which may or may not separated by a gap called synaptic cleft. It is filled by fluid called neurotransmitter which are involved in transmission of impulse at these synapses.

Question30

The figure shows an axon terminal and synapse. Select the option giving correct identification of labels A-D.
(KN NEET 2013)

Options:

A. A-Action potential, C-Neurotransmitter

B. B-Neurotransmitter, D- Receptor capsules

C. C-Receptor, D-Synaptic vesicles

D. A-Axon terminal, B- Serotonin complex

Answer: C

Solution:

A - Action potential
B - Neurotransmitter
C - Receptor
D - Synaptic vesicles

Question31

A sagittal section of human brain is shown here. Identify at least two labels from A-D.
(KN NEET 2013)

Options:

A. C-Mid brain, D-Cerebellum

B. A-Cerebrum, C-Pons

C. B-Corpus callosum, D-Medulla

D. A-Cerebral hemispheres, B-Cerebellum

Answer: B

Solution:

Solution:
(c) Cerebrum is the first and most developed part of fore brain. It makes 2/3 part of total brain. Pons is a small spherical projection, which is situated below the midbrain and upper side of the medulla oblongata. It acts as a relay centre among different parts of brain. B and D are thalamus and spinal cord respectively.

Question32

The human hind brain comprises three parts, one of which is
(2012)

Options:

A. spinal cord

B. corpus callosum

C. cerebellum

D. hypothalamus

Answer: C

Solution:

(c) : Brain is the anterior most part of central nervous system. Human brain can be divided into three parts: forebrain, midbrain and hindbrain. Human hindbrain comprises pons, cerebellum and medulla (also called the medulla oblongata).

Question33

Which part of the human ear plays no role in hearing as such but is otherwise very much required?
(2012)

Options:

A. Eustachian tube

B. Organ of Corti

C. Vestibular apparatus

D. Ear ossicles

Answer: C

Solution:

Solution:
(c) : Vestibular apparatus is a part of inner ear which is located above the cochlea. It consists of three semicircular canals, which detect movements of the head, and the utriculus and sacculus which detect the position of head. It does not play any role in hearing but is responsible for maintaining the balance of the body and posture, thus necessary.

Question34

When a neuron is in resting state i.e., not conducting any impulse, the axonal membrane is
(2011)

Options:

A. comparatively more permeable to Na^+ ions and nearly impermeable to K^+ ions

B. equally permeable to both Na^+ and K^+ ions

C. impermeable to both Na^+ and K^+ ions

D. comparatively more permeable to K^+ ions and nearly impermeable to Na^+ ions.

Answer: D

Solution:

(d) : When a neuron is not conducting any impulse, i.e., resting, the axonal membrane is comparatively more permeable to potassium ions (K^+) and nearly impermeable to sodium ions (Na^+).

Question35

The nerve centres which control the body temperature and the urge for eating are contained in
(2010)

Options:

A. hypothalamus

B. pons

C. cerebellum

D. thalamus

Answer: A

Solution:

Solution:
(a) : Hypothalamus is the region of the forebrain in the floor of the third ventricle, linked with the thalamus above and the pituitary gland below. It contains several important centres controlling body temperature, thirst, hunger, and eating, water balance, and sexual function. It is also closely connected with emotional activity and sleep and functions as a centre for the integration of hormonal and autonomic nervous activity through its control of the pituitary secretions.

Question36

Select the answer with correct matching of the structure, its location and function.

	Structure	Location	Function
(a)	Eustachian tube	Anterior part of internal ear	Equalizes air pressure on either sides of tympanic membrane
(b)	Cerebellum	Mid brain	Controls respiration and gastric secretions
(c)	Hypothal-amus	Fore brain	Controls body temperature, urge for eating and drinking
(d)	Blind spot	Near the place where optic nerve leaves the eye	Rods and cones are present but inactive here

(2010)

Options:

A. (a)

B. (b)

C. (c)

D. (d)

Answer: C

Solution:

Solution:
(c) : Hypothalamus is the region of the forebrain in the floor of the third ventricle, linked with the thalamus above and the pituitary gland below. It contains several important centres controlling body temperature, thirst, hunger, and eating, water balance, and sexual function. It is also closely connected with emotional activity and sleep and functions as a centre for the integration of hormonal and autonomic nervous activity through its control of the pituitary secretions.

Question37

Alzheimer's disease in humans is associated with the deficiency of (2009)

Options:

A. glutamic acid

B. acetylcholine

C. gamma aminobutyric acid (GABA)

D. dopamine

Answer: B

Solution:

Solution:
(b) Alzheimer disease in humans is associated with the deficiency of acetylcholine. Acetylcholine is the neurotransmitter produced by neurons referred to as cholinergic neurons. Acetylcholine plays a role in skeletal muscle movement, as well as in the regulation of smooth muscle and cardiac muscle. Acetylcholine is synthesised from choline and acetyl coenzyme-A through the action of the enzyme choline acetyl transferase and becomes packaged into membrane-bound vesicles.

Question38

Which part of human brain is concerned with the regulation of body temperature?
(2009)

Options:

A. Cerebellum

B. Cerebrum

C. Hypothalamus

D. Medulla oblongata

Answer: C

Solution:

Solution:
(c) : Hypothalamus is the thermoregulatory center of the body. It keeps body temperature at $37^{\circ}C$ by means of a complex thermostat system.

Question39

Cornea transplant in humans is almost never rejected. This is because (2008)

Options:

A. it is composed of enucleated cells

B. it is a non-living layer

C. its cells are least penetrable by bacteria

D. it has no blood supply

Answer: D

Solution:

Solution:
(d) : Cornea is a transparent portion that forms the anterior one-sixth of the eye ball. The cornea admits and helps to focus light waves as they enter the eye. The cornea is avascular (i.e., has no blood supply). This part of eye absorbs oxygen from the air. The cornea was one of the first organs to be successfully transplanted because it lacks blood vessels.

Question40

During the propagation of a nerve impulse, the action potential results from the movement of (2008)

Options:

A. K^+ ions from intracellular fluid to extracellular fluid

B. Na^+ ions from extracellular fluid to intracelluar fluid

C. K^+ ions from extracellular fluid to extracellular fluid

D. Na^+ ions from intracellular fluid to extracellular fluid

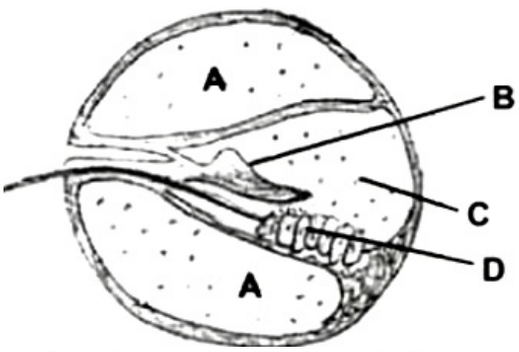
Answer: B

Solution:

(b) : Action potential is the change in electrical potential that occurs across a plasma membrane during the passage of a nerve impulse. As an impulse travels in a wavelike manner along the axon of a nerve, it causes a localized and transient switch in electric potential across the membrane from $-60mV$ (millivolts; the resting potential) to $+45mV$. It is due to the fact that the sodium channels open and the potassium channels remain closed. As a result, sodium channels permit the influx of Na^+ by diffusion from extracellular fluid to intracellular fluid.

Question41

Given below is a diagrammatic cross section of a single loop of human cochlea.



Which one of the following options correctly represents the names of three different parts?
(2008)

Options:

A. D : Sensory hair cells, A: Endolymph B: Tectorial membrane.

B. A : Perilymph, B : Tectorial membrane, C:Endolymph

C. B: Tectorial membrane, C : Perilymph, D:secretory cells

D. C : Endolymph, D : Sensory hair cells, A :Serum

Answer: B

Solution:

(b) : A - Perilymph
B - Tectorial membrane
C - Endolymph
D - Sensory hair cells

Question42

Which one of the following is the correct difference between rod cells and cone cells of Our retina?

		Rod cells	Cone cells
(a)	Overall function	Vision in poor light	Colour vision and detailed vision in bright light
(b)	Distribution	More concentrated in centre of retina	Evenly distributed all over retina
(c)	Visual acuity	High	Low
(d)	Visual pigment contained	Iodopsion	Rhodopsin

(2008)

Options:

A. (a)

B. (b)

C. (c)

D. (d)

Answer: A

Solution:

Solution:
(a) : Rod cell is a type of light-sensitive receptor cell present in the retina of yertebrates. Rods contain the pigment rhodopsin and are essential for vision in dim light. They are not evenly distributed on the retina, being absent in the fovea and occupying all of the retinal margin, Cone cell is a type of light-sensitive receptor cell, found in the retina of all diurnal vertebrates. Cones are specialized to transmit information about colour and are responsible for the visual acuity of the eye. They function best in bright light. They contain pigment iodopsin. They are not evenly distributed on the retina.

Question43

During the transmission of nerve impulse through a nerve fibre, the potential on the inner side of the plasma membrane has which type of electric change?
(2007)

Options:

A. First positive, then negative and continue to be negative

B. First negative, then positive and continue to be positive

C. First positive, then negative and again back to positive

D. First negative, then positive and again back to negative

Answer: D

Solution:

During the transmission of nerve impulse through a nerve fibre, the potential on the inner side of the plasma membrane has first negative charge, due to the high concentration of potassium ions inside high concentration of sodium outside. This state is known as resting phase and the potential is known as rest potential. The nerve cells are stimulated by nerve signals the voltage-gated sodium channels reverse the membrane polarity which makes the inner side of the membrane positive while outer turns negative. The potential generated at this phase is known as the action potential. As the action potential reaches its maximum value it again causes the reversal of membrane potential which by closing the sodium channels and opening the potassium channels. This state of the neuron is known as repolarization.

Question44

Bowman's glands are located in the (2007)

Options:

A. Anterior pituitary

B. Female reproductive system of cockroach

C. Olfactory epithelium of our nose

D. Proximal end of uriniferous tubules

Answer: C

Solution:

Solution:
(c) : Bowman's gland, also called olfactory gland is any of the branched tubuloalveolar glands situated in the mucous membrane of the olfactory region of the nasal cavity that produce mucus to moisten the olfactory epithelium and dissolve odour-containing gases.

Question45

Bowman's glands are found in (2006)

Options:

A. juxtamedullary nephrons

B. olfactory epithelium

C. external auditory canal

D. cortical nephrons only

Answer: B

Solution:

(b) : Bowman's gland, also called olfactory gland is any of the branched tubuloalveolar glands situated in the mucous membrane of the olfactory region of the nasal cavity that produce mucus to moisten the olfactory epithelium and dissolve odour-containing gases.

Question46

Which one of the following does not act as a neurotransmitter? (2006)

Options:

A. Cortisone

B. Acetylcholine

C. Epinephrine

D. Norepinephrine

Answer: A

Solution:

Solution:
(a) : Neurotransmitters are chemicals that are used to relay, amplify and modulate electrical signals between a neuron and another cell. Substances that act as neurotransmitters can be categorized into three major groups: (1) amino acids (primarily glutamic acid, GABA, aspartic acid and glycine), (2) peptides (vasopressin, somatostatin, neurotensin, etc.), and (3) monoamines (norepinephrine, dopamine and serotonin) plus acetylcholine. Cortisone is a glucocorticoid steroid hormone, produced by the adrenal glands and has anti-inflammatory and immune-system suppressing properties.

Question47

Which one of the following is the example of the action of the autonomous nervous system? (2005)

Options:

A. Swallowing of food

B. Pupillary reflex

C. Peristalsis of the intestine

D. Knee-jerk response

Answer: C

Solution:

(c) : Options (a), (b) and (d) are reflex actions. Autonomic nervous system is involved in peristalsis of intestine which is effected through mysentric plexus. Sympathetic fibres decrease peristaltic movements while parasympathetic fibres increase these movements.

Question48

In a man, abducens nerve is injured. Which one of the following functions will be affected?
(2005)

Options:

A. Movement of the eyeball

B. Movement of the tongue

C. Swallowing

D. Movement of the neck

Answer: A

Solution:

Solution:
(a) : Abducens is the sixth cranial nerve which innervates the external rectus muscle of the eye ball. It is responsible for turning the eye outwards. Movement of the tongue is controlled by the hypoglossal nerve. Neck movements is controlled by the facial nerve. Swallowing is by glossopharyngeal.

Question49

Parkinson's disease (characterized by tremors and progressive rigidity of limbs) is caused by degeneration of brain neurons that are involved in movement control and make use of neurotransmitter
(2005)

Options:

A. acetylcholine

B. norepinephrine

C. dopamine

D. GABA

Answer: C

Solution:

(c) : Parkinsonism is caused by degenerations of neurons in Substantia nigra tract which are essentially dopaminergic. This striatum controls muscle tones and coordinates movements. An imbalance is caused by deficiency of dopamine (an inhibitory neurotransmitter) vis- a -vis.

Question50

In the resting state of the neural membrane, diffusion due to concentration gradients, if allowed, would drive (2004)

Options:

A. K^+ into the cell

B. K^+ and Na^+ out of the cell

C. Na^+ into the cell

D. Na^+ out of the cell.

Answer: C

Solution:

Solution:
(c) : In the resting nerve fibre, in the external medium (tissue fluid), sodium ions (Na^+) predominate, whereas within the fibre (intracellular fluid) potassium ions (K^+) predominate. Due to different concentrations of ions on the two sides of the membrane, sodium ions tend to passively diffuse into the nerve fibre and potassium ions tend to diffuse out of the nerve fibre down their electrochemical gradients. The membrane of a resting nerve fibre is, however, more permeable to potassium than to sodium. Because of this selective permeability of the membrane, potassium leaves the nerve fibre faster than sodium enters it. This makes the membrane of the resting nerve fibre polarized, extracellular fluid outside it being electropositive (positively charged) with respect to the cell contents inside it.

Question51

Injury to vagus nerve in humans is not likely to affect (2004)

Options:

A. tongue movements

B. gastrointestinal movements

C. pancreatic secretion

D. cardiac movements

Answer: A

Solution:

Solution:
(a) : Vagus nerve arises from the side of medulla oblongata. It innervates the larynx, trachea, oesophagus, stomach, lungs, heart and intestines. It is a mixed nerve. It controls the visceral sensations and visceral movements, i.e., heart beat, respiratory movements, peristalsis, sound production, etc. Movement of the tongue is controlled by hypoglossal nerve as it innervates the muscles of the tongue.

Question52

What used to be described as Nissl's granules in a nerve cell are now identified as
(2003)

Options:

A. cell metabolites

B. fat granules

C. ribosomes

D. mitochondria.

Answer: C

Solution:

Solution:
(c) : Cell body of a nerve cell contains basophilic granules called Nissl's granules. These granules appear to be cisternae of rough endoplasmic reticulum with numerous attached and free ribosomes. They probably synthesize proteins for the cell.

Question53

Which of the following statement is correct for node of Ranvier of nerve?
(2002)

Options:

A. Neurilemma is discontinuous

B. Myelin sheath is discontinuous

C. Both neurilemma and myelin sheath are discontinuous

D. Covered by myelin sheath

Answer: B

Solution:

Solution:
(b) : At the level of node of Ranvier the myelin sheath is discontinuous but not the neurilemma lining. Actually myelin sheath is an integral part of Schwann cell - which form a continuous neurilemmal covering. Each Schwann cell wrap-around the neurite to form concentric layers of plasma membrane. But at the level of junction between two Schwann cells myelin cannot be formed and thus a gap appears.

Question54

When we migrate from dark to light, we fail to see for sometime but after a time visibility becomes normal. It is example of (2001)

Options:

A. accomodation

B. adaptation

C. mutation

D. photoperiodism.

Answer: B

Solution:

Solution:
(b) : The rod cells of eye contain a purplish pigment called visual purple, or rhodopsin. They function in dim light and at night. Bright light splits rhodopsin into a lipoprotein scotopsin and a carotenoid pigment retinene. The splitting of rhodopsin depolarizes the rod cell. In the dark, rhodopsin is resynthesized from scotopsin and retinene. This process is called "dark adaptation." It makes the rods functional. It takes some time for rhodopsin to be reformed. This is why on entering a dark room at daytime or on coming out of a well lighted room at night, we feel blind for a while. When we go from darkness into bright light, we feel difficulty in seeing properly for a moment till rhodopsin is bleached and cones become functional.

Question55

Which of the following statements is the characteristics of human cornea? (2001)

Options:

A. It is secreted by conjuctiva and glandular layer.

B. It is a lacrimal gland which secrete tears.

C. Blood circulation is absent in cornea.

D. In old age it becomes the cause of cataract

Answer: C

Solution:

Solution:
(c) : Cornea forms the anterior one-sixth of the fibrous coat. It is transparent, circular and fully visible from in front. It is composed of a peculiar variety of connective tissue covered externally by stratified nonkeratinized squamous epithelium and internally by simple squamous epithelium. It lacks blood vessels. It is nourished by lymph from adjacent area.

Question56

Depolarization of axolema during nerve conduction takes place because of
(2000)

Options:

A. equal amount of Na^+ and K^+ move out across axolema

B. Na^+ move inside and K^+ move more outside.

C. more Na^+ outside

D. none of these

Answer: B

Solution:

Solution:
(b) : Depolarization of a nerve cell membrane occurs during the passage of an action potential along the axon where the nerve is transmitting an impulse. During depolarization, the activation gates of Na^+ channels open, and the K^+ channels remain closed. Na^+ rush into the axon. Entry of sodium ions leads to depolarization (reversal of polarity) of the nerve membrane, so that the nerve fibre contents become electropositive with respect to the extracellular fluid.

Question57

Which cranial nerve has the highest number of branches?
(1999)

Options:

A. Vagus nerve

B. Trigeminal nerve

C. Facial nerve

D. None of these

Answer: A

Solution:

Vagus nerve is the tenth cranial nerve, supplying the heart, lungs, upper digestive tract and other organs of the chest and abdomen. It has the highest number of branches, which is 5.
(i) Superior laryngeal nerve
(ii) Recurrent laryngeal nerve
(iii) cardiac nerve
(iv) Pneumogastric nerve
(v) Depresser

Question58

Sympathetic nervous system induces
(1999)

Options:

A. secretion of digestive juices

B. heart beat

C. secretion of saliva

D. all of these

Answer: B

Solution:

Solution:
(b) : Sympathetic nervous system is a component of autonomic nervous system consisting of a pair of sympathetic trunks, preganglionic sympathetic fibres, postganglionic sympathetic fibres and collateral ganglia. It quickens rate and force of heart beat while it inhibits secretion of saliva and gastric juice.

Question59

The junction between the axon of one neuron and the dendrite of the next is called
(1999)

Options:

A. constant bridge

B. junction point

C. a joint

D. a synapse

Answer: D

Solution:

(d) : Synapse is the close proximity of the axon of one neuron and the dendrite or cyton of another neuron with a gap of just about 200 Å in between. A nerve impulse is transmitted across the synapse by the release from the presynaptic membrane of neurotransmitter, which diffuses across the synaptic cleft to the post synaptic membrane. This triggers the propagation of the impulse from the dendrite along the length of the post synaptic neuron.

Question60

Which of the following is regarded as a unit of nervous tissue? (1999)

Options:

A. Neurons

B. Myelin sheath

C. Axons

D. Dendrites

Answer: A

Solution:

Solution:
(a) : Neurons or nerve cells are the structural and functional unit of nervous system. These have a special structure but vary greatly in size and shape. Each neuron has a cell body which encloses cytoplasm and has a nucleus. A number of processes arise from the cell body. There is usually a single axon and a variable number of dendrites. The medullated nerve fibres is composed of a shining, white, fatty substance called myelin.

Question61

The Nissl's granules of nerves cell are made up of (1997)

Options:

A. DNA

B. RN A

C. ribosome

D. protein

Answer: C

Solution:

(c) : Cell body of a nerve cell contains basophilic granules called Nissl's granules. These granules appear to be cisternae of rough endoplasmic reticulum with numerous attached and free ribosomes. They probably synthesize proteins for the cell.

Question62

In the chemistry of vision in mammals, the photosensitive substance is called
(1997)

Options:

A. rhodopsin

B. melanin

C. sclerotin

D. retinol

Answer: A

Solution:

Solution:
(a) : Photosensitive means sensitive to light. The rod cells of retina contain a purplish pigment called rhodopsin. They function in dim light and at night. Rhodopsin consists of a protein component, opsin, linked to a nonprotein chromophore, retinal (or retinene), a derivative of vitamin A. Light falling on the rod is absorbed by the retinal, which changes its form and separates from the opsin component. This initiates the transmission of a nerve impulse to the brain.

Question63

The vagus nerve is the cranial nerve numbering
(1997)

Options:

A. 7

B. 5

C. 10

D. 9

Answer: C

Solution:

Solution:
(c) : Vagus nerve is the tenth cranial nerve. It arises from the side of medulla oblongata. It innervates the larynx, trachea, oesophagus, stomach, lungs, heart and intestines. It is a mixed nerve. It controls the visceral sensations and visceral movements, i.e., heart beat, respiratory movements, peristalsis, sound production, etc.

Question64

By which nervous system and of what type, the blood is supplied into visceral organs?
(1996)

Options:

A. Both SNS and PNS, involuntary

B. Para-sympathetic nervous system involuntary

C. Sympathetic nervous system, involuntary

D. Sympathetic nervous system, voluntary

Answer: A

Solution:

Solution:
(a) : The blood is supplied into visceral organs by both SNS (sympathetic nervous system) and PNS (parasympathetic nervous system) involuntarily. The sympathetic fibres increase the rate and force of heart beat, constrict most blood vessels and raise the arterial blood pressure. The parasympathetic fibres decrease the rate and force of heart beat, dilate many blood vessels and lower the arterial blood pressure.

Question65

Ivan Pavlov performed experiments on
(1993)

Options:

A. simple reflexes

B. conditioned reflexes

C. cardiac reflexes

D. origin of life.

Answer: B

Solution:

Solution:
(b) : By training, a particular response can be obtained to a stimulus other than the one which normally evokes that response. Such a reflex is known as the conditioned reflex.

The conditioned reflexes were first demonstrated in 1920's by the Russian physiologist I.P. Pavlov. He found that the sight and smell of food reflexly cause flow of saliva in hungry animals. He rang a bell every time he offered food to a dog. The bell did not induce salivation by itself in the beginning of the experiment. Gradually, the dog learnt to associate the bell with food. Eventually, mere ringing of bell, without presenting food, induced salivation in the dog. Thus, ringing of bell can substitute sight of food to cause salivation. Pavlov called sound of the bell as conditioned stimulus, salivation in response to bell a conditioned response, food itself as unconditioned stimulus, and salivation in response to food an unconditioned response. A conditioned reflex is established when a new sensory clue (the bell) becomes associated with an inborn reflex (salivation).

Question66

Light rays entering the eye is controlled by (1993)

Options:

A. pupil

B. iris

C. cornea

D. lens

Answer: A

Solution:

(a) : Pupil is the opening which controls the amount of light entering in eye. When light intensity is high, it decrease in size and when light intensity is low it dilates to allow more light in the eye to make eye enable to see the object.

Question67

Retina is most sensitive at (1993)

Options:

A. optic disc

B. periphery

C. macula Jutea

D. fovea centralis

Answer: D

Solution:

Solution:
(d) : A small area of the optical part of the retina lying exactly opposite to the centre of the cornea is called the macula lutea, or yellow spot which has a yellow pigment (xanthophyll). The macula lutea has at its middle a shallow depression, the fovea centralis. The fovea has cone cells only, and is the place of most distinct vision. Away form the fovea, the rod and cone cells occur in equal numbers, and at the periphery of the retina, the rods are more numerous than the cones. This is why we see better in dim light by looking out of the corner of the eye. The point on the retina from where the optic nerve starts is called the blind spot, or optic disc, as it lacks the receptor cells and is insensitive to light.

Question68

Function of iris is to (1993)

Options:

A. move lens forward and backward

B. refract light rays

C. bring about movements of eye lids

D. alter the size of pupil

Answer: D

Solution:

(d) : At the junction of the sclera and the cornea, the vascular coat sharply bends into the cavity of the eyeball to form a thin, coloured partition. This partition is called iris. It is perforated at the middle by an aperture called pupil. The iris contains two sets of smooth muscles: sphincters and dilators. These muscles regulate the amount of light entering the eyeball by varying the size of the pupil. The sphincter muscles are arranged in rings. Their contraction makes the pupil smaller in bright light so that less light enters the eye. The dilator muscles are arranged in a radial manner. Their contraction widens the pupil in dim light to let in more light. Iris, by regulating the size of the pupil, allows light to pass only through the centre of the lens, which is optically the most effective part.

Question69

Iris is part of
(1993)

Options:

A. sclerotic

B. choroid

C. choroid and retina

D. sclerotic and choroid

Answer: D

Solution:

Solution:
(d) : At the junction of the sclera and the cornea, the vascular coat sharply bends into the cavity of the eyeball to form a thin, coloured partition. This partition is called iris. It is perforated at the middle by an aperture called pupil. The iris contains two sets of smooth muscles: sphincters and dilators. These muscles regulate the amount of light entering the eyeball by varying the size of the pupil. The sphincter muscles are arranged in rings. Their contraction makes the pupil smaller in bright light so that less light enters the eye. The dilator muscles are arranged in a radial manner. Their contraction widens the pupil in dim light to let in more light. Iris, by regulating the size of the pupil, allows light to pass only through the centre of the lens, which is optically the most effective part.

Question70

Afferent nerve fibres carry impulses from
(1992)

Options:

A. effector organs to CNS

B. receptors to CNS

C. CNS to receptors

D. CNS to muscles

Answer: B

Solution:

(b) : Afferent nerve fibres carry impulses from the receptors to the central nervous system. Efferent nerve fibres conduct nerve impulses from the central nervous system to the effector organs such as muscles and glands.

Question71

Vagus nerve is
(1992)

Options:

A. X

B. IX

C. VII

D. V

Answer: A

Solution:

Solution:
(a) : Vagus nerve is the tenth cranial nerve. It arises from the side of medulla oblongata. It innervates the larynx, trachea, oesophagus, stomach, lungs, heart and intestines. It is a mixed nerve. It controls the visceral sensations and visceral movements, i.e., heart beat, respiratory movements, peristalsis, sound production, etc.

Question72

Third ventricle of brain is also known as
(1990)

Options:

A. metacoel

B. rhinocoel

C. paracoel

D. diacoel

Answer: D

Solution:

Solution:
(d) : The ventricles consist of four hollow, fluid filled spaces inside the brain. The third ventricle is also known as diacoel. The third ventricle consists of a narrow channel between the hemispheres through the area of the thalamus. It is connected by the cerebral aqueduct or aqueduct of Sylvius or iter in the midbrain portion of the brainstem to the fourth ventricle in the pons and medulla. Metacoel is the IV ventricle, rhinocoel is the I ventricle and paracoel is the II ventricles.

Question73

One function of parasympathetic nervous system is (1990)

Options:

A. contraction of hair muscles

B. stimulation of sweat glands

C. acceleration of heart beat

D. constriction of pupil

Answer: D

Solution:

Solution:
(d) : The action of the parasympathetic nervous system is opposite to that of the sympathetic nervous system. If the sympathetic nervous system accelerates an action, the parasympathetic nervous system slows it. However, neither system is exclusively exitatory or inhibitory. The parasympathetic fibres constrict the pupil, decrease the rate and force of heart beat, dilate many blood vessels, lower the arterial blood pressure, quicken the peristaltic movements, and contract the urinary bladder.

Question74

Which of the following cranial nerves can regulate heart beat? (1989)

Options:

A. X

B. I X

C. VIII

D. VII

Answer: A

Solution:

(a) : Vagus nerve is the tenth cranial nerve. It arises from the side of medulla oblongata. It innervates the larynx, trachea, oesophagus, stomach, lungs, heart and intestines. It is a mixed nerve. It controls the visceral sensations and visceral movements, i.e., heart beat, respiratory movements, peristalsis, sound production, etc.

Question75

Sensitive pigmented layer of eye is (1989)

Options:

A. cornea

B. retina

C. sclerotic

D. iris

Answer: B

Solution:

(b) : The retina consists of both pigmented layer and the sensory layer. The pigment cells reinforce the light absorbing property of choroid in reducing the scattering of light in the eye. The sensory layer consists of rods and cones required for vision.
