UNIT - V
RABBIT FUNCTIONAL ANATOMY-III

NERVOUS SYSTEM

- The system that translates sensory information into action potentials which results in a response by the activation of effector organs is

  - Nervous System.
- Basic pathway in the above process is - reflex arc

- **The study of nervous system and ner vous disorders is called** - neurology
- Nervous system of rabbit consists of the divisions namely :

  1. Central Nervous System (CNS)

  2. Peripheral Nervous System (PNS)
- Peripheral nervous system is further subdivided into

  a) somatic nervous system

  b) autonomic nervous system
- Division of PNS that controls voluntary movements of skeletal nuscles is **Somatic nervous system**
- Division of PNS that controls involuntary activities of cardiac muscles, smooth muscles and glands is

  -Autonomic nervous system

CENTRAL NERVOUS SYSTEM (CNS)

- CNS originates from - **embryonic neural tube**

Meninges:

- Protective coverings of central nervous system are **meninges.**
- Outer tough, fibrous double layered meninx **duramater.**
- Middle, delicate and richly vascular meninx is - **Arachnoid mater**
- Inner highly vascular meninx closer to brain and spinal cord - **Piamater**
- Choroid plexuses of the brain are formed from

  -Piamater.
- The space between arachnoid matter and piamater is **-Subarachnoid space.**
- Cerebrospinal fluid is secreted by- **choroid plexuses**
- CSF enters into the subarachnoid space from- **4th ventricle**

BRAIN

- Brain is protected by **cranium**
- **Primary divisions of Brain are :**

  1. PROSENCEPHALON (Fore brain)

  2. MESENCEPHALON (Mid brain)

  3. RHOMBENCEPHALON (Hind brain)

Prosencephalon includes : olfactory lobes, cerebral hemispheres, diencephalon

- Anterior most part of the brain is formed by two small and distinct club shaped

  - Olfactory lobes or bulbs
- Each olfactory bulb continues behind and ventrally as a narrow **- olfactory tract.**
- The cavity of each olfactory lobe is called

  - Rhinocoel

CEREBRUM

- Cerebrum includes two large conical cerebral hemispheres which are

  - narrow infront and broad behind
- Posteriorly the cerebral hemispheres overlap

  - diencephalon and midbrain
- Dorsally the two cerebral hemispheres are separated by a groove called

  - Median fissure
- The ventral longitudinal fissure dividing each cerebral hemisphere into outer lobe and inner hippocampal lobe is called

  - Hippocampal sulcus
- The oblique fissure that separates each cerebral hemisphere into anteromedian frontal lobe and posterolateral temporal lobe - **Sylvian fissure**
- The hippocampal lobe and olfactory tract on the ventral side are separated by **- Rhinal fissure**
- Each cerebral hemisphere on the dorsal side is divided into anterior **frontal lobe**, posterior **parietal lobe**, lateral **temporal lobe** and a ventral

  - hippocampal lobe
- A broad transverse nerve band joining the two cerebral hemispheres internally is

  - corpus callosum
- Corpus callosum is found only in **placental mammals**

- The floor and ventro-lateral walls of paracoels is thickened to form **- Corpora striata**
- The transverse band that connects corpora striata is called - **Anterior commissure**
- The roof and dorso-lateral walls of paracoels form **- Neopallium**
- Neopallium is formed by **- Grey matter**
- Neopallium is smooth in **- Rabbit**
- Neopallium is with gyri and sulci in **- Primates**
- The cavities of cerebral hemispheres are called **- Lateral ventricles or Paracoels (1st and 2nd ventricles)**
- Paracoels open together into diacoel or third ventricle through **- Foramen of Monro**

DIENCEPHALON

- It is also known as **- Thalamencephalon**
- It is a small and narrow rectangular part overlapped dorsally by **- cerebral hemispheres**
- The roof of third ventricle is called**- Epithalamus**
- Structure formed by the fusion of epithalamus and piamater and projecting into III ventricle **- Anterior choroid plexus**
- The floor of Diencephalon is called **- Hypothalamus**
- Hypothalamus bears a funnel like out growth called **- Infundibulum**
- Anterior to the infundibulum is a crossing of optic nerves called **- Optic chiasma**
- Infundlibulum bears **- Pituitary gland or Hypophysis**
- Hypophysis and the infundibulum together form **- Pituitary body**
- Rounded elevation present behind the infundibulum is called **- Corpus mamillare**
- Lateral parts of Diencephalon are called **- Optic thalami**
- The two optic thalami are connected by a **- Median commissure**
- The cavity of Diencephalon is called **-Diocoel (or) III ventricle**

MESENCEPHALON

- It includes **- Four solid optic lobes, Crura cerebri and Iter**
- The optic lobes of Mammals are called **- Corpora quadrigemina**
- The anterior pair of optic lobes are larger and called **- superior colliculi (for vision)**
- The posterior pair are smaller and called **- Inferior colliculi (for hearing)**
- The canal in the mid brain joining diocoel and myelocoel is called **- Iter or Aqueduct of sylvius**
- The two thick fibrous tracts passing through the floor of mid brain are called **- Crura cerebri**
- Crura cerebri link the **- Forebrain and Hind brain**
- Crura cerebri give rise to third pair of cranial nerves namely **- Occulomotor**

RHOMBENCEPHALON

- Anterior part of Rhombencephalon is **- metencephalon**
- Metencephalon is represented by well developed lobed structure **- Cerebellum**
- The large central lobe of cerebellum is called **- Vermis**
- Vemis has on either side **- Lateral lobes**
- The ventrolateral extension of each lateral lobe is called **- Flocculus**
- A transverse band of nerve fibres joining right and left halves of cerebellum on the venral side is called **- Pons Varolii**
- The whole surface of cerebellum is formed by **- grey matter**
- Strips of white matter projects into the folds of grey matter and form a system of branched tree like structure called **- Arbor vitae**
- Cerebellum and pons varolii are without any **- Ventricles.**

MYELENCEPHALON(Posterior part of Rhombencephalon)

- It is represented by **- Medulla oblongata**
- Medulla extends between **- Pons Varolii and spinal cord**
- Medulla continues behind as **- Spinal cord**
- The cavity of Medulla is called **- IV ventricle (or) Myelocoel**
- The roof of myelocoel bears non-nervous vascular structure called **- Posterior choriod plexus**

FUNCTIONS OF BRAIN

- The olfactory lobes are **- the centers of sense of smell**
- Mammals detect their food by **- smell**
- Cerebral hemispheres in mammals are seats of **- thought and reasoning – Intelligence and Memory**
- **All voluntary actions** are controlled by **-cerebral hemispheres**
- Perception of touch, pressure, pain and temperature is by **- Diencephalon**
- Controling and integration of autonomic nervous system, pituitary gland and controls body temperature by **- Hypothalamus**
- Superior colliculi are centers of **- vision**
- Inferior colliculi are the centres of **- Hearing**
- Cerebellum maintains equilibrium, posture and coordinates **- Voluntary muscular movements**
- Medulla oblongata and pons varolii controls **-Heartbeat, breathing, vomiting, swallowing etc.,**

SPINAL CORD

- Posterior prolongation of medulla oblongata is known as **- Spinal cord**
- The spinal cord emerges out from the skull through a large aperture called **- Foramen magnum**
- The part of vertebral column in which spinal cord is lodged is known as **- Neural canal**
- The fourth ventricle continues behind into the spinal cord as **- Central canal**
- The spinal cord is also enclosed by three meninges namely **- Outer duramater, middle arachnoid and inner piamater**
- The spinal cord tapers up to 4th lumbar vertebra and afterwards it becomes a non-nervous **- Filum terminale**
- The spinal cord shows two enlargements namely **- Brachial swelling and lumbar swelling**
- The central canal is lined by ciliated columnar neuroglia cells called **- Ependyma**
- The inner part of spinal cord around central canal is formed by 'H' shaped or Butterfly shaped **- grey mater.**
- Grey matter contains- **Cell bodies, dendrites & non myelinated axons.**
- The grey matter projects into outer white matter as a pair of **- Dorsal horns & Ventral horns**
- The outer part of spinal cord is formed by **- White matter**
- White matter contains **- Medullated axons**
- White matter is divided by grey matter into **- 4 Funiculi**
- Fibres of dorsal funiculus are **- Sensory**
- Fibres of ventral funiculus are **- Motor**
- Fibres of lateral funiculus are **- Mixed**
- Along the middorsal and midventral suface of spinal cord, there are **-shallow dorsal and deep ventral fissures**
- Dorsal horn and form **- Dorsal roots**
- Ventral horns form **- Ventral roots**
- The spinal cord acts as "middleman" between **- effectors and brain**
- Spinal cord is the centre of **- several reflex actions**
- The spinal cord is the path for the conduction of nerve impulses **- from and to the brain.**

PERIPHERAL NERVOUS SYSTEM

- Anatomically the peripheral nervous system includes **- cranial nerves and spinal nerves**
- Nerves arising from different parts of brain are called **- cranial nerves**
- The part of brain from which 8 pairs of cranial nerves arise is **- Hind brain**
- First pair of nerves **olfactory nerves** arise from **- Olfactory epithelium and end on olfactory lobes**
- Second pair of nerves **optic nerves** arise from **-Retina, eyes and ends in mid brain**
- Third pair of cranial nerves, **oculomotor nerves** arise from **- crura cerebri**
- They innervate - **Anterior , superior, inferior recti muscles and inferior oblique muscles**
- Fourth pair of cranial nerves pathetic or trochlear nerves arise from the **- mid brain and cerebellum**
- Smallest cranial nerve is **- Trochlear**
- They innervate **- Superior oblique muscles**
- Fifth pair of cranial nerves the **Trigeminal** arise from the **- Gasserian ganglion (pons varolii)**
- It is divided into - **(a)Opthalmic Superficialis (sensory)**
  (b) Maxillary (mixed)
  (c) Mandibular (mixed)
- Opthalmic superficialis innervate **-Cornea , Ciliary body, conjunctiva, iris, lacrimal glands, upper eyelids.**
- It also innervate

- **epithelium of nasalchamber (sensory)**

- Maxillary innervates **-Palate, upper jaw, vibrissae, lower eyelid, upper lip, sides of snout & mucus of nasal sac (mixed)**
- Mandibular innervates **-skin of temporal region, teeth of muscles of lower jaw, external ears, lower lip, anterior region of tongue**
- Abducens originate from **-pons Varolii**
- Sixth pair is Abducens which innervates - **Posterior rectus eye muscles and orbit, nictitating membrane**
- VII Cranial nerve facial nerve originates from - **pons**

  a) Palatine- (sensory) innervates roof of buccal cavity

  b) Chordatympani - (sensory) innervates taste buds of anterior part of tongue

  c) Hyomandibular- (Motor) innervates muscles of lower jaw, neck, pinna, face & Hyoid and also salivary glands.
- VIII cranial nerve **Auditory** orginates from - **Internal ear and ends in the medulla**
- **They bring sensory impulses from - internal ear**

  a) Vestibular nerve brings impulses from - utriculus, sacculus and semicircular canals

  b) Cochlear - from Cochlea
- IX Cranial nerve**Glossopharyngeal** (Mixed) originates in - **Medulla**

  a) Lingual nerve innervates - **Posterior third of tongue, salivary glands and pharynx.**
- **Phyryngeal innervates- Muscles of pharynx and parotid salivary glands.**
- X Cranial nerve **Vagus** (Mixed) - **The largest nerve and passes through vagus ganglion.**

  a) Superior laryngeal innervate - (Sensory) epithelium of larynx

  b) Recurrent laryngeal innervates - Motornerve - muscles of larynx

  c) Cardiac depressor goes to - Aortic arch (Sensory)

  d) Cardiac goes to - muscles of heart (motor)

  e) Pneumogastric goes to - muscles of lungs, oesophagus and stomach (mixed)
- XI Cranial nerve **Spinal accessory** nerve innervate - **muscles of pharynx, larynx, neck and shoulder -(motor)**
- XII Cranial nerve **Hypoglossal** nerve innervates - **Tongue** and **hyoid apparatus** (Motor)
- Sensory cranial nerves/**afferent cranial nerves - I, II, VIII pairs**
- Motor cranial nerves / Efferent cranial nerves **- III, IV, VI, XI, XII pairs**
- Mixed cranial nerves are **- V, VII, IX, X pairs**
- Cranial nerves pass through vagus ganglion **- X pair**
- Number of cranial nerves in anamniotes **- 10 pairs**
- Number of cranial nerves in amniotes **- 12 pairs**
- Amniotes with only 10 pairs of cranial nerves **- snakes**

BRAIN TEASERS

- Cranial nerves going to branches to lower jaw **- V & VII**
- Cranial nerves giving to salivary glands **- Chorda tympani of facial (VII) & Lingual of Glossopharyngeal (IX)**
- Cranial nerves going to neck **- Hyomandibular of VII & spinal accessory – XI**
- Cranial nerves going to tongue **- VII, IX & XII**
- Cranial nerves going beyond head & Neck **- X**
- Cranial nerves going to muscle of eye ball **- III ,IV & VI**
- Longest cranial nerve **- Vagus**
- Cranial nerve with highest number of branches **- Vagus**
- Destruction of which cranial nerves results in the loss of the sense of balance and hearing **- VIII**

SPINAL NERVES

- The number of spinal nerves in Rabbit are**-37 pairs**

Cervical	**- 8 pairs**
Thoracic	**- 12 pairs**
Lumbar	**- 7 pairs**
Sacral	**- 4 pairs**
Caudal (Coccygeal)	**- 6 pairs**

- The number of spinal nerves are less than the number of vertebrae because **- spinal cord does not extend into the tail**
- The spinal nerve is formed by the union of **- dorsal and ventral roots**

LIST OF CRANIAL NERVES, THEIR ORIGIN, DISTRIBUTION AND NATURE

S.No.	Name	Origin	Branches	Distribtuion	Nature
I	Olfactory	Nasal epithelium	—	Olfactory lobe	Sensory
II	Optic	Retina of eye	—	Optic lobe	Sensory
III	Oculomotor	Crura cerebri	—	Anterior rectus, superior rectus, inferior rectus & inferior oblique muscles of eye ball	Motor
IV	Trochlear (pathetic)	Between Mid brain & cerebellum		Superior oblique muscles of eye	Motor
V	Trigeminal	pons Varolii	a) Opthalmic b) Maxillary c) Mandibular	Eye, Eye lids, Snout Upper jaw Lower jaw	Sensory Mixed Mixed
VI	Abducens	Pons Varolli	—	External rectus	Motor
VII	Facial	Pons Varolli	a) Palatine b) Chorda -tympani c) Hyomandi -bular	Palate Tongue Salivary glands Lower jaw, neck, pinna Taste buds	Sensory Sensory Mixed
VIII	Auditory	Internal ear	a) Vestibular b) Cochlear	Sides of medulla Utriculus & Sacculus. Cochlea	 Sensory Sensory
IX	Glosso -Pharyngeal	Postero lateral Margin of medulla	a) Lingual b) Pharyngeal	Tongue, Pharynx, Saliary glands Salivary glands pharynx	Mixed Mixed
X	Vagus	Medulla	a) Superior laryngeal b) Recurrent laryngeal c) Cardiac depressor d) Cardiac e) Pneumogastric	Laryngeal epithelium Muscles of larynx Aortic arches Cardiac muscles Stomach,Oesophagus, Lungs	Sensory Motor Sensory Motor Mixed
XI	Spinal accessory	Medulla	—	Pharyx, Larynx neck, Shoulder	Motor
XII	Hypo glassal	Medulla	—	Hyoid apparatus,tongue muscles	Motor

- Spinal nerves emerge out through
  - Inter vertebral foramina
- The dorsal root is **sensory** because it contain nerves of **Somatic sensory and Visceral sensory**
- The ventral root is motor because it contains
  - Somatic motor & Visceral motor nerves
- Each spinal nerve forms three branches.
  - Ramus dorsalis, Ramus Ventralis, Ramus Communicans or Visceral nerve
- Ramus dorsalis is thin and it contains Somatic sensory nerve and goes to
  - the skin of dorsal side

- Ramus ventralis is thick and forms the **- spinal nerve proper**
- It contains Somatic Motor nerves, it goes to muscles of **- Ventral side**
- Ramus communicans contains **-Visceral sensory, Visceral motor nerves**
- Ventral branch of III cervical gives off - Auricular nerve goes to pinna
- Ventral branches of IV, V, VI cervical nerves in the neck form **- Cervical plexus**
- Spinal nerves going to the muscles of neck. **- Cervical plexus, Ventral branches of IV, V, VI**
- Brachial plexus is formed by the Union of **- V to VIII cervical & Ist thoracic nerves**
- Lumbo sacral plexus is formed by the union of **- IV-VII lumbar spinal nerves, First 3 sacral nerves**
- The branches of lumbo –sacral plexus mainly go **- Hind limbs**
- Slender nerves from cervical plexus on either side form **- Phrenic nerve**
- Phrenic nerve goes to **- Muscles of Diaphragm**
- Lumbar, Sacral & Caudal nerves & Filum terminale constitute **– Cauda equina (Tail of a horse)**
- Nerves from Brachial plexus innervates the forelimbs through - **Radial, Ulnare and median nerves**
- Nerves from Lumbosacral plexus innervates the hindlimbs through **- Femoral, sciatic and obturator nerves**

Functional divisions of peripheral nervous system

I. Somatic nervous system

- Cells that convey consciously perceived special senses (eg. Vision, hearing) and somatic senses (eg.pain, tactile sense) are - **Somatic sensory nervous system**
- Nerves that innervate skeletal muscles controlling voluntary movements are - **Somatic motor nerves**
- Somatic nervous system is **One neuron pathway**
- Nerve endings release **Acetylcholine**

AUTONOMOUS NERVOUS SYSTEM

- Centres that regulate ANS reflexes are located in **-hypothalamus**
- ANS is associated with **interoceptors or chemoreceptors**
- Autonomic neurons regulate- **involuntary activities**
- There are two series of motor neurons in the **autonomic motor pathways (two neuron pathway)**
- The preganglionic neuron has its cell body in CNS and its myelinated axons extend to **autonomic ganglion**
- Cell bodies of post ganglionic neurons lie in the autonomic ganglion and its unmyelinated axon extends from the ganglion to the **effector**
- It includes **- sympathetic and parasympathetic divisions**

SYMPATHETIC DIVISION:

- Sympathetic division is also called **thoracolumbar division.**
- It consists of **two sympathetic chains** one on either side of the dorsal aorta & beneath the **- vertebral column**
- Sympathetic chains extend from **- base of the skull to posterior end of the body**
- The axons of sympathetic preganglionic neurons are called **- Thoraco – Lumbar outflow**
- The sympathetic ganglia are connected to spinal nerves through **- Ramus communicans.**
- Ganglia formed by sympathetic nerves of cervical region are**- superior & inferior cervical ganglia.**
- Ganglia on each chain has **-2 cervical , 12 thoracic, 6 or 7 lumbar & 3 or 4 sacral ganglia**
- Ganglia which are present in sympathetic chain are called **Trunk ganglia**
- Nerves from superior and inferior cervical ganglia go to **- Palate, Salivary glands, Heart, Lungs, Ciliary muscles, Iris muscles & Nasal Mucosa and mucous glands.**
- The ganglia which are present outside the sympathetic chain are **collateral ganglia**
- Postganglionic axons from sympathetic trunk ganglia innervate - **Parts anterior to diaphragm**
- Postganglionic axons from sympathetic collateral ganglia innervate - **Parts posterior to diaphragm**

PARASYMPATHETIC DIVISION

- It is called **- cranio – sacral division**
- Its outflow is by the preganglionic nerve fibres of III, VII, IX & X cranial nerves and 2, 3, 4 sacral spinal nerves Form **- Parasympathetic nervous system**
- Parasympathetic preganglionic fibres are called **- Cranio-sacral out flow**
- Para sympathetic ganglia lie in head, neck and sacral regions.
- The parasympathetic ganglia present closer or within the wall of visceral organs are called **terminal ganglia.**
- The effects of sympathetic and parasympathetic nerves are **- Antagonistic**

Most of the organs are innervated in the form of - **Dual innervation**

- Accelerator and brake system of the body is **- Autonomic nervous system**
- Neurotransmitter of sympathetic system is **- Acetylcholine and norepinephrine**
- Neurotransmitter of parasympathetic system is **Acetylcholine**
- The balacne between sympathetic and parasympathetic activities is **Tone**

Sympathetic action

Increases heartbeat and blood pressure, dilates pupil, bronchi, coronoary arterioles and skeletal muscle arterioles, constricts blood arterioles, contracts arrector pili muscles, decreases gastrointestinal motility, contraction of sphincters, relaxation of wall of urinary bladder and contraction of sphincters

Para sympathetic action

Decreases heartbeat and blood pressure, constricts pupil, bronchi and coronoary arteriole, dilates blood arterioles, increases gastrointestinal motility,relaxation of sphincters, contraction of wall of urinary bladder and relaxation of sphincters

Neurotransmitters of ANS:

- All the sympathetic and parasympathetic preganglionic neurons are **- Cholinergic**
- Most of the sympathetic postganglionic neurons are **- Adrenergic**
- Sympathetic postganglionic neurons of most of the sweat glands are **- Cholinergic**
- Parasympathetic postganglionic neurons are **-Cholinergic**
- Cholinergic neurons secrete **- Acetylcholine**
- Adrenergic neurons secrete **- Norepinephrine**
- Activation of sympathetic division and release of hormones by adrenal medulla give **- Fight or flight response**
- The parasympathetic division enhances **- Rest-and-digest activities**

EXERCISE

NERVOUS SYSTEM

LEVEL - I

1. The narrow passage which connects third and fourth ventricles is
   1) Foramen of Monro 2) Iter
   3) Fenestra ovalis 4) Foramen magnum
2. The lateral ventricles are connected with diacoel through
   1) Aqueduct of sylvius 2) Foramen of Monro
   3) Rhinocoel 4) Myelocoel
3. A transverse band of nerve fibres which connects the right and left halves of ventral side of the cerebellum
   1) Crura cerebri 2) Pons Varoli
   3) Corpusalbicans 4) Corpus callosum
4. The canal in the mid brain is
   1) Aqueduct of sylvius 2) Myelocoel
   3) Diocoel 4) Central canal
5. Highly tough thick layer of meninx in the rabbit is
   1) Duramater 2) Piamater
   3) Arachnoid matter 4) Cranium
6. On hypothalamus optic chaisma is present
   1) anterior to Olfactory lobes
   2) anterior to infundibulum
   3) Posterior to infundibulum
   4) Posterior to optic lobes
7. The round structure behind the infundibulum is
   1) Pons Varoli 2) Corpus mamillare
   3) Corpus callosum 4) Corpora striata
8. The functions of various parts of the body are controlled and co-ordinated by
   1) Muscles only
   2) Nervous system only
   3) Endocrine system only
   4) Neuro-endocrine system
9. Soft, thin, highly vascular layer and in close contact with the brain is
   1) Duramater 2) Arachoid matter
   3) Piamater 4) Gray matter
10. The part of brain which forms 2/3 part of it is
    1) Cerebellum 2) Medulla oblongata
    3) Optic lobes 4) Cerebrum
11. In higher mammals like primates, the surface of the cerebrum is very thick and shows
    1) Arbor vitae 2) gyri & sulci
    3) Corpus callosum 4)Crura cerebri
12. The olfactory tract and hippocampal lobe are separated by
    1) Rhinal fissure 2) Median fissure
    3) Sylvian fissure 4) Hippocampal fissure
13. Connecting two hemispheres internally there is broad transverse band of nervous tissue which is characteristic of placental mammals
    1) Corpus callosum 2) Corpora striatum
    3) Corpus albicans 4) Anterior commisure
14. The nonnervous highly vascular roof of diocoel is called
    1) Brachial plexus 2) Anterior choroid plexus
    3) Sciatic plexus 4) Posterior choroid plexus
15. The cavity of olfactory lobe is called
    1) Optocoel 2) Rhinocoel
    3) Paracoel 4) Myelocoel

16. Which of the following parts of brain are without paired parts
1) Telencephalon & Diencephalon
2) Diencephalon & Mesencephalon
3) Mesencephalon & Rhombencephalon
4) Diencephelon & Rhombencephalon

17. Aqueduct of Sylvius lies between
1) Diocoel - Myelocoel
2) Third ventricle - Fourth ventricle
3) Diencephalon - Medulla
4) Paracoels - Diocoel

18. The solid part of brain of rabbit
1) Mid brain 2) Medulla
3) Cerebellum 4) Diencephalon

19. Adeno hypophysis is derived from
1)Roof of buccal cavity 2) Optic thalami
3) Hypothalamus 4) Pineal body

20. The meninges in rabbit brain are
1) Pia mater 2) Dura mater
3) Arachnoid membrane 4) All the three

21. Middle vascular meninx of brain is
1) Dura mater 2) Pia mater
3) Archnoid matter 4) Grey mater

22. The fluid present between meninges of brain
1) Pericardial fluid 2) Cerebro-spinal fluid
3) Spinal fluid 4) Coelomic fluid

23. Median fissure separates
1) Cerebral hemispheres 2) Olfactory lobes
3) Diencephalon 4) Optic lobes

24. The nervous tissue that is present at the inner side of the brain of placental mammals is
1) White matter 2) Gray matter
3) Dura mater 4) Pia mater

25. Between the frontal and temporal lobes on the dorso lateral side is present a groove called
1) Median fissure 2) Sylvian fissure
3) Rhinal fissure 4) hippcampal fissure

26. The cavities present in the cerebral hemispheres
1) Lateral ventricles or Paracoels
2) Third ventricles or Diacoels
3) Metacoels or Fourth ventricles
4) Optocoel or Optic ventricles

27. The cavity of diencephalon
1) I ventricle 2) II ventricle
3) III ventricle 4) IV ventricle

28. The roof of the diacoel is
1) Epithalamus 2) Hypothalamus
3) Optic chiasma 4) Cruracerebri

29. The floor of the diocoel is
1) Epithalamus 2) Hypothalamus
3) Corpus albicans 4) Infundibulum

30. The crossing of optic nerves anterior to the infundibulum of diencephalon
1) Corpora quadrigemina 2) Corpus albicans
3) Optic chiasma 4) Pineal stalk

31. The large central lobe of cerebellum is
1) Vermis 2) Lateral lobes
3) Floccular lobes 4) Pons varoli

32. Fourth ventricle or myelocoel is present in
1) Medulla 2) Cerebrum
3) Cerebellum 4) Diencephalon

33. Voluntary actions are under the control of
1) Cerebrum 2) Cerebellum
3) Medulla 4) Optic lobes

34. The centre of intelligence, memory, thought and reasoning
1) Cerebrum 2) Cerebellum
3) Pineal stalk 4) Medulla

35. Voluntary muscular movements are coordinated by
1) Spinal cord 2) Cerebellum
3) Cerebrum 4) Medulla

36. Heartbeat, breathing, vomiting and swallowing are controlled by
1) Cerebrum 2) Cerebellum
3) Medulla 4) Diencephalon

37. The parts of fore brain or prosencephalon are
1) Olfactory lobes, cerebral hemispheres, optic lobes
2) Olfactory lobes, cerebral hemispheres, diencephalon
3) Olfactory lobes, cerebral hemispheres, cerebellum
4) Olfactory lobes, cerebral hemispheres, medulla

38. The branched tree-like structure present in the cerebellum of rabbit is
1) Arbor vitae 2) Choroid plexus
3) Crura cerebri 4) Pons varolii

39. Crura cerebri are present in
1) Forebrain 2) Midbrain
3) Hindbrain 4) Spinal cord

40. Which of the following structure is found in the diencephalon
1) Cerebral cortex 2) Crura cerebri
3) Hypothalamus 4) Arbor vitae

41. Which of the following is not a part of forebrain ?
1) Olfactory lobes 2) Rhombencephalon
3) Diencephalon 4) Thalamencephalon

42. Brain develops from
1) Ectoderm 2) Mesoderm
3) Endoderm 4) Both ectoderm and mesoderm

43. Part of brain responsible for hearing is
1) Superior colliculi 2) Inferior colliculi
3) Epithalamus 4) Hypothalamus

44. Diencephalon does not control
1) Metabolism 2) Heart beat
3) Reproduction 4) Temperature

45. In which part of brain cytons of neurons are present?
1) White matter 2) Grey matter
3) Duramater 4) Piamater

46. The diocoel is also known as
1) 2nd ventricle 2) 3rd ventricle
3) 1st ventricle 4) 4th ventricle

47. Infundibulum is located at
1) Ventral part of mid brain
2) Dorsal part of mid brain
3) Floor of diencephalon
4) Dorsal part of diencephalon

48. The pineal stalk with a small rounded pineal body arises from
1) The roof of diencephalon
2) Floor of the diencephalon
3) Crura cerebri 4) Metencephalon

49. Optic lobes of mammals are called
1) Optic chiasma 2) Crura cerebri
3) Corpora Quadrigemina 4) Optic thalami

50. The autonomous nervous system is controlled by
1) Diencephalon 2) Cerebellum
3) Medulla oblongata 4) Optic lobe

51. Corpora quadrigemina is located in
1) Fore brain 2) Mid brain
3) Hind brain 4) Cerebellum

52. Damage to which of the following results in the loss of memory
1) Cerebellum 2) Cerebrum
3) Hypothalamus 4) Medulla

53. Meninx primitiva is found in
1) Amphibia 2) Cyclosomes 3) Fishes 4) 2&3

54. Only duramater and piamater are found in
1) Amphibians 2) Reptiles 3) Birds 4) All

55. Median commissure connects
1) Crura cerebrii 2) Corpora striata
3) Optic thalami 4) Corpus callosum

56. 'Flocculus' is a term related to
1) Cerebellum 2) Pons varolii
3) Optic lobes 4) Medulla

57. The size and complexity of this part of brain is an indication of gradual evolution of intelligence is
1) Neopallium 2) Ponsvaroli
3) Choroid plexus 4) Cerebellum

58. The thick fibrous thickening bulging into the cavity of lateral ventricles from its floor is
1) Crura cerebri 2) Corpus albicans
3) Corpora striata 4) Optic chaisma

59. The structures associated with epithalamus of brain are
1) hypophysis, optic chiasma
2) Epiphysis, corpus mamillare
3) Optic thalami, pituitary body
4) Pineal body, anterior choroid plexus

60. Perception of touch, pain and temperature are associted with
1) Hypothalamus 2) Epithalamus
3) Medulla 4) Cerebellum

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

61. **Assertion (A) :** If cerebellum is damaged, equilibrium of the body is lost.
Reason (R) : Movement of voluntary muscles is co-ordinated by the proximal part of Rhombencephalon.

62. **Assertion (A) :** Pons varoli is a transverse band of nerve fibres connecting the right and the left halves of cerebellum.
Reason (R) : Pons Varolii is a part of the hind brain.

63. **Assertion (A) :** Rabbit is not so intelligent animal as the roof of the cerebrum is smooth without gyri and sulci.
Reason (R) : The size and complexity of Neopallium is an indication of gradual evolution of intelligence.

64. **Assertion (A) :** In Cyclostomes and fishes the brain is not well protected from the external shocks.
Reason (R) : The brain of cyclostomes and fishes is covered over by a single meninx called meninx primitiva.

65. **Assertion (A):** A rabbit is unable to move its eye balls.
Reason (R): In the same rabbit, its III IV and VI cranial nerves are diseased.

66. If the medulla oblongata is damaged due to injury in rabbit, predict the out come of this injury.
i) Memory is lost
ii) Vital centres would be impaired
iii) Control and integration of the pituitary gland would be impaired
iv) The rabbit not likely to survive the injuries.
The right combination is
1) i and ii 2) ii and iv 3) iii and iv 4) i and iv

67. The following are the statements about meninges,
i) Duramater lines the outer surface of cranium
ii) Arachnoid is the middle membrane
iii) Piamater is non vascular membrane
iv) Arachnoid is delicate and vascular
The right combination is
1) i and iv 2) ii and iii 3) iv and iii 4) iv and ii

68. The following are the statements about the mesencephalon.
i) It consists of corpora quadrigemina and crura cerebrii
ii)Crura cerebri link the optic thalami
iii) The four optic lobes are centres of vision
The right combination is
1) i and ii are true 2) i, ii and iii are true
3) i and iii are true 4) only ii and iii are not true

69. The following are the statements about forebrain of rabbit
i) The posterior most part of prosencephalon is diencephalon.
ii) Optic chiasma is present on the posterior part of infundibulum.
iii) The thick lateral wall of diencephalon is called optic thalamii
iv) Neopallium is well developed with sulci and gyri.
Choose the false combination
1) i & ii 2) i & iii 3) ii & iv 4) ii & iii

70. Read the following statements about optic lobes of rabbit.
i) The optic lobes of rabbit are called corpora quadrigemina.
ii) The anterior lobes are bigger and are called superior colliculi.
iii) The posterior lobes are smaller and are called inferior colliculi.
iv) The superior colliculi are concerned with hearing and the inferior colliculi are concerned with sight.
Choose the correct combination
1) i, ii, iii 2) ii, iii, iv 3) iii, iv, i 4) All are true

71. Choose correct set about brain of rabbit
i. Neopallium shows gyri and sulci
ii. Hippocampal fissure separates hippocampal lobe from the other lobes of cerebrum
iii. Median commissure separtes the two cerebral hemispheres
iv. Sylvian fissure separates frontal and temporal lobes.
1) i, ii 2) ii, iii 3) ii, iv 4) all

72. Choose correct set about ventricles of brain
i. They are lined by ciliated epithelium called ependyma
ii. Iter connects the III and IV ventricles
iii. Foramen of Monro connects I and II ventricles with III ventricle
1) all 2) i, iii 3) ii, iv 4) ii, iii

73. Choose the incorrect statements
i. Flocculus is the ventro lateral extension of lateral lobe of cerebrum
ii. Corpora quadrigemina refers to colliculi
iii. Corpus mamillare is a round elevation behind infundibulum
1) i, ii 2) i only 3) ii, iii 4) all

74. Match the regions of the brain with the parts of brain

A. Diencephalon	i. Hypothalamus
B. Myelencephalon	ii. Pons varoli
C. Mesencephalon	iii. Optic lobes
D. Metencephalon	iv. Cerebrum
	v. Medulla

	A	B	C	D
1)	i	ii	iii	iv
2)	ii	v	iv	iii
3)	i	v	iii	ii
4)	ii	iv	v	iii

75. Match the following.

A. Diacoel	i. Olfactory lobes
B. Paracoel	ii. Cerebrum
C. Myelocoel	iii. Diencephalon
D. Rhinocoel	iv. Mid brain
	v. Medulla oblongata

	A	B	C	D
1)	ii	iii	iv	v
2)	v	ii	i	iv
3)	iii	ii	v	i
4)	ii	iii	iv	i

76. Choose the correct set related to rabbit

List - I	*List - II*
A. Corpus straitum	I. Cerebrum
B. Corpora quadrigemina	II. Cerebellum
C. Corpus mamillare	III. Mesencephalon
D. Choroidplexus	IV. medulla oblongata
E. Corpus spongiosum	V. diencephalon
	VI. Penis

	A	B	C	D	E		A	B	C	D	E
1)	I	VI	IV	V	II	2)	I	III	V	IV	VI
3)	IV	I	II	V	III	4)	III	I	IV	VI	V

77. Choose the correct set

List - I	*List - II*
A. Anterior commissure	I. Connects corpora striata
B. Median commissure	II. Connects superior colliculi
C. Posteror commissure	III. Connects cerebrum and medulla
D. Crura cerebrii	IV. Connects right and left halves of cerebellum
E. Pons varolii	V.Connects optic thalami

	A	B	C	D	E		A	B	C	D	E
1)	I	V	IV	II	III	2)	I	III	V	IV	II
3)	I	V	II	III	IV	4)	III	I	IV	II	V

78. Choose the correct combination

List - I	*List - II*
A. Epiphysis	I. Cerebellum
B. Hypophysis	II. Hypothalamus
C. Hippocampal lobe	III. Epithalamus
D. Lateral lobe	IV. Cerebrum
E. Myelocoel	V. Optic lobes
	VI. Medulla

	A	B	C	D	E		A	B	C	D	E
1)	I	V	IV	II	III	2)	I	III	V	IV	II
3)	III	II	IV	I	VI	4)	III	I	IV	II	V

79. Study the following.

Part of the Brain	**Location**	**Function**
I. Diencephalon	Fore brain	Reproduction
II. Cerebrum	Hind brain	Heart beat
III. Corpora quadrigemina	Mid brain	Vision
IV. Cerebellum	Hind brain	Reasoning

The correct combination is

1) I and IV 2) I and II
3) III and IV 4) I and III

80. Study the following

Part of brain	**Character**	**Function**
i) Metencephalon	No ventricle	Coordinates involuntary muscles
ii) Diencephalon	Has infundibulum	Centres of on the ventral side Temperature and pain
iii) Cerebrum	has 3rd ventricle	Controls voluntary muscles
iv) myelencephalon	Roof is non nervous	Control involuntary actions.

The correct combination is

1) i & iv 2) i & ii 3) ii & iii 4) ii & iv

81. Choose correct combination

Part of Brain	**Character I**	**Character II**
i) Cerebral hemispheres	Corpora straita	Lateral ventricles
ii) Cerebellum	arborvitae	without ventricle
iii) Diencephalon	Optic thalami	Diacoel
iv) Medulla oblongata	Posterior Choroid plexus	III ventricle

1) ii, iii 2) i, iii 3) iii, iv 4) All

82. The following are the parts of the brain :

a) Optic lobes b) Diencephalon c) Cerebrum d) Olfactory lobes
e) Cerebellum f) Medulla

Arrange them from anterior to posterior end.

1) a-b-c-d-e-f 2) d-b-a-c-f-e 3) d-c-b-a-e-f 4) c-d-b-a-e-f

83. The following are the ventricles in the brain of rabbit.

a) Diacoel b) Rhinocoel c) Paracoel d) Myelocoel

Arrange them in ascending order.

1) d-c-a-b 2) d-a-c-b 3) a-d-c-b 4) b-c-a-d

84. Reflex action involves **(JIPMER 2005)**

1) Spinal cord 2) Cerbellum 3) Medulla oblongata 4) Optic lobe

85. Sense of smell is by **(AFMC 2003)**

1) cerebrum 2) cerebellum 3) olfactory lobe 4) hypothalamus

SPINAL CORD

LEVEL - I

86. In the spinal cord the 'H' shaped or butterfly shaped part is
1) Dorsal fissure 2) Lateral fissure
3) Ventral fissure 4) Grey matter

87. Grey matter does not contain
1) Cytons 2) Non-medullated axons
3) Dendrites 4) Myelinated axons

88. White matter is composed of
1) Cytons 2) Medullated fibres
3) Non-myelenated axons 4) 2 & 3

89. Immediate covering's around spinal cord are
1) Meninges 2) Peritoneum
3) Neural arches 4) Cranium

90. Spinal cord is located in
1) Cranial canal 2) Central canal
3) Cerebral canal 4) Neural canal

91. Filum terminale is
1) Last part of spinal cord
2) First part of spinal cord
3) First part of hind brain
4) Middle part of hind brain

92. The brachial enlargement and the sciatic enlargement are the parts of
1) Diencephalon 2) Cranial nerves
3) Spinal cord 4) Brain

93. The fibre of this funiculus of spinal cord are connected to brain
1) dorsal 2) ventral
3) lateral 4) all funiculi

94. This surrounds the central canal of the spinal cord
1) White matter 2) Grey matter
3) Arbor vitae 4) Funiculi

95. Central canal of spinal cord is lined by
1) ciliated ependymal cells 2) cuboidal cells
3) flat cells 4) white matter

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

96. **Assertion (A) :** The last part of the spinal cord, posterior spinal nerves together called cauda equina which means the tail of a horse.
Reason (R) : The lumbar, sacral, caudal spinal nerves along with filum terminale form a thick bundle of nerves.

97. Identify the correct answer :
Assertion (A) : The rabbit has only 37 pairs of spinal nerves coming out through inter vertebral foramina, eventhough it has 44 vertebrae
Reason (R) : Spinal cord of rabbit does not extend into the tail.

98. The following are the statements about spinal cord of rabbit.
i) The spinal cord is located in the central canal.
ii) The white matter of spinal cord has deep and narrow dorsal fissure and ventral sulcus
iii) The white matter is distinguished as dorsal, lateral and ventral flocular lobes.
iv) In the T.S. of spinal cord H.shaped grey matter is surrounded by white matter.
Find the wrong statements.
1) ii and iii 2) i and iii 3) iii and iv 4) i and iv

99. The following are statements about spinal nerves of rabbit.
i) Spinal nerve is formed by the union of dorsal and ventral roots of white matter.
ii) Sensory fibres and motor fibres are present in dorsal and ventral roots respectively.
iii) The ventral and dorsal roots are small and long respectively.
iv) The spinal nerves emerge out from the vertebral column through the inter vertebral foramina.
The right combination is
1) i and ii 2) ii and iv 3) i and iii 4) iv and iii

100. The following are the characters of spinal cord as seen in its transverse section.
i) Dorsal fissure is more deeper and narrow.
ii) The grey matter around the central canal consists of medullated nerve fibres.
iii) The grey matter is butterfly shaped has dorsal and ventral horns.
iv) The dorsal funiculus is motor and ventral funiculus is sensory.
Choose the correct combination is
1) iii and iv 2) i and ii
3) ii and iv 4) i and iii

101. Choose the correct set of statements about spinal cord
i. It is enclosed by the central canal
ii. Grey horns divide the white matter into dorsal, lateral and ventral funiculi
iii. Lateral funiculus has sensory and motor fibres.
iv. Grey matter has cell bodies and axons of non-medullated neurons.
1) i, ii 2) i, iii 3) ii, iii, iv 4) all

102. Choose the correct combination with reference to spinal cord
i. Central canal - CSF - lined by ependyma
ii. Dorsal funiculus - myelinated - sensory fibres
iii. Ventral funiculus - myelinated - motor fibres

1) all 2) i, iii 3) ii, iii 4) i, ii

103. Match the list ii with list i

List- i	List - ii
A. Filum terminale	i. Terminal part of spinal cord
B. Brachial enlargement	ii. Hind limbs
C. Horns of spinal cord	iii. Fore limbs
D. Medullated fibres	iv. Grey matter
	v. White matter

	A	B	C	D
1)	i	ii	v	iv
2)	i	iii	v	iv
3)	i	iii	iv	v
4)	iii	ii	iv	v

104. Match the following.

List - i	List - ii
A. Cervical plexus	i. Fore limbs
B. Brachial plexus	ii. Cauda equina
C. Lumbo sacral plexus and Filum terminale	iii. Tongue and Hyoid apparatus
D. Hypoglossal nerve	iv. Pharynx and larynx
	v. Diaphragm

	A	B	C	D
1)	i	ii	iv	iii
2)	ii	iii	iv	i
3)	i	iii	iv	ii
4)	v	i	ii	iii

105. Choose the correct Matching

List - I	*List - II*
A. Foramen magnum	I. Cerebellum
B. Funiculus	II. White matter of spinal cord
C. Flocculus	III. non nervous terminal part of spinal cord
D. Filum terminale	IV. Opening of cranium
	V. Cavity of vertebra

	A	B	C	D
1)	I	VI	IV	V
2)	IV	II	I	III
3)	IV	I	II	V
4)	III	I	IV	V

106. The following are related to spinal cord of Rabbit.
a) Duramater b) Piamater c) White matter
d) Grey matter e) Central canal
Arrange these parts from outside to inside in sequence.
1) b-a-c-d-e 2) e-a-b-d-c
3) a-b-c-d-e 4) e-a-c-d-b

CRANIAL NERVES

LEVEL - I

107. The last cranial nerve in amniotes is
1) Brachial nerve
2) Glossopharyngeal nerve
3) Hypoglossal nerve 4) Hypogastric nerve

108. The branch of auditory nerve which innervates utriculus and sacculus of the internal ear
1) Cochlear 2) Vestibular
3) Chordatympani 4) Mandibular

109. The mixed nerve that innervates the tongue, pharynx, salivary glands is
1) Vagus 2) Trigeminal
3) Glossopharyngeal 4) Hypoglossal

110. The motor nerve that innervates the superior oblique muscles of eye is
1) Optic nerve 2) Trigeminal
3) Trochlear 4) Abducens

111. The motor nerve that innervates the external posterior rectus muscles of eye is
1) Trigeminal 2) Occulomotor
3) Abducens 4) Facial

112. In rabbit out of the total number of cranial nerves the number of pairs of nerves that arise from the medulla oblongata
1) 7 2) 8 3) 5 4) 9

113. The cranial nerve which innervates all other parts of the body except head is
1) Vagus 2) Spinal accessory
3) Hypoglossal 4) Auditory

114. The origin of facial nerve is from
1) Floor of mid brain 2) Pons Varolii
3) Olfactory lobe 4) Hypothalamus

115. Which of the following cranial nerves of rabbit are purely sensory in nature
1) III, IV, VII 2) V, VII, IX
3) I, II, VIII 4) VIII, IX, X

116. The number of cranial nerves in rabbit
1) 10 pairs 2) 12 pairs
3) 13 pairs 4) 14 pairs

117. Hypoglossal in rabbit is
1) XII cranial nerve 2) XI cranial nerve
3) X cranial nerve 4) IX cranial nerve

118. The cranial nerve which innervates pharynx, larynx and neck
1) XI 2) XII 3) IX 4) VIII

119. Cranial nerve which is longest and innervates visceral organs is
1) Trigeminal 2) Auditory
3) Glosso pharyngeal 4) Vagus

120. The cranial nerve which innervates both jaws
1) Optic nerve 2) Olfactory
3) Trigeminal nerve 4) Vagus nerve

121. Number of pairs of mixed cranial nerves in rabbit
1) 3 2) 4 3) 5 4) 6

122. Vagus nerve is
1) Motor 2) Sensory
3) Mixed 4) Part of brachial plexus

123. The 11th and 12th cranial nerves of Rabbit are respectively called
1) Hypoglossal and spinal accessory
2) Hypoglossal and pneumogastric
3) Spinal accessory and Hypoglossal
4) Hypoglossal and glossopharyngeal

124. Parotid salivary gland is innervated by this cranial nerve
1) lingual of IX 2) pharyngeal of IX
3) mandibular of V 4) maxillary of V

125. Sensory impulses from the cochlea of ear are taken to this part of brain
1) superior colliculi 2) medulla
3) cerebrum 4) hypothalamus

126. Sensory impulses from tongue of rabbit are taken to the brain through these nerves
1) Hypoglossal, lingual 2) maxillary, mandibular
3) Lingual,mandibular 4) pharyngeal, mandibular

127. The cranial nerve with only mixed branches
1) Glossopharyngeal 2) Facial
3) Trigeminal 4) Vagus

128. The motor impulses to lacrimal glands are conducted by
1) Mandibular of V 2) Maxillary of V
3) Opthalmic superficialis of V
4) Hyomandibular of VII

129. The mixed branch of vagus nerve does not innervate
1) stomach 2) oesophagus
3) heart 4) lungs

130. Sensory impulses from fungiform papillae of tongue reach brain through
1) maxillary of V 2) mandibular of V
3) chorda tympani of VII 4) both 2 and 3

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

131. **Assertion (A) :** Paralysis of vocal cords is caused by the impairment of the largest cranial nerve.
Reason (R) : Xth cranial nerve innervates the parts of the voice box in mammals.

132. **Assertion (A) :** Digestion, Respiration, excretion and circulation are under the control of medulla.
Reason (R) : Cardiac and pneumogastric branches of Xth cranial nerve innervates heart, l ungs, oesophagus and stomach.

133. Match the following :

List - I Origin	List - II Name of Nerve
A. Pons Varolii	i. Pneumogastric
B. Crura cerebri	ii. Trochlear
C. Dorsal side of mid brain	iii. Auditory
D. Vagus ganglion	iv. Trigeminal
	v. Occulomotor

	A	B	C	D
1)	iv	ii	iii	i
2)	iv	v	ii	i
3)	i	ii	iii	iv
4)	iii	i	iv	ii

134. Match the following

A. Trigeminal nerve	i. Chordatympani
B. Facial nerve	ii. Lingual
C. Glossopharyngeal	iii. Pneumogastric
D. Vagus nerve	iv. Maxillary
	v. Vestibular

	A	B	C	D
1)	i	iii	iv	v
2)	iv	i	ii	iii
3)	iii	ii	v	iv
4)	i	iii	iv	v

135. Study the following

Nerve	Distribution	Nature
I) Ophthalmic	Eyelids	Motor
II) Hyomandibular	Lower Jaw	Mixed
III) Hypoglossal	Tongue	Motor

The correct combination is
1) I & III 2) III & II
3) I & II 4) I, II & III

136. The following are the cranial nerves
a) Vestibular b) Ophthalmic superficialis
c) Trochlear d) Chordatympani
e) Lingual
Arrange them in sequence based on their serial number
1) d, e, a 2) b, e, d
3) b, d, e 4) a, c, d

137. The following are the cranial nerves in Rabbit
a) Trochlear b) Facial
c) Abducens d) Trigeminal
Arrange these nerves in correct sequence.
1) a, b, d, c 2) d, a, b, c
3) d, a, c, b 4) a, d, c, b

138. The cranial nerve in Rabbit that is connected to the superior oblique muscle of the eye is : (EAMET 2004)
1) II 2) IV 3) V 4) VIII

139. The cranial nerve that goes to the external rectus muscle is : (EAMCET 2006)
1) II 2) III
3) VII 4) VI

SPINAL NERVES

LEVEL - I

140. Brachial plexus supplying to the muscles of the forelimb is formed by
1) 5-8 cervical and 1st thoracic nerve
2) 4-6 cervical and 1st thoracic nerve
3) 4-8 cervical nerves only
4) 4-6 cervical nerves only

141. The number of caudal spinal nerves in rabbit
1) 4 pairs 2) 7 pairs
3) 8 pairs 4) 6 pairs

142. Brachial plexus supplies nerves to
1) Fore limb 2) Neck
3) Hind limb 4) Diaphragm

143. Identify the correct statement with regard to nerves of rabbit
1) All cranial nerves are mixed
2) All spinal nerves are mixed
3) All cranial nerves are sensory
4) All spinal nerves are sensory

144. Phrenic nerve is formed by
1) 4th spinal nerve 2) 5th spinal nerve
3) 6th spinal nerve 4) all the above

145. Identify the nerves arising from brachieal plexus and lumbosacral plexus respectively
1) radial, phrenic 2) obturator, median
3) auricular, sciatic 4) ulnar, femoral

146. The first spinal nerve emerges out from the neural canal through an aperture between
1) atlas and axis
2) axis and 3rd cervical vertebra
3) skull and atlas
4) 1st and 2nd vertebra

147. Choose the incorrect pair
1) Cervical plexus - phrenic nerve
2) 3rd cervical spinal nerve auricular nerve
3) 4th to 6th cervical nerves - brachial plexus
4) Cauda equina - lumbar, sacral and caudal nerves

148. Intervertebral foramina represent the opening for emergence of
1) spinal nerve 2) cranial nerve
3) spinal cord 4) medulla oblongata

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

149. **Assertion (A) :** Ramus ventralis of spinal nerve innervates skin and muscles of dorsal bodywall.
Reason (R) : Dorsal root of spinal cord contain sensory fibres, and ventral root contain motor fibres.

150. Match the following.

A. Cervical spinal nerves	i. 7 pairs
B. Cranial nerves of rabbit	ii. 6 pairs
C. Sacral spinal nerves	iii. 8 pairs
D. Lumbar spinal nerves	iv. 4 pairs
	v. 12 pairs

	A	B	C	D
1)	v	i	iv	v
2)	iii	v	iv	i
3)	i	iii	i	iv
4)	i	iii	i	iv

151. The following are the spinal nerves
a) Cervical - 7 pairs b) Lumbar - 7 pairs
c) Sacral 4 pairs d) Caudal 4 pairs
e) Thoracic - 12 pairs
The correct combination with correct sequence from anterior to posterior
1) a-c-e-b-d 2)a-e-b-c-d
3) a-e-c-b-d 4) a-b-e-c-d

152. Choose the correct combination with reference to spinal nerves of rabbit
I) 3rd cervical nerve - auricular nerve - pinna
II) Cervical nerve - Phrenic nerve - Diaphragm
III) Brachial plexus - obturator - forelimb
IV) Lumbosacral plexus - Median - hind limb
1) I, II 2) II, III 3) III, IV 4) I, IV

153. The brachial plexus are formed by these spinal nerves : (EAMCET 2005)
1) IV, V, VI cervical
2) V, VI, VII, VIII cervical and I thoracic

3) IV to VII Lumbar 4) First three sacral

AUTONOMIC NERVOUS SYSTEM

LEVEL - I

154. Smooth muscles of the visceral organs are under the control of
1) Central nervous system
2) Autonomous nervous system
3) Both 1 and 2 4) Filum terminale

155. Sympathetic nerves from this ganglion innervate the gonads, kidney, urinary bladder and rectum
1) Inferior cervical 2) Superior cervical
3) Coeliac 4) Hypogastric

156. The subsystems which innervate a particular organ and act antagonistically are
1) Sympathetic and parasympathetic
2) Central nervous system and peripheral nervous system
3) Sympathetic and central nervous system
4) Parasympathetic only

157. The ganglia of sympathetic chain are connected to spinal nerve through
1) Ramus dorsalis 2) Ramus ventralis
3) Ramus communicans 4) 1 & 3

158. Para sympathetic nervous system is formed by
1) Craniothoracico outflow
2) Cranio sacral out flow
3) Thoracico-lumbar out flow
4) Thoracico sacral out flow

159. Which of the system inhibits the activities and brings the organ back to the normal position
1) Sympathetic 2) Parasympathtic
3) Central nervous system
4) Peripheral nervous system

160. Visceral sensory and somatic sensory fibres reach the spinal cord via
1) Dorsal root only
2) Dorsal and ventral roots
3) Ventral and dorsal roots 4) Ventral root only

161. Adrenergic neurons release this neurotransmitter
1. Acetyl choline 2) adrenalin
3) norepinephrine 4) Secretin

162. Identify the collateral ganglia of thoraco lumbar outflow
1) Anterior mesenteric, coeliac 2) Coeliac, ciliary
3) Otic, pterygopalatine 4) Submandibular, ciliary

163. The part of brain which regulates the tone of ANS is
1) Epithalamus 2) Cerebrum
3) Cerebellum 4) Hypotnalamus

164. Choose the incorrect statement
1) The no. of sympathetic chain ganglia is equal to the no. of spinal nerves
2) Preganglion nerve fibres of sympathetic system are shorter than post ganglionic nerve fibres.
3) Ganglionic axons of sympathetic trunk ganglia mostly innervate visceral organs of thoracic region.
4) Parasympathetic division enhances 'rest' and 'digest' activities.

165. Functioning of sympathetic division resembles the activityof this hormone
1) somatotropin 2) acetyl choline
3) insulin 4) adrenalin

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

166. **Assertion (A):** Somatic nervous system controls voluntary movements of skeletal muscles.
Reason(R): Nerves originating from hypothalamus integrate the functions of voluntary muscles.

167. **Assertion (A) :** The heart which beats fast during running, reduces its number of beats to normal at rest.
Reason (R) : Stimulation of sympathetic nervous system brings the heart to normal condition.

168. **Assertion (A) :** Parasympathetic division enhances 'rest - and - digest' activities.
Reason (R) : It reduces body functions that favour storage of energy

169. **Assertion (A) :** Activation of sympatheticdivision and release of hormones by the adrenal medulla brings about fight - or - flight response
Reason (R) : Stimulation of sympathetic nervous system and release of adrenalin hormone accelerate the activity of organs in general.

170. **Assertion (A) :** Somatic nervous system has a single motor-neuron pathway
Reason (R) : The axon of a single myelinated somatic motor neuron extends from CNS all the way to the skeletal muscle fibres.

171. Choose the correct set related to sympathetic stimulation.
A. Dilation of pupil
B. Constriction of coronary arterioles
C. Stimulation of secretion of digestive enzymes
D. Dilation of skeletal muscle arterioles
1) All except A 2) B, D only
3) A & D 4) All

172. Read the following
A) Relaxation of sphincters in the alimentary canal
B) dilation of coronary arterioles
C) Constriction of bronchii
D) Decrease of heart beat
The correct combination related to parasympathetic stimulation
1) all except B 2) B, C only
3) all except A 4) A, B only

173. The following are the statements about autonomic nervous system.
i) Autonomic nervous system entirely works under the influence of spinal nerves.
ii) Antagonistic actions are executed by the ANS.
iii) Secretions of glands, heart beat and blood pressure are under the influence of ANS.
iv) ANS usually operates without the conscious control of the organism.
Find the correct combination is
1) i, ii and iii 2) ii, i and iv
3) ii, iii and iv 4) i,iii and iv

174. The following are the statements about sympathetic nervous system.
i) Sympathetic nervous system is partly independent and controls involuntary activities.
ii) The sympathetic stimulation causes, increased heart beat, raise in blood pressure, bronchial dilation.
iii) Pelvic ganglion is a part of sympathetic system.
The correct combination is
1) All are true 2) only i & ii are true
3) i & iii are true 4) only ii & iii are true

175. Choose the correct set realted to ANS
i. Preganglionic nerve fibres are myelinated and secrete acetyl choline
ii. All post ganglionic nerve fibres are non myelinated and secrete non epinephrine
iii. Terminal ganglia of cranio sacral outflow are close to the visceral organs
1) i, ii 2) ii, iii 3) i, iii 4) all

176. Choose the correct set realted to ANS
i. Sympathetic stimulation increases blood pressure but decreases peristalsis
ii. Muscles of arrector pili contract by parasympathetic stimulation
iii. Sympathetic stimulation causes the contraction of sphincter in the neckof urinary bladder.
1) i,ii 2)i, iii 3) ii, iii 4) all

NERVE IMPULSE
- The functional unit of nervous system is - **Neuron**
- Neurons act as wiring of - **Nervous system**
- Receivers of signals in a neuron - **Dendrites**
- Conductor of signals in a neuron - **Axon**
- The cells with electrical excitability are - **Muscle cells and nerve cells**

PROPERTIES OF NEURONS

I. Irritability : It is the capacity to react to environmental changes (or) the response to stimuli.

II. Threshold stimulus :
- It is the minimum strength of the stimulus to which a nerve(or) a muscle responds.

CONDUCTIVITY :
- Conduction of the stimulus in the form of nerve impulse from the site of its application along the nerve (or) a muscle fibre is known as - **conductivity**

All or none Principle :
- When the depolarization is just equal to or above the threshold potential, an action potential of equal amplitude is initiated. Thus action potential is an **all-or-none** phenomenon
- The conduction of nerve impulse is a Electro Chemical Phenomenon. It is conducted along the axon without any change in its intensity or velocity.

CONDUCTION OF NERVE IMPULSE :
- The sum total of mechanical, chemical and electrical disturbance created by a threshold stimulus in a neuron is known as 'nerve impulse.
- Physical and chemical changes are first initiated at the point of application of stimulus.

RESTING POTENTIAL : (POLARISED STATE)
- When a nerve fibre is at rest, its outer face is positively charged and its inner face is negatively charged.
- The above potential difference across the membrane is called **- Resting potential or Membrane potential.**
- ECF contains large amount of - Na^+ **ions**
- Axoplasm contains large amount of - K^+ **ions**
- Diffusible potassium and non-diffusible organic phosphates and complex organic molecules are found in **-axoplasm**
- The resting potential across the membrane is caused by **- Sodium – Potassium ATPase pump.**
- The resting potential is mainly due to the unequal distribution of Na^+ and K^+ across the outer and inner face of membrane.
- In the resting condition the cell roughly 100 times more permeable to K^+ than to Na^+ at this point.

- Sodium ion (Na^+) concentration is about **10 times greater** on the outer face than that of inner face.
- Concentration of K+ is about **30 times greater** on the inner face than that of outer face.
- A large number of non-diffusable, negatively charged mostly proteins are **- trapped in the nerve cells.**
- Influx of Na^+ **ions** into axoplasm and continuous out flux of potassium ions from axoplasm occurs through-**leakage channels during resting state**
- At resting state activation gate of sodium is **closed and inactivation gate is - opened**
- The resting potential is about **-70 (mV) milli volts.**
- The neurilemma is more permeable to **- Potassium than to Sodium.**
- Due to this reason Na^+ ions can not diffuse back into resting neuron. But K^+ ions are able to diffuse.

ACTION POTENTIAL

- Action potential arises according to - **all or none principle**
- Electrical chemical or mechanical stimulus may alter the resting potential by increasing the permeability of plasma membrane to sodium.
- The excitatory stimuli **open sodium gates**. permitting Na^+ ions to rush into the cell.
- When depolarisation reaches threshold level, the voltage gated channels - **open and amplitude of actionpotential is generated**
- At the threshold level the membrane potential changes from **-70 to - 55 mv**
- This passaige of positive sodium ions into the cell. **- Depolarisies the membrane**
- This wave of depolarization is called **- nerve impulse or action potential**
- Influx of Na^+ ions changes the membrane potential from **--55 to + 45 mV (Depolarising Phase)**
- As the wave of depolarization moves along the axon, the membrane over which it has just passed **begins to repolarise.**
- The sodium gates close and the potassium gates open during **- repolarisation**
- Resting potential is reestablished with the restoration of Na pump.
- During depolarising phase **- both gates of Sodium channel are opened and the potassium channel is closed.**
- Depolarsing phase is followed by- **Repolarising Phase**
- In repolarising phase activation gate of **- Potassium channel is opened**
- Inactivation gate of sodium channel is **-closed**
- During Hyperpolarisation phase-**Both the gates of Sodium channels are colsed and potassium channels are remained open**
- Now the membrane potential becomes **-90 mV inside**
- During repolarisation and Hyperpolarisation - **inactivation gates of sodium are closed**
- Insensitive to stimulus period is called **- refractory period**
- For a millisecond after initiation of an action potential., it is impossible to trigger a second action potential. This period is called **absolute refractory period**
- The **relative refractory period** is the time during which a second action potential can be initiated by a larger-than-normal stimulus

TRANSMISSION OF NERVE IMPULSE

- The **giant axons** are present in **invertebrates**
- Many neurons of vertebrates are **myelinated**
- In myelinated axons the myelin sheath is not continuous it is interrupted at nodes of **Raniver.**
- At the node of Ranvier the membrane makes direct contact with the interstitial fluid.
- **Depolarisation occurs at the nodes of Ranvier only.**
- Depolarisation spreads around the outer face of the membrane from one node to the next node. Thus the impulse of jumping or leaping transmission of nerve impulse in a medullated fibre is known as **'Saltatory conduction'.**
- Saltatory conduction is 50 times faster than the continuous type in a **non-medullated fibre**.
- Saltatory conduction requires less energy than continuous conduction.
- The greater the diameter of an axon, **the faster the conduction**

SYNAPTIC TRANSMISSION

- **The structural gap (or) functional bridge between the teledendrites of one neuron and the dendrites of Next neuron is known as 'Synapse'.**
- In a chemical synapse, the presynaptic neuron synthesizes **- Neurotransmitter**
- Neurotransmitter is stored in- **Synaptic vesicles of synaptic terminals**
- The neurotransmitter from synaptic vesicle is secreted by a process - **Exocytosis**
  The postsynaptic membrane has **ligand-gated ion channels**
- The most common neurotransmitter of both invertebrates and vertebrates is **Acetylcholine**

- The enzyme of postsynaptic membrane which hydrolyses Acetyl choline quickly is **Acetyl Cholinesterase.**
- The other neurotransmitters which indirectly help in synaptic transmission are - **Norepinephrine, epinephrine, serotonin and dopamine**.
- Excitatory neurotransmitters depolarise the postsynaptic membrane causing **excitatory post synaptic potentials (EPSPs)**
- Post synaptic regeneration action potential is inhibited by **- Inhibitory neurotransmitters Ex. Glycine & GABA (Gama amino butyric acid)**
- These potentials are called **inhibitory post' synaptic potentials (IPSPs)**
  Summation of post synaptic potentials
- Post synaptic potentials are graded and do not have refractory periods, thus occuring Summation of potentials
- A neuron recieves inputs from many synapses and the integration of these inputs is known as **- summation**
- Summation occurs at the **- axon hillock**
- Summation of inputs from several presynaptic boutons is called **-spatial summation**
- The summation of successive inputs from a single presynaptic bouton is called **-temporal summation**
- The threshold is reached when the sum of all EPSPs exceeds the sum of IPSPs, thus **generating an action potential.**

NERVE IMPULSE

LEVEL - I

177. The resting membrane potential in a nerve fibre is
1) + 75 mv 2) + 45 mv
3) -45 mv 4) - 70 mv

178. Concentration of sodium ion in the ECF is
1) Ten times its concentration in the axoplasm
2) Thirty times its concentration in the axoplasm
3) five times its concentration in the axoplasm
4) 100 times its concentration in the axoplasm

179. Principal anions in the ECF is
1) Chloride ions
2) Nondiffusible proteins
3) Sulphate ions
4) Phosphate ions

180. Membrane potential can be measured by
1) Polygraphy 2) Sonography
3) Oscilloscope 4) Ammeter

181. In the resting membrane potential the axolemma is
1) Permeable to sulphates and phosphate ions
2) 100 times more permeable to Na^+ than to K^+
3) Impermeable to both Na^+ and K^+ ions
4) 100 times more permeable to K^+ than to Na^+

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

182. Assertion(A): Plasma membrane of axon of a neuron is more permeable to potassium ions than to the sodium ions of the resting state.
Reason (R): Voltage gated channels of sodium are provided with one gate only

183. To maintain Na^+ and k^+ "sodium potassium pump" transports
1) Two Na^+ into ECF and three K^+ into the cell
2) Two Na^+ into ECF and two K^+ into the cell
3) Three Na^+ into ECF and two K^+ into the cell
4) Three Na^+ into ECF and four K^+ into the cell

184. Two conditions on which resting membrane potential of nerve fibre depends
i) Equal distribution of ions across the axolemma
ii) Defferential permeability of the axolemma
iii) Equal permeability of the axolemma
iv) Unequal distribution of ions across the axolemma
Choose the correct combination
1) I & II 2) I & III
3) II & IV 4) III & IV

ACTION POTENTIAL

LEVEL - I

185. In which of the following phases inactivation gate of sodium channel is in closed condition
1) Resting phase, Depolarisation phase
2) Repolarisation phase alone
3) Repolarisation phase and Depolarisation phase
4) Hyperpolarisation and Repolarisation

186. In which of the following phases of conduction of nerve impulse the potassium channels are in open condition
1) Resting phase, Repolarisation phase
2) Resting phase, Depolarisation phase

3) Hyper polarization phase, Repolarisation phase
4) Hyper polarization phase, Depolarisation phase

187. Depolarisation of axolemma is due to
1) Out flux of Na^+ 2) Influx of Na^+
3) Outflux of K^+ 4) influx of K^+

188. During which two phases inactivation gates of Na^+ are opened
1) Resting phase, repolarisation phase
2) Depolarisation phase, Hyperpolarisation
3) Repolarisation phase, Hyperpolarisation phase
4) Resting phase, depolarisation phase

189. At the threshold level the membrane potential changes from
1) + 45 to - 70 mv 2) - 70 to - 90 mv
3) - 55 to + 45 mv 4) -70 to -55 mv

190. The membrane potential when the both gates of Na^+ are closed and potassium channels are opened
1) - 70 mv 2) - 90 mv
3) - 55 mv 4) + 45 mv

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

191. In which of the following phases both the gates of sodium channels are in resting state
1) Depolarisation phase and Hyper polarization phase
2) Hyper polarization phase
3) Hyperpolarisation phase and Repolarisation phase
4) Resting phase, Repolarisation phase

192. Identify the correct sequence of changes in membrane potential of the axon from resting state to hyper polarization phase
1) –70mV –55mV –90mV + 45mV
2) –55mV –70mV –45mV + 90mV
3) –70mV + 55 mV – 45 mV – 90 mV
4) –70mV – 55mV + 45mV – 90 mV

193. In which of the following phase both the gates of sodium opened and potassium channel closed.
1) Depolarising phase 2) Hyperpolarising phase
3) Repolarising phase 4) Resting phase

194. Which of the following statements are related to medullary nerve fibres?
I) They are insulated by myelin sheath
II) Depolarisation occurs in nodes of Ranvier
III) Saltatory transmission occurs in them
1) I and II 2) I and III
3) II and III 4) all are true

195. Identify the sequence of changes during the transmission of nerve impulse
a) Influx of Na^+ ions from ECF into cytoplasm of nerve fibre
b) Outward diffusion of Na^+ ions causing repolarisation
c) Depolarisation causes a potential of +45 mv on inner side of axolemma
d) Stimulation of cell membrane alters its permeability to Na^+ ions and thereby resting potential is altered
1) a - b- c -d 2) d- a -c - b
3) a - d - b - c 4) d - b - a - c

196. Influx of Na^+ ions occurs from ECF to axoplasm during
i) Resting state through leakage channels
ii) Depolarisation phase when both the Na^+ voltage gated channels open
iii) Concentration of Na^+ ions in axoplam is about 10 times less than in ECF
iv) Plasmamembrane of neuron has more Na^+ leakage channels
Choose the correct combination
1) i, ii, and iii are correct
2) i, iii and iv are correct
3) i, iii and iv are correct
4) only iii, iv are correct

197. Assertion (A): Action potentials are self propagating
Reason (R) A wave of depolarisation can induce another action potential in forward direction.

198. **Assertion (A) :** The imbalance in the concentration of Na^+ and K^+ and proteins generates the resting potential. **(AIIMS 2002)**
Reason (R) : To maintain the unequal distribution of Na^+ and K^+, the neurons use electrical energy.

SYNAPTIC TRANSMISSION

LEVEL - I

199. Which of the following is an aminoacid that acts only as inhibitory neurotransmitter?
1) Serotonin 2) Dopamine
3) Glycine 4) Norepinephrine

200. Identify the set of inhibitory neurotransmitters from the following
1) Serotonin, Dopamine
2) Norepinephrine, Glycine
3) Gama Amino Butyric acid, Glycine
4) Glycine, Serotonin

201. One of the following is purely inhibitory
1) Epinephrine 2) Seratonin
3) GABA 4) Acetylcholine

202. This enzyme neutralises the Acetylcholine at the synapse
1) Acetylcholine 2) Cholineesterase
3) Nor epinephrine 4) Dopamine

203. The summation of inputs from several presynaptic boutons is called
1) Temporal summation 2) Excitatory post synaptic potentials 3) Spatial summation
4) Inhibitory post synaptic potentials

LEVEL - II

204. The inhibitory Post-synaptic potentials (IPSPs) have a charge of
1) –70 mV
2) More than –70 mV (more negative)
3) Less than –70 mV (less negative)
4) Exactly –55 mV

205. Once a synaptic junction between neurons has allowed the transmission of a nerve impulse across it, the 'synaptic cleft' is made ready to transmit the next impulse. The foremost activity facilitating this process is that of
1) Storage of acetylcholine
2) Degradation of acetylcholine
3) GABA 4) Ca^+

206. Assertion (A): Acetylcholine can act as an excitatory neurotransimitter.
Reason (R): The most sympathetic postganglionic neurons release the neurotransmitter acetylcholine.
1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

207. Receptor proteins are present on
1) Presynaptic membrane of axon terminal
2) Postsynaptic membrane of axon terminal
3) Presynaptic membrane of dendrite
4) Postasynaptic membrane of dendrite

208. Excitatory neurotransmitters released into the synapse causes
1) Opening of voltage-gated calcium channel
2) Depolarization of presynaptic membrane
3) Hyperpolarization of postsynaptic membrane
4) Depolarisation of postsynaptic membrane

ENDOCRINE SYSTEM

INTRODUCTION

- Different cells in the body are communicated and integrated by hormones.
- There are two types of glands :
  1.Exocrine glads Eg.Sweat gland
  2.Endocrine glands Eg Thyroid gland
- Study of endocrine glands and their disorders is called **endocrinology**

Chemical messengers:

- Activities of various cells of body are co-ordinated by several types of **chemical messengers.**
- Substances released by axon terminals of neurons into synaptic cleft are **neurotransmitters**
- Substances that are released by glands or specialised cells into blood are **hormones**
- Substances that are secreted by neurons into blood are **neuroendocrine hormones.**
- Substances that are secreted by cells into interstitial fluid are **cytokines.**
- Substance that acts as a neurotransmitter as well as a hormone is **noreprinephrine**
- Substances that are useful in long distance and local signaling are **chemical messengers**

Hormones & mechanism of their action:

- The chemical messenger that is secreted by glands or specialised cells or neurons, into blood and influences the cells at another location in the body is called **hormone.**
- Hormones are secreted in **lower quantities**
- Hormones are degraded by tissues and excreted by liver (into bile) and kidneys (into urine)
- **Chemical classes of hormones:**
- **-Peptide hormones & protein hormones:**

Peptide hormones consists of chains of 3 to 49 aminoacids. Eg. ADH & oxytocin.
-Protein hormones consists of 50 to 200 amino acids Eg.hGH,TSH & Insulin

- **Steroid hormones :**
-Derivatives of cholesterol
Eg.Corticosteroids,oestrogen, progesterone &testosterone.

3. **Amine hormones:**

- Derived from a **single amino acid**
- Catecholamines (epinephrine, norepinephrine) and thyroid hormones are derived from tyrosine.
- Melatonin is derived from tryptophan

Hormone transport

- Water soluble hormones are circulated through blood plasma
- Lipid soluble hormones circulate in the blood mainly bound to plasma proteins.

Mechanism of hormone action

- Hormone binds to specific protein of target cells called **hormone receptors.**
- The hormones that can affect many cells of differemt types are **growth hormone & Thyroxine**
- Steroids and Thyroid hormones are **lipid soluble hormones.**
- The hormones that diffuse through plasma membrane and bind to intracellular receptors are **lipid soluble hormones.**
- The activated receptor - hormone complex influences **gene expression.**
- Protein hormones, peptide hormones & catecholamine are **water soluble hormones** (lipid insoluble).
- Water soluble hormones cannot diffuse through plasma membrance and bind to receptors on target cells.
- **Second messenger** (eg.Cyclic AMP) is produced inside the cell which causes activation of a cascade of enzymes

Endocrine glands of rabbit:

- Purely endocrine glands are pituitary, Thyroid etc.
- Partly endocrine glands are pancreas, gonads etc.

PITUITARY GLAND

- Pituitary gland is called **-Master Endocrine gland.**
- Pituitary gland is present in a small depression of the cranium called **-Sellaturcica.**
- Pituitary gland is connected to the ventral wall of Diencephalon of the brain through **-Infundibular stalk.**
- The gland which is formed by the union of two main lobes, an Adenohypophysis and a Neurohypophysis is **- Pituitary gland.**
- Adenohypophysis develops from the roof of buccal cavity as a pouch called **-Rathke's Pouch**
- Adenohypophysis is distinguished into - **A large anterior lobe and a thin intermediate lobe**
- Intermediate lobe atrophies during **human foetal development**
- Neurohypophysis (posterior lobe) develops from terminal region **of an ectodermal out growth hypothalamus**.

Adenohypophysis :

- Hormones secreted by adenohypophysis influence other endocrine glands and are called **tropic hormones**
- Release & inhibition of hormones from adenohypophysis are under the control of hormones secreted by **hypothalamus**
- Hypothalamic secretions reach adenohypophysis through **hypophyseal portal system**.
- Secretion of growth hormone is stimulated by **growth hormone-releasing hormone** (GHRH) or **Somatocrinin**.
- Growth hormone secretion is inhibited by **growth hormone inhibiting hormone** (GHIH) or **Somatostatin**.
- Secretion of TSH, FSH, LH and ACTH decreases when blood levels of their target glands hormones rise and is called **negative feed back**.
- Adenohypophysis secretes **7 protein hormones**.
- **Growth hormone (GH)/Somatotropin**
- Cells of liver, skeletal muscles, cartilage, bone & other tissues secrete **insulin-like growth factors** (IGF) by the influence of **growth hormone**.
- Increase in uptake of aminoacids by cells, acceleration of synthesis of proteins & decrease in the catabolism of proteins is caused by – **IGFs**

Thyroid stimulating hormone (TSH) stimulates the secretion of **thyroid hormones**.

Adrenocorticotropic hormone (ACTH) controls the secretion of **glucocorticoids** by the **adrenal cortex**.

Follicle stimulating hormone (FSH)

- The hormone that initiates the development of ovarian follicles in females is **FSH**
- The hormone that stimulates spermatogenesis in

males is **FSH**

Leutinizing hormone(LH)

- The hormone that stimulates ovulation, formation & secretion of corpus luteum is **-LH**
- The hormone that stimulates Leydig cells in testes is-**Interstitial cell stimulating hormone (ICSH)**.
- FSH & LH are termed **gonadotropins**.

Prolactin

- The hormone that initiates and maintains milk secretion by mammary glands is **-Prolactin (PRL)**.

Melanocyte stimulating hormones

- The hormone that increases skin pigmentation in fishes & amphibians is **Melanocyte stimulating hormone** (MSH).

NEUROHYPOPHYSIS

- Two small peptide hormones called **Vasopressin** and **oxytocin** secreted by the **hypothalamic neurons** flow down the axon and form local accumulations in neurohypophysis.

VASOPRESSIN :

- The hormone which helps in reabsorption of water from the distal convoluted tubules, collecting duct of nephrons is **-Vasopressin.**
- Vasopressin reduces excretion of water in urine, hence it is also called **- Antidiuretic hormone.**
- Urine becomes concentrated and ECF is diluted, increasing the BP due to release of large amounts of **-Vasopressin.**
- Urine becomes diluted and ECF is concentrated decreasing the BP due to release of lesser amounts of **-Vasopressin**
- Constriction of arterioles is caused by **vasopressin**
- Amount of ADH secreted is regulated by **osmoreceptors of hypothalamus**

OXYTOCIN

- The hormone which stimulates contraction of smooth uterine muscles, facilitating child birth is **-Oxytocin.**
- The hormone that helps in the release of milk is **-Oxytocin.**

Thyroid gland

- Largest gland among the endocrine system **-Thyroid gland**
- The two lobes of thyroid gland are connected by **-Median Isthmus**
- Origin of thyroid gland **-Endodermal**
- The gland which is homologous to the Endostyle of prochordates is **-Thyroid gland**
- Thyroxine or Tetraiodothyronine (T_4) with four iodine atoms & Triiodothyronine (T_3) with three iodine atoms are produced by **follicular cells of Thyroid**.
- Parafollicular cells of thyroid produce the hormone **calcitonin**
- The hormone which lowers calcium level in ECF is **-Calcitonin**
- The hormones that increase basal metabolic rate, body temperature, protein synthesis, growth of body and nervous tissue are **-thyroid hormones**
- The hormone that is essential for metamorphosis in amphibians is **- Thyroxine**
- The hormone that lowers blood calcium and phosphates is **- Calcitonin.**
- Inhibition of bone resorption by osteoclasts and acceleration of calcium and phosphorus uptake into bone matrix is by the action of **- Calcitonin.**

PARATHYROID GLANDS

- Parathyroids secrete single hormone called **-Parathormone**
- Hypercalcaemic hormone is **parathormone (PTH)**
- Increase in bone resorption by activating osteoclasts is by **-PTH**
- The hormone that reduces loss of calcium and magnesium and increases loss of $HPO4^{-2}$ in urine is **- PTH**
- The active form of vitamin D is calcitriol.
- Formation of calcitriol is promoted by **PTH**
- Absorption of Ca^{+2},$HPO4^{-2}$ and Mg^{+2} from the intestine into blood is increased by - **Calcitriol**

ADRENAL OR SUPRA RENAL GLANDS

- Each gland has two parts, an internal **medulla** and an external **cortex.**
- Adrenal cortex originates from **mesoderm**
- Adrenal medulla originates from **ectoderm**

ADRENAL CORTEX

- The Adrenal cortex is distinguished into three regions
  1) Outer zona glomerulosa
  2) Middle Zona fasciculata
  3) Inner zona reticularis
- Adrenal cortex secretes more than **25** hormones (Corticosteroids)

  They fall into three categories

  1) Mineralocorticoids
  2) Glucocorticoids
  3) Sex corticoids

1) MINERALO CORTICOIDS

- Secreted by zona glomerulosa and the principal mineral corticoid is **-Aldosterone**
- The hormone which regulates the levels of sodium,

potassium chloride ions in E.C.F. by stimulating the absorption of sodium and chloride and secretion of K^+ **- Aldosterone**

- Secretion of aldosterone is controlled by **renin - angiotensin - aldosterone pathway**

2) GLUCOCORTICOIDS

- Secreted by **zona fasciculata.**
- Important glucocorticoids **-Cortisol, corticosterone & cortisone**
- The hormones which play an important role in carbohydrate, Protein and fat metabolism are **-Cortisol and corticosterone.**
- They are also useful in inflammatory reactions and coping with stress (Stress combat and life saving)

3) SEX CORTICOIDS :

- Secreted in minute quantities by **zona fasciculata** and **zona reticularis**
- Male hormone is **-Androgen**
- Female hormone is **-Estrogen**

ADRENAL MEDULLA :

- Adrenal medulla is modified **sympathetic ganglion**
- The cells of Adrenal medulla which produces hormones are called **-Chromaffin cells.**
- Chromaffin cells secrete two important hormones namely **- Adrenaline or Epinephrine and Nor-adrenaline or Nor epinephrine.**
  -Only 20% of adrenal medulla cells secrete norepinephrine as they lack the enzyme which converts norepinephine to epinephrine.
- The hormone which causes marked elevation of blood pressure intensifies cardiac contraction and cardiac output is **-Adrenaline**
- The hormones which are commonly called **fight, 'flight or fright',** hormones are **-Adrenaline and Nor adrenaline.**
- The gland which is highly essential for proper development, existence and welfare of the body is **- Adenal gland.**
- The hormones that cause dilation of airways to lungs and increase the levels of glucose and fattyacids in blood are - **epinephrine and nor epinephrine**

THYMUS GLAND :

- The bilobed, flat gland located on the ventral side just in front of heart is **-Thymus gland.**
- The gland which is well developed in a new born is **- Thymus gland.**
- The gland which grows upto puberty and shrinks to a small structure by the age of twenty five years is **- Thymus gland.**
- The hormone which promotes the maturation of T-lymphocytes that destroy the invading micro-organisms and antigens is **-Thymosin.**

PINEAL GLAND :

- The small gland that is attached to the roof of the diencephalon is **-Pineal gland.**
- The hormone secreted by pineal gland is **-Melatonin.**
- Melatonin is secreted in darkness by the release of **- norepinephrine.**
- The hormore that is responsible for the setting of " biological clock " is **Melatonin**
- The hormone that regulates annual breeding cycle and suppresses gonadotropin secretion is **-Melatonin**
- The hormone which stimulates the concentration of melanophores and makes the skin pale is **-Melatonin.**
- Effect of melatonin is antagonistic to that of **-(M.S.H) Melanocyte Stimulating Hormone.**

II. MIXED GLAND - PANCREAS

- Pancreas secretes digestive juice and two hormones namely **-Insulin and Glucagon.**
- In pancreas, about 98% of the gland is thus exocrine formed by **-Pancreatic acini**
- In the stroma, there are approximately 1 to 2 million small cluster's of endocrine cells called **-Islets of Langerhans.**
- Islets of langerhans contain hundreds of small cells that are distinguished into 4 types **-beta cells, alphacells, deltacells, F-cells.**

INSULIN

- The hormone secreted by beta cells is **- Insulin.**
- Regulation of carbohydrate metabolism is done by **-Insulin**
- The hormone which facilitates diffusion of glucose from blood into the cells through cell membrane is **-Insulin**
- The scientists, who were first to extract insulin in pure form from the pancreatic Islets of new born calf are **-Banting and Best.**
- Insulin accelerates glycogenesis, Lipogenesis Insulin slows down glycogenolysis, gluconeogenesis

GLUCAGON

- The hormone secreted by α -cells of Islets of langerhans is **-Glucagon.**
- The hormone which elevates glucose level in blood, when glucose is deficient is **-Glucagon**
- The hormone which intensifies glycogenolysis, deamination and gluconeogenesis is **-Glucagon.**
- The hormone which inhibits glycogenesis in the liver cells **-Glucagon.**
- The hormone secreted by delta cells is **-Somatostatin.**

- The hormone that inhibits the secretion of insulin and glucagon is **-Somatostatin**
- The hormone that slows down the absorption of nutrients in the gut **Somatostatin**
- Secretion of somatostatin is inhibited by **- a pancreatic polypeptide**

GONADS :

A) TESTES :

The clusters of endocrine cells seen in stroma around the seminiferous tubules in testes are called **- Interstital cells or cells of Leydig.**

- The hormones secreted by leydig cells are **-Androgens**
- The principal androgen is **-Testosterone**
- Masculinization hormone is **-Testosterone**
- The hormone which effects acessory reproductive organs such as Epididymis, seminal vesicle, scrotal sac, Penis, acessory genital glands grow to their normal sizes is **-Testosterone.**
- The hormone which effects the growth of male secondary sexual characters like beard, mustache, low-pitch voice, strong muscular body and broad shoulders is **-Testosterone.**

OVARIES

- The principal oestrogen is **-Estradiol.**
- The yellow glandular structure produced from the ruputured follicle cells is **-Corpus luteum.**
- Theca interna secretes **-Oestrogen (before ovulation)**
- After ovulation estrogens are secreted by **- Granulosa cells**
- The hormones produced by corpus luteum are **oestrogens** and **progestines**
- Principal progestine is **progesterone**
- The hormone which prepares the uterus for implantation of the zygote and mammary glands for lactation. **-Progesterone.**

PLACENTA

- Secretes **oestrogens, progestins, chorionic gonadotropin and relaxin.**
- The hormone produced by the placenta, which acts with other hormones to maintain pregnancy is **-Chorionic gonadotropin.**
- The hormone which helps in relaxing the Pelvic ligaments to facilitate the easy birth of the young ones is **-Relaxin.**

3. GASTRO INTESTINAL MUCOSA :

- Secretes many **peptide hormones.**
- These hormones affect the secretory function of **stomach, Intestine, liver, pancreas, gall bladder.**
- The hormone which stimulates gastric mobility, secretion of pepsinogen and HCl by gastric glands is **-Gastrin.**
- The hormone released by mucous membrane of the duodenum by the stimulation of HCl is **-Secretin.**
- The hormone which stimulates pancreas is **-Secretin.**
- The hormone which is stimulated by incomplete digestion of proteins and fats is **-Cholecystokinin.**
- The hormone which contracts the gall bladder, relaxes sphincter of Oddi and helps in release of bile is **- Cholecystokinin**
- The hormone produced by mucous membrane of duodenum, which inhibits the secretion of HCl by gastric glands is **-Enterogastrone.**

ENDOCRINE SYSTEM

INTRODUCTION

LEVEL - I

209. The sex hormones chemically are the
1.Steroids 2.Cholesterols
3.Fats 4.Glycoproteins

210. Chemically hormones are
1.Amines 2.Proteins
3.Steroids 4. All of the above

211. Which of the following acts as chemical messengers
1.Enzymes 2.hormomes
3.Vitamins 4. minerals

212. Endocrinology is the study of
1. Hormones 2.Enzymes
3. Fibres 4.Vitamins

213. Biocatalysts which act on target organs are
1.Enzymes 2.Hormones
3.Minerals 4.Vitamins

214. Defect in second messenger system leads to disorders of
1) Circulatory system
2) Nervous system
3) Endocrine system
4)Reproductive system

LEVEL - II

215. The action of hormones are
1.Fast and shorter duration
2.Slow and longer duration
3.Slow only 4.Fast only

216. Which is not true about hormomes
1. Hormonal action is slow but lasts for a long period
2. Hormones are destroyed at the end of the reaction
3. Hormonal action is fast and ends quickly
4. Hormones are subjected to feed back regulation

217. Chemical nature of the hormones secreted by adrenal cortex, ovaries and testis

1.Proteins 2.Amines
3.Steroids 4.Fatty acids

218. Which of the following is not a steroid hormone?
1.Oestrogen 2.Androgen
3.Aldosterone 4.Thyroxine

219. Amino acid found in thyroxine is
1.Alanine 2.Glycine
3.Threonine 4.Tyrosine

220. Structure which has no role in endocrine secretion
1.Duodenal epithelium 2.Testes
3.Adrenal medulla 4.Submaxillary gland

221. Local signaling brought about by chemical messengers that act on neighbouring cells is called
1) Paracrine signaling 2) Autocrine signaling
3) Endocrine signaling 4)Exocrine signaling

222. Example of catecholamines
1) Melatonin 2) Epinephrine
3) Estrogen 4) Testosterone

223. Example of lipid soluble hormones
1) Protein hormones 2) Peptide hormones
3) Catecholamines 4) Steroid hormones

224. 'Second messenger of the body is '
1) ATP 2)ADP 3)AMP 4)cAMP

225. Match the following and choose the right combination

List - I	List - II
1. Amine hormone	A. Estrogen
2. Steroid hormone	B. Insulin
3. Proteinous hormone	C. Thyroxine
4. Chemical messenger	D. Hormone

	1	2	3	4
1	A	B	C	D
2.	B	A	D	C
3	C	A	B	D
4.	D	C	B	A

226. Study the following.

Biochemical Structure	Hormone	Endocrine gland
i. Amine Hormone	Prolactin	Thyroid
ii. Proteinous Hormone	Insulin	Pancreas
iii. Steroid Hormone	Relaxin	Corpus Luteum

1) i, ii & iii Correct 2) i only correct
3) i, ii are Correct 4) ii and iii are correct

227. Assertion (A): Endocrine glands are ductless glands
Reason (R): Hormones of endocrine glands are released into blood
1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

228. Match the following and choose the correct combination.

List – I	List – II
A) Amine hormone	I) Oxytocin
B) Steroid hormone	II) Thyroxine
C) Protenoid hormone	III) Testosterone
D) Catecolamine	IV) TSH
	V) Epinephrine

	A	B	C	D
1)	II	III	V	IV
2)	II	III	IV	V
3)	V	IV	II	III
4)	IV	V	II	I

ENDOCRINE GLANDS OF RABBIT

LEVEL - I

229. Hormones secreted by adenophypophysis are
1.Aminoacids, fatty acids
2.Protein hormones
3.Combination of fatty acids and glycerol
4.Glucose

230. Oxytocin and antidiuretic hormones reach the posterior pituitary through
1.Anterior pituitary 2. Blood vessles
3.Lymphatic system 4.Axons

231. The part of the pituitary that arises from the roof of the buccal cavity is
1.Neurohypophysis 2. Adenohypophysis
3.Intermediate lobe 4. Infundibulum

232. Gland that is present in sella turcica is
1.Pineal gland 2.Pituitary gland
3.Thymus gland 4.Thyroid gland

233. Master gland is controlled by
1.Hypothalamus 2. Epithalamus
3. Cerebellum 4. Medulla oblongata

234. Which one of the following is both exo and endocrine gland
1.Thyroid 2.Pancreas
3.Pituitary 4.Thymus

235. Hormones released from posterior lobe of pituitary:
1.Vasopressin and Oxytocin 2.MSH and ADH
3.ADH and STH 4.Relaxin and calcitonin

236. The hormone which causes release of milk from breast.
1.Oxytocin 2.Vasopressin
3.Progesterone 4.Relaxin

237. ADH is
1.Oxytocin 2.Vasopressin

3.Adrenalin 4.Insulin

238. The hormones that help in child birth (or) delivery
1.Oestrogen and progesterone
2.Oxytocin and Relaxin
3.Chorionic gonadotropin and Relaxin
4.Oestrogens and Relaxin

239. The hormone with striking effect on growth of bones, muscles and protein synthesis
1.TSH 2.ACTH 3.FSH 4.STH

240. Master gland is
1.Pituitary 2.Thyroid
3.Hypothalamus 4.Adrenal

241. Chemically pituitary hormones are mostly
1.Proteins 2.Amino acids
3.Steroids 4.Amines

242. The hormone which has striking effects on the growth of bones, muscles, adipose tissue, liver and protein synthesis is
1.S.T.H 2.F.S.H
3.L.H 4.L.T.H

LEVEL - II

243. Vertebrate organ secreting hormones but composed entirely of nerve cells is
1.Thalamus 2.Hypothalumus
3.Pituitary 4.Anterior pituitary

244. Secretion or inhibition of which hormone is controlled by osmoreceptors present in hypothalamus
1.Vasopressin 2.Oxytocin
3.TSH 4.ACTH

245. A hormone which removes inertia of uterus and makes delivery easy
1.Vasopressin 2.Prolactin
3.Oxytocin 4.Progesterone

246. Neurohypophysis of pituitary releases the following hormones
1. Vasopressin - Oxytocin
2. Cortisone - Corticosterol
3. Progesterone - Estradiol
4. Testosterone - Aldosterone

247. Oestrogen secretion is controlled by
1.FSH 2.LH
3.Progesterone 4.GTH

248. Releasing hormones are secreted by
1.Islets of Langerhans
2.Gastric Mucosa
3.Adrenal cortex
4.Hypothalamus

249. Which of the following is true about the hormones of posterior lobe
1.They are produced in posterior lobe
2.They are secreted by hypothalamus and are stored and released by neurohypophysis
3.They are secreted by medualla and stored in posterior lobe
4.They are secreted by cerebrum and stored in posterior lobe

250. Excess intake of water would inhibit secretion of :
1.Adrenalin 2.Vasopressin
3.Glucocorticoids 4.Thyroxine

251. In lower vertebrates the hormone which makes the skin colour dark by dispersion of melanin in melanocytes is
1.Vasopressin 2.Melatonin
3.Adrenalin 4.MSH

252. LTH in female mammal is associated with
1. maintainance of corpus luteum in pregnancy
2. growth of mammary glands
3. Secretion of milk and maternal behaviour
4. all of the above

253. The part of pituitary which is well developed in lower vertebrates but under developed in mammals
1.Anterior lobe 2.Intermediary lobe
3.Posterior lobe 4.Pars tuberalis

254. ICSH in males and LH in females is associated with
1.Ovulation
2.Stimulation of Leydig cells to secrete testosterone
3.Stimulation of ovarian follicles to secrete oestrogen
4.all of the above

255. Gonadotropins are secreted by
1.Gonads
2.Anterior lobe of pituitary
3.Posterior lobe of pituitary
4.Intermediate lobe of pituitary

256. Which is not a hormone released from anterior lobe of pituitary
1.STH 2.TSH
3.ACTH 4.ADH

257. The factors stimulating the secretions of trophic hormones from anterior lobe of pituitary are released by
1.Pineal gland 2.Hypothalamus
3.Epithalamus 4.Corpus callosum

258. The milk ejecting hormone is
1.Prolactin 2.Oxytocin
3.Vasopressin 4.LTH

259. The hormone which regulates the blood pressure is
1.Vasopressin 2.ACTH
3.Calcitonin 4.Oxytocin

260. Hypophysis is an alternative name for
1.Thyroid gland 2.Pituitary gland
3.Thymus gland 4.Pineal gland

261. Which of the pituitary hormone is responsible for the secretion of milk by the mammary glands in female
1.ACTH 2.TH
3. Prolactin 4. oxytosin

262. Ovulation in mammals is caused by
1. FSH & TSH 2. FSH & LH
3. FSH & LTH 4. LTH & LH

263. Closure of epiphyseal plates is associated with attainment of
1)Normal weight 2)Normal height
3)Wound healing 4)Normal metabolism

264. Gonadotropic hormones which stimulate oogenesis and ovulation respectively are
1) Leuteotropic hormone, leutinizing hormone
2) Leutinizing hormone and follicle stimulating hormone
3) Leuteotropic hormone, follicle stimulating hormone
4) Follicle stimulating hormone, leutinizing hormone

265. Hormones of hypothalamus are called **(JIPMER 2000)**
1) angiotensis 2) trophic hormones 3) growth hormones 4) regulatory hormones

THYROID GLAND

LEVEL - I

266. Thyroxine is necessary for
1.normal growth
2.mental developoment
3.increasing basal metabolic rate
4.all of the above

267. Hormone with iodine is
1.Epinephrine 2.Thyroxine
3.Melatonin 4.Insulin

268. Male hormone is :
1.Progesterone 2.Testosterone
3.Aldosterone 4.Adrenalin

269. Thyroid secretions are
1. Thiamine pyrophosphate
2. Tri & tetraidothyronines
3. Trimethylamine oxide
4. Tyrosine oxidase

270. Orign of Thyroid gland is
1.Ecotdermal 2.Endodermal
3.Mesodermal 4.Ecto-mesodermal

271. Largest endocrine gland and gland with isthmus is
1.Parathyroid 2.Thyroid
3.Adrenal 4.Thymus

272. The hormone which enhances basal metabolic rate, O_2 consumption, protein synthesis and also glucose absorption from intestine is
1.Insulin 2.Thyroxine
3.Adrenalin 4.Glucagon

273. The hormone responsible for development of prostate gland in males
1.Oestrogen 2.Testosterone
3.Epinephrine 4.Nor Epinephrine

274. At the time of puberty, the hormone that triggers sexual characters in male is
1.Insulin 2.Testosterone
3.Adrenalin 4.Thyroxine

LEVEL - II

275. Bilobed endocrine gland connected with isthmus is
1. Pancreas 2. Thyroid
3. Pituitary 4. Adrenal

276. Leydig cells screte
1.Steroids 2.Peptides
3.Fattyacids 4.Amines

277. Calcitonin is secreted by
1.Hypothalamus 2.Thyroid
3.Adenohypophysis 4.Adrenal gland

278. The flat bilobed gland that lies infront of the heart is
1.Thymus 2.Adrenal cortex
3.Adrenal medulla 4.Pineal

279. The hormones which regulate calcium and phosphrous metabolism in the body are secreted by
1.Thyroid 2.Parathyroid, Thyroid
3.Thymus 4.Pancreas

280. The hormone which enhances BMR
1.Thyroxine 2.Vasopressin
3.Parathormone 4.Cortisone

PARATHYROID GLANDS

LEVEL - I

281. Number of parathyroids in rabbit
1. 1 2. 4
3. 2 4. 8

282. Parathormone promotes formation of
1) Calcitriol 2) Calcitonin
3) Cortisol 4) Cortisone

283. Hormone secreted by parathyroid glands
1) Hypercalcimic hormone
2) Hypocalcemic hormone
3) Hypo glycemic hormone
4) Hyper glycemic hormone

284. Parathormone increases the activity of
1) Osteoblasts 2) Osteocytes
3) Osteoclasts 4) Chondrocytes

LEVEL - II

285. Which is not a funciton of parathormone

1) it decreases HPO_4^{2-} level in blood
2) it slows down loss of Ca^{2+} and Mg^{2+} through urine
3) it elevates bone resorption
4) it accelarates uptake of Ca^{2+} and HPO_4^{2+} into bone matrix

286. Assertion (A): PTH increases Ca^{2+} and Mg^{2+} levels and decreases blood HPO_4^{2+} levels
Reason (R): PTH promotes formation of the hormone calcitonin
1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

ADRENAL OR SUPRA RENAL GLANDS

LEVEL - I

287. The endocrine tissue which secretes hormones that stimulate central nervous system and produce alertness and prepares the individual to meet any emergency is
1.Adrenal cortex 2.Adrenal medualla
3.Thyroid 4.Pituitary

288. Hormones of adrenal cortex are
1.Steroids
2.Proteins
3.Proteins and steroids
4.Steroids and carbohydrates

289. Hormones that help in overcoming stress
1.Glucocorticoids 2.Aldosterone
3.Epinephrine 4.Thyroxine

290. Mineralocorticoids are secreted by
1.Adrenal medulla 2.Zona glomerulosa
3.Zona fasciculata 4.Zona reticularis

291. Hormones of Adrenal Medulla
1.Adrenalin only 2.Nor Adrenalin only
3.Cortisone 4.Adrenalin and Nor adrenalin

292. Glucocorticoids are secreted by
1.Zona Glomerulosa 2.Zona Fasciculata
3.Zona reticularis 4.Medulla

293. Endocrine gland that is modified sympathetic ganglia
1.Adrenal cortex 2.Adrenal medulla
3.Thyroid 4. Pituitary

LEVEL - II

294. Cortisol (or) hydrocorticosterone is secreted into the blood during stress by the
1.Adrenal cortex 2.Adrenal medulla
3.Hypothalamus 4.Thyroid

295. Hormones which mainly act on nephron and influence Na,K,Cl metabolism
1.Aldosterone 2.Vasopressin
3.Paratharmone 4.Calcitonin

296. Origin of adrenal gland
1.ectodermal 2.mesodermal
3.ectomesodermal 4.mesoendodermal

297. Hormones secreted by Zona Glomerulosa of adrenal cortex are
1. Cortisone, Cortisol, and Corticosterone
2. Catacholamines
3. Adrenalin and noradrenalin
4. Aldosterone

298. Hormones used in the treatment of tissue inflammation and help combat stress
1.Adrenalin 2.Thyroxine
3.Insulin 4.Cortisone

299. The secretion of which gland has anti inflammatory in nature
1.Adrenal gland 2.Thyroid gland
3.Parathyroid gland 4.Pituitary gland

300. The endocrine tissue which secretes both androgens and estrogens
1.Adrenal medulla 2.Adrenal cortex
3.Testes 4.Ovary

301. The endocrine tissue that prepares the individual to meet any emergency by alerting it is
1.Adrenal cortex 2.Adrenal Medulla
3.Thyroid 4.Pituitary

302. Hypersecretion of which hormone causes excessive sweating, shivering, headache and nervousness
1.Vasopressin 2.Paratharmone
3.Adrenalin 4.Cortisone

303. The hormone used in the treatment of asthma
1.Insulin 2.Thyroxine
3.Vasopressin 4.Adrenalin

304. Gluconeogenesis is promoted by
1.Aldosterone 2.Androgens
3.Insulin 4.Cortisone

305. The reabsorption of sodium from the urine is increased by
1.Cortisone 2.Cortisol
3.Hydro cortisone 4.Aldosterone

306. Blood pressure is controlled by the gland
1.Adrenal 2.Thyroid
3.Thymus 4.Corpus luteum

307. The part of adrenal gland that secretes sex hormones
1. Zona glomerulosa 2. Zona fasciculata
3. Zona reticularis

4. Zona fasciculata & Zona reticularis

308. When a normal man's heart is injected with physiological concentration of adrenaline it shows
1.Decreased rate
2.Systolic rate
3.Sustained increased rate
4.Rate of heart beat increases suddenly

309. The following are parts of Adrenal gland
a) Zona glomerulosa
b) Zona fasciculatta
c) Adrenal Medulla
d) Zona reticularis
Arrange the above in correct sequence from outer surface to the centre
1. d - b - a - c 2. a - d - b - c
3. d - b - c - a 4. a - b - d - c

310. Study the following and choose the correct option
1) Adrenal medulla is a modified sympathetic ganglion
2) It has chromaffin cells that lack dendrites
3) 80% of the medullary cells secrete epinephrine
1) All are correct 2) 1,2 are correct
3) 2,3 are correct 4) 1,3 are correct

311. Identify a set of hormones which are useful in anti-inflammatory reaction coping with stress from the following.
1) Cortisol and corticosterone
2) Androgens and estrogens
3) Aldosterone and oxytocin
4) Prolactin and vasopressin

312. Select the correct statements about, Adrenal gland
I) Adrenal gland is a derivative of mesoderm and ectoderm
II) Adrenal cortex produces steroid hormones that are essential for life.
III) The cells of the medulla are called chromaffin cells
IV) Adrenaline and noradrenaline are called fight or flight hormones.
1) I & IV only 2) II & III only
3) I, II & III only 4) All the above

313. The endocrine gland which is highly essential for the proper development, existence and welfare of the body is located
1) on the top of each kidney
2) just infront of the heart
3) on the ventral side of larynx
4) on the dorsal surface of diencephalon.

314. The hormone secreted by zona glomerulosa helps in
1) coping with stress
2) gluconeogenesis
3) the development of secondary sexual characters
4) The reabsorption of sodium and chloride ions and also in the secretion of potassium ions in the kidneys.

315. Adrenals are located above **(AFMC 2003)**
1) stomach 2) liver
3) pancreas 4) kidney

THYMUS GLAND

LEVEL - I

316. The thymosin hormone produced by thymus stimulates the development and differentiation of
1.Red blood corpouscles
2.White blood corpuscles
3.T-Lymphocytes
4.Antibodies

LEVEL - II

317. Which of the following endocrine gland is atrophied in adult
1.Pituitary 2.Pineal
3.Parathyroid 4.Thymus

318. The hormone secreted by the bilobed flat gland located on the ventral side just infront of heart promotes.
1) Protein synthesis
2) Lymphopoiesis and maturation of T-lymphocytes
3) Maturation of T.lymphocytes
4) Lymphopoiesis and maturation of B-lymphocytes.

PINEAL GLAND

LEVEL - I

319. Hormone of pineal gland
1.MSH 2.Melatonin
3.Adrenalin 4. Vasopressin

320. This gland appears to function as a biologial clock
1.Pituitary 2.Thymus
3.Pineal 4.Adrenal

321. The hormone which is responsible for setting the 'biological clock' is
1.Adrenalin 2.MSH
3.Melatonin 4.Vasopressin

322. The gland that regulates annual breeding cycle in animals
1.Pituitary gland 2.Thymus gland

3.Adrenal gland 4.Pineal gland

323. Melatonin is secreted by
1.Pineal body 2.Pituitary
3.Thyroid 4.Parathyroid

324. Exposure to darkness stimulates the synthesis of
1.FSH 2.GH
3.ACTH 4.Melatonin

325. Endocrine gland attached to the roof of diocoel of brain
1. Pituitary 2. Pineal
3. Thyroid 4. Parathyroid

326. In darkness, norepinephrine released by sympathetic fibres stimulates which gland
1.Thyroid gland 2.Pineal gland
3.Thymus gland 4.Pituitary gland

LEVEL - II

327. Which of the following hormone induces sleep
1.Melatonin 2.Thyroxine
3.Thymus 4.Insulin

328. The gland that regulates concentration of melanin in amphibians
1.Pituitary 2.Pineal
3.Thyroid 4.Thymus

329. The effect of melatonin is antagonistic to the effect of
1) MSH 2) Prolactin
3) Vasopressin 4) Oxytocin

MIXED GLAND PANCREAS

LEVEL - I

330. Pancreatic polypeptide is secreted by
1. α - cells 2. β - cells
3. F - cells 4. δ - cells

331. Alpha cells of pancreas secrete
1.Insulin 2.Pepsin
3.Trypsin 4.Glucagon

332. Function of beta cells islets of Langerhans is
1.Secretion of Insulin 2.Secretion of glucagon
3.Adrenalin 4.Not known

333. Which cells produce glucagon in pancreas
1.Acinar cells 2.Alpha cells
3.Beta cells 4.Gamma cells

334. Hormone secreted by delta cells
1) Insulin 2) Glucogon
3) Somatostatin 4) Pancreatic polypeptide

335. Hormone which accelerates glycogenesis and lipogenesis
1) Alpha cells 2) Beta cells
3) F- cells 4) Delta cells

336. Somatostatin secretion inhibition hormone secreting cells are
1) Delta cells 2) F - Cells
3) Beta cells 4) Alpha Cells

LEVEL - II

337. Antagonistic hormones which regulates carbohydrate metabolism in man
1.Insulin and glucagon 2.Insulin and Thyroxine
3.Glucagon and Adrenalin
4.Glucagon and glucocorticoids

338. Which is not a function of insulin in the body of man
1.Enhances utilization of glucose
2.Promotes glycogenesis
3.Promotes glycogenolysis
4.Enhances absorption of glucose by cells from blood

339. Which cells are not belong to endocrine tissue of pancreas
1. α cells 2. γ cells
3. β cells 4.Acinar cells

340. Hyperglycemic hormone is
1.Insulin 2.Glucagon
3.Sympathin 4.Thyroxine

341. Which hormone has the anti-insulin effect
1.Calcitonin 2.Cortisol
3.Oxytocin 4.Aldosterone

342. A hormone which has seat of activity in liver (converting glucose into glycogen) is produced in
1.Pancreas 2.Pituitary
3.Parathyroid 4.Thymus

343. Identify the correct answer
Assertion (A) - The pancreas has both exocrine and endocrine parts
Reason (R) - Islets of Langerhans consists of alpha and beta cells, beta cell produce insulin and alpha cells produce glucagon, these hormones regulate carbohydrate metabolism
1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

344. The hormone which intensifies glycogenolysis, gluconeogenesis and inhibits glycogenesis in the liver cells is
1) Insulin 2) Glucagon
3) Somatostatin 4) Vasopressin

345. Glycogen is converted to glucose by
1.Insulin 2.Glucagon
3.Somatostatin 4.Somatotropin

346. Insulin promotes
1.Glycogenesis 2.Glycolysis
3.Gluconeogenesis 4.Glycogenolysis

347. The hormone of mixed gland which slows down the absorption of nutrients from the alimentary canal inhibits the secretion of
1) alpha cells, betacells
2) delta cells
3) F-cells
4) alpha, beta and delta cells

GONADS

LEVEL - I

348. Which of the following stops ovulation after fertilisation
1.Progesterone 2.Estorogen
3.Glucocorticoids 4.Prolactin

349. Corpus luteum is the source of secretion of
1.Oestrogen 2.Progesterone
3.STH and FSH 4.LH

350. The hormone responsible for development of secondary sexual characters in female
1.Progesterone 2.Oestrogen
3.Relaxin 4.Testosterone

351. Onset of menstrual cycle in females is by
1.F.S.H 2.Progesterone
3.Oestrogens 4.Sexcorticoids

352. Testosterones are secreted by:
1.Leydig cells 2.Sertoli cells
3.Primary spermatocytes
4.Spermatogonia

353. Relaxin hormone
1.Prepares uterus for pregnancy
2.Maintains pregnancy
3.relaxes pelvic ligaments during child birth
4.contracts uterine muscles

LEVEL - II

354. Ovarian hormones are
1. Proteins 2.Steroids
3. Polysaccharides 4.Lipids

355. The cells surrounding the Graffian follicles in the mammalian ovary secrete
1.Relaxin 2.Oestrogen
3.Progesterone 4.Oxytocin

356. Corpus luteum is not found in
1.Frog 2.Rat 3.Rabbit 4.Man

357. Which of the following stops ovulation after fertilization and maintains uterus during pregnancy
1.Progesterone 2.Oxytocin
3.Oestrogen 4.Relaxin

358. Progesterone is secreted by
1.Corpus leuteum 2.Placenta
3.Uterus 4.Corpus leuteum and placenta

359. Hormone which stops ovulation is
1.FSH 2.LH
3.Prolactin 4.Progesterone

360. Relaxin facilitates child birth by
1) Promoting the contraction of uterine muscles.
2) Increasing the contraction of pelvic ligaments
3) Stimulating the relaxation pelvic ligaments
4) Initiating the relaxation of uterine muscles

361. The hormone that prepares and maintains the uterus during pregnacy is secreted by :(EAMCET 2005)
1) Corpora cardiaca 2) Corpus leuteum
3) Corpora albicans 4) Graafian follicle

362. Progesterone is secreted by **(JIPMER 2005)**
1) Corpus luteum 2) Uterus
3) Corpus albicans 4) Graafian follicle

GASTRO INTESTINAL MUCOSA

LEVEL - I

363. Gastric secretions are induced in the stomach by
1.Secretin 2.Enterogastrone
3.Enterocrinin 4.Gastrin

364. Which of the following causes relaxation of sphincter of Oddi?
1) Relaxin 2) Gastrin
3) Cholecystokinin 4) Enterogastrone

LEVEL - II

365. Which is not a duodenal hormone
1.Secretin 2.Enterogastrone
3.Gastrin 4.Chole cystokinin

366. The hormomes not secreted by duodenum are
1.Enterogastrone 2.Cholecystokinin
3.Gastrin 4.Secretin

367. The hormone that stimulates pancreas is
1.Secretin 2.Gastrin
3.Enterocrinin 4.Cholecystokinin

368. Cholecystokinin stimulates the contraction of gallbl adder. It is secreted by
1.Mucosa of stomach
2.Mucosa of ileum
3.Mucosa of Duodenum
4.Large intestine

369. Match the following and choose the right combination

Hormones	**Digestive Juices**
a) Enterogastrone	i) Gastric juice
b) Secretin	ii) Intestinal juice
c) Enterocrinin	iii) Bile juice
d) Cholecystokinin	iv) Pancreozymin
	v) Pancreatic juice

	A	**B**	**C**	**D**
1.	i	v	**i**	**iii**
2.	**i**	**iv**	v	**iii**
3.	i	v	**iv**	**i**
4.	**i**	**iv**	**i**	v

Endocrine disorders in human beings

Pituitary gland disorders:

- Hyposecretion of growth hormone during growth years causes **-Pituitary dwarfism**
- Normal height is not reached due to the **closure of epiphyseal plates**.
- Hypersecretion of hGH during childhood causes - **Gigantism**
- Hypersecretion of hGH during adulthood causes disproportionate gigantism called -**Acromegaly**
- Enlargement of tissues and thickening bones of hands , feet, cheeks, jaws are found in the coridition. **-Acromegaly**
- Defeciency of ADH causes **- Diabetes insipidus**
- Excretion of large volume of urine, dehydration and thirst are the symptoms of **- Diabetes insipidus**

Thyroid gland disorders

- Congenital hypothyroidism causes **Cretinism**
- Hypothyroidism in adults causes **Myxoedema**
- Mental retardation , dwarfism and sterility are seen in the condition **-Cretinism.**
- Slow heart rate, low body temperature, sensitivity to cold, dry hair and skin , lethargy are the symptoms of **-Myxoedema**
- Hyperthyroidism causes -Grave's disease
- An autoimmune disorder due to the release of antibodies for TSH - receptors causing the release of thyroid hormones is **-Grave's disease**
- Edema behind the eyes in Grave's patients causes the eyes to protrude called **-exophthalmos**
- Enlarged thyroid due to the defeciency of Iodine is called **-Endemic goitre/Simple goitre**
- The condition associated with euthyroidism, hyperthyroidism or hypothyroidism is **-enlarged thyroid gland**

Parathyroid gland disorders

- Defeciency of Ca^{+2} occurs by **-hypoparathyroidism**
- Hypoparathyroidism leads to the condition causing **- Tetany**
- Depolarisation of muscle fibres and nerve fibres, spontaneous production of action potentials occurs due to **-Ca $^{+2}$ defeciency**
- Hyperparathyroidism causes excessive resorption of bone matrix raising calcium levels of blood and phosphate called **- Hypercalcemia**
- Hyperparathyroidism causes the formation of kidney stones called " **Stones**"
- Bone related complications like Osteitis fibrosa cystica, Osteoporosis, Osteomalacia & arthritis are called **-" bones"**
- Central nervous system gets affected leading to lethargy, fatigue, depression, memory loss, psychosis causing the condition **- " moans"**

Adrenal gland disorders

- Hypersecretion of cortisol by adrenal cortex causes **- Cushing syndrome**
- Tumors in adrenal gland or tumour in pituitary lead to **- hypersecretion of cortisol**
- "Moon face ", "buffalo hump" and "pendulus abdomen" are symptoms of **-Cushing symdrome**
- "Cushinoid appearanee" may be developed by a person taking **-longterm glucocorticoid therapy**
- Hyperglycemia, Osteoporosis, hypertension, mood swings, decreased resistance to diseases and stress are due to **-hypersecretion of Cortisol**
- Undersecretion of glucocorticoids and aldosterone causes **- Addison's disease**
- Autoimmune disorders due to hyposecretion of cortisol may be caused by **-destruction of adrenal cortex**
- Mental lethargy, anorexia, hypoglycemia, muscular weakness, " bronzed " appearance of skin are the symptoms of -**Addison's disease**
- Elevated potassium levels and decreased sodium in blood are due to the **hyposecretion of aldosterone Pancreatic Islet disorders**
- Impairment of carbohydrate, fat and protein metabolism is common in the disease **-Diabetes mellitus**
- Glucosuria, polyuria, polydipsia, polyphagia are symptoms of the disease **-Diabetes mellitus**
- There are two general types of **-Diabetes mellitus**
- Lack of insulin secretion or very little secretion of insulin causes -**Type I diabetes or IDDM**
- Insulin injections are necessary in the treat ment of **-Juvenile diabetes**
- Decreased sensitivity of target tissues to insulin causes -**Type II diabetes or NIDDM**
- Type II diabetese is also called - **age - onset (or) adult - onset diabetes**.
- Loss of glucose in the urine occurs when blood glucose levels increase **above 180mg/100ml**
- Uptake and utilisation of glucose by cells decreases , and utilisation of fats, proteins increases due to - **Insulin defeciency or insulin resistance on glucose metabolism**
- Injections of too much insulin results in

-hyperinsulinism

- Main symptom of hyper insulinism is **-hypoglycemia**
- Epinephrine , glucagon and growth hormeone are secreted when there is **-hypoglycemia**
- Anxiety, sweating , tremors, increased heart rate, lunger, weakness are symptoms of hypoglycemia.
- The only nutrient that is used by brain is **-glucose**
- Insulin overdose causes **-Insulin shock**
- Severe hypoglycemia causes depreivation of glucose by **-brain cells**
- Mental disorientation, Convulsions, unconscio - usness and shock occur due to **-severe hypoglycemia**
- Mental disorientation, Convulsions, unconscio - usness and shock occur due to

ENDOCRINE DISORDERS IN HUMAN BEINGS

PITUITARY GLAND DISORDERS

LEVEL - I

370. Men with enlarged nose, thickened bones and enlarged tissues appear due to over secretion of STH. This condition is called
1.Dwarfism 2.Acromegaly
3.Gigantism 4.Cretinism

371. Deficiency of which hormone causes Diabetis insipidus.
1.Vasopressin 2.Oxytocin
3.Aldosterones 4.Insulin

372. Muscular weakness, body pains and osteitis fibrosa cystica are due to
1.Hyperpituitarism
2.Hypothyroidism
3.Hyperparathyroidism
4.Hypoparathyroidism

373. Which of the following is due to defects in ADH
1.Diabetes insipidus 2.Gigantism
3.Acromegaly 4.Simmonds disease

LEVEL - II

374. hGH cannot cause
1) Thicker bones of the hands
2) Enlargement of nose
3) Thicker lips
4)Longer bones

375. In hyposecretion of vasopressin or ADH
1) Urine becomes concentrated and ECF is diluted
2) Urine becomes diluted and ECF is concentrated
3) Urine and ECF become concentrated
4) Urine and ECF become diluted

376. A person passes much urine and drinks much water but his blood glucose level is normal. This condition may be result of
1) a reduction is insulin secretion from pancreas.
2) a reduction in vasopressin secretion from pituitary gland.
3) a fall in the glucose concentration in urine
4) an increase in secretion of glucogens.

377. Acromegaly is due to the hypersecretion of a hormone from : (EAMCET 2005)
1) neurohypophysis 2) Adenohypophysis
3) Cells of Leydig 4) Pars intemedialis

THYROID GLAND DISORDERS

LEVEL - I

378. Hyperthyroidism in man causes symptoms like high temperature, protruding eyes, and high metabolic rate. The disease is called
1. Addisson's disease
2.Basedow`s syndrome
3.Simple goitre
4.Grave`s disease

379. Sensitive to cold, puffy face, low body temp, low B.P in man are symptoms of
1.Myxodema 2.Addison's disease
3.Diabetes mellitus 4.Acromegaly

380. Mental disability , sterility and stunted growth in children are due to
1.Hypopituitarism 2.Hypothyroidism
3.Hyperpituitarism 4.Hyperthyroidism

381. Grave's disease or Exopthalmic goiter is caused by
1.Hypo secretion of thyroxine
2.Hypersecretion of thyroxine
3.Defeciency of iodine
4.Hyper secretion of STH

382. Tetany is caused due to deficiency of
1.Crotisone 2.Insulin
3.Parathormone 4.Estrogen

383. Osteitis fibrosa cystica, kidney stones, constipation and psychosis are due to
1.Hyperpituitarism
2.Hypothyroidism
3.Hyperparathyroidism
4.Hypoparathyroidism

LEVEL - II

384. Deficiency hormone responsible for mental retardation and under development of sex organs in children
1.Thyroxine 2.Adrenaline
3.Oxytocin 4.Vasopressin

385. Which one of the following diseases results from endocrine disorder?
1.Pneumonia 2.Goitre
3.Typhoid 4. Jaundice

386. Congenital hypo-thyrodism in children leads to
1) Myxoedema 2) Graves's disease
3) Cretinism 4)Gigantism

387. Which of the following is an auto immune disease
1) Graves's disease 2)Myxoedema
3)Simple goitre 4)Tetany

388. Assertion (A): Iodine deficiency in food leads to simple goitre
Reason (R): Thyroxine is an iodine containing hormone
1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

389. Study the following statements about thyroxine irregularities
I) Hypothyroidism in childhood leads to cretinism
II) Hypothyroidism in adults causes exophthalmic goitre
III) Hypothyroidism in adults causes myxoedema
IV) Basal metabolic rate increases several folds by the hyposecretion by thyroid hormones
The correct combination is
1) I & III 2) II & III
3) I & IV 4) all the above

390. Which of the following are the symptoms of hypothyroidism in adults.
1) Thick and dry skin, pot belly and hair fall
2) Muscular weakness, poor memory and hair fall
3) Nervous tension, weight loss, warm & soft skin
4) Intolerance to cold, muscular weakness and high blood pressure.

PARA THYROID GLAND DISORDERS

LEVEL - I

391. Hypoparathyroidism causes
1.Tetany 2.Polio
3.Myasthenia gravis 4.Osteitis cystica fibrosa

392. Hypercalcemic horomone is
1.Calcitonin 2.Thyroxine
3.Parathormone 4.Aldosterone

393. " Stones " " Bones " " Groans" " Moans" are associated with
1) Elevated levels of TSH
2) Elevated levels of PTH
3) Decreased levels of TSH
4) Decreased levels of PTH

394. In human beings under secretion of parathormone results in
1) Osteoporosis 2) Tetany
3) Osteitis fibrosa cystica 4) Cretinism

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

395. Deficiency of Ca^{2+}, which causes neurons and muscle fibres to depolarize, is due to
1)Hyperparathyroidism
2) Hyopoparathyroidism
3)Hyper thyroidism
4) Hypothyroidism

396. The following are the statements about parathyroid gland
a) Parathormone regulates the concentration of calcium and phosphorous in body fluids
b) Hypo parathyroidism leads to Tetany
c) Parathormone inhibits calcium absorption from the gut
The correct combination is
1. only a and b are true
2. only b and c are true
3. only a and c are false
4. all are true

397. Assertion(A): Under secretion of parathormone result in hypocalcaemia
Reason (R): Sustained contraction of skeletal muscles due to hyposecretion of parathormone.

398. Assertion (A): Hypoparathyroidism causes tetany of skeletal muscles.
Reason (R): Deficiency of calcium causes depolarization of muscles to produce action potential spontaneously

ADRENAL GLAND DISORDERS

LEVEL - I

399. Hyposecretion of adrenal cortex causes
1.Cushing syndrome
2.Addison's disease
3.Grave's disease
4.Basedow's syndrome

400. Addison's disease is caused by the under secretion of
1.Adrenalin 2.Cortisone
3.Insulin 4. Oxytocin

401. Deficiency of which hormone causes salt loss from the body and polyurea
1.Parathormone 2.Aldosterone
3.Calcitonin 4.Glucocorticoid

402. Excessive secretion of glucocorticoids causes a syndrome with decreased disease resistance is
1.Turners syndrome 2.Cushing syndrome
3.Down's syndrome 4.Edward's syndrome

403. Muscular weakness, Depression, Low BP, Bronze pigmentation are the symptoms of
1.Cushing's syndrome 2.Addisons disease
3.Beriberi 4.Grave's disease

404. 'Moon face' and ' buffalo hump' are associated with
1) Addison's disease 2)Cushings syndrome
3) Cretinism 4) Graves's disease

LEVEL - II

405. The cause of Addison's disease is
1.Excess secretion of gonadotropin
2.Activation of Leydig cells
3.Hypo secretion of Adrenal cortex
4.Hypersecretion of Adrenal cortex

406. Deficiency of which hormone causes low blood pressure, dehydration and cardiac arrest
1.Androgens 2.Testosterone
3.Aldosterone 4.Cortisone

407. A patient who excretes large quantity of sodium in urine has
1.diseased adrenal medulla
2.diseased adrenal cortex
3.diseased pancreas 4.diseased thymus

408. Assertion (A): Hyposecretion of adrenal cortex causes addison's disease
Reason (R): Aldosterone regulates the levels of sodium, potassium and water in E.C.F
1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

409. In this disease considerable amounts of sodium and water are excreted in urine and uneven distribution of melanin in the skin occurs.
1) Cushing's disease 2) Myxoedema
3) Exophthalmic goitre
4) Addison's disease

410. Hyposecretion of adrenal cortex causes
1) Hypertension and brownish pigmentation of the skin
2) Dehydration and Pneumonia
3) Cardiac arrest and brain haemorrhage
4) Hypotension and dehydration

411. A person with hormonal imbalance who has mental lethargy, anorexia, nausea, weight loss is also characterized by
1) Dry skin
2) Protrusion of eye balls
3) Enlarged tongue
4) Hypoglycemia

412. The hypo-secretion of which hormones leads to loss of sodium and water through urine, low blood pressure and hypo-tension ?(EAMCET 2007)
1) Thyrotropic hormones
2) Hormones of Adrenal cortex
3) Hormones of Andrenal medulla
4) Luteotrophic hormones.

PANCREATIC ISLET DISORDERS

LEVEL - I

413. " Juvenile diabetes " is also called
1) IDDM 2) NIDDM
3)Diabetes insipidus
4)Cushings syndrome

414. Islets of Langerhans produce a hormone that controls diabetes mellitus
1.Insulin 2.Vasopressin
3.Oxytocin 4.Cortisol

415. In diabetes mellitus loss of glucose in the urine occurs when the blood glucose concentration rises above
1) 90mg / 100ml 2) 180 mg / 100 ml
3) 120 mg / 100ml 4) 150mg / 100ml

416. The only nutrient that can normally be used by the brain
1)ATP 2)Glucose
3)Fructose 4)Lactose

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

417. High blood glucose level, discharge of glucose with urine are the symptoms of
1.Diabetes insipidus 2.Diabetes mellitus
3.Cushings syndrome 4.Adisons disease

418. **Asserstion :** Death can occur due to insulin shock
Reason (R): Insulin shock is due to very low levels of insulin in the body

419. Assertion (A): In hyposecretion of insulin the glucose level of the blood increases.
Reason (R): Glucose is the only nutrient that normally cannot be used by the brain

IMMUNOLOGY

- The system that distinguishes "self" and "foreign" and can distinguish one foreign pathogen from another is - **immune system**
- Immunity is classified into two types"
1. Innate immunity 2.Adaptive immunity
- Inborn resistance to diseases is called **-innate immunity**
- Skin and mucous membranes form a**natomic -barriers**
- Stratified keratinised epithelium of the skin acts as **- Physical barrier**
- Low pH of skin is maintained by **sebum**
- Growth of micro - organisms is inhibited by **sebum**
- Body temperature, Gastric juice, lysozyme in tears act as - **Physiological barriers.**
- Bacterial cell wall is dissolved by the enzyme present in tears called **lysozyme.**
- Interferons and complement proteins are also form - **Physiological barriers**
- Vasodilation, increase in capillary permeability are considered as - **inflammatory barriers**
- Erythema and increase in temperature are caused by **-Vasodilation**
- Influx of phagocytes from capillaries to tissues is facilitated by **increased - Caplillary permeability**
- Substances causing vasodilation and increase in capillary permeability are- **histamine and brady kinin**
- Pain receptors in the skin are stimulated by the substance - **Bradykinin**

Adaptive immunity:

- Immunity developed during the life time of an individual is- **adaptive immunity**
- The immunity that is more specific and provides immunological memory is- **adaptive immunity**
- Adaptive immunity is mediated by **lymphocytes and antibodies**
- Adaptive immunity may be active a passive
- Immunity developed in response to antigenic stimulus is - **active immunity**
- Immunity developed inresponse to natural infections is - **naturally acquired active immunity**
- Immunity acquired by the host in response to artificial inoculation of antigen is **Artificially acquired active immunity**
- Immunity transferred from mother to child through colostrum provides **-naturally acquired passive immunity**
- Immunity developed from an immunised donor to non- immunized individual is **-artificially acquired passive immunity**

Humoral immunity and cell mediated immunity

- Immunity mediated by antibodies released into humors of the body like plasma, lymph etc- **-Humoral immunity**
- Humoral immunity is mediated by **-B-cells and TH cells**
- Cell mediated immunity is mediated by **-antigen specific T-cells**

Organs of immune system:

- The organs in which lymphoid progenitors differentiate into mature or immunocompetent cells are **- Primary lymphoid Organs**
- The organs in which mature T-Cells and B-cells are formed in mammals - **Thymus and Bone marrow**
- The primary lymphoid organ which is present only in birds is **-Bursa of fabricius**
- The organs in which antigens are trapped and provide sites for mature lymphocytes to interact with

antigen are - **Secondary lymphoid organs**

- Spleen and lymphnodes are - **Secondary lymphoid organs**
- Less orgamised secondary hymphoid tissue is **-MALT**

Cells of immune system:

- 99% of cells are - **Lymphocytes**
- Native B & T - lymphocytes are resting cells in the **-Go phase of cell cycle**
- These resting cells differentiate into short lived effector cells and long lived memory cells in the presence of **-Cytokines**
- Membrane bound antibody molecules are synthesised and displayed by **mature B-Cell**
- Effector B-cells are called **plasma cells**
- Free Antibodies are synthesized and secreted by **-Plasma cells**
- Antigen presenting cells are **B-cells, dendritic cells and macrophages.**
- Cells with antigen receptors and CD markers are **-T-lymphocytes**
- Cells having CD4 markers are T_H **cells**
- Cells having CD8 markers are T_C **cells**
- Antigen presenting cells present antigens along with **-MHC II Complex**
- T_H cells are activated by recognition of antigen class II MHC complex on an **antigen presenting cell.**
- T_C cells are activated by interaction with antigen - class I MHC complex on the surface of **altered self cell.**
- Activation of T_C cells occurs in the presence of - **Cytokines**
- Effector T_C cells are called **- Cytotoxic,T-lymphocytes (CTL)**
- CTLs recognise and eliminate - **altered self cells**
- Large gramular lymphocytes without surface markers are **Natural killer cells (NK cells)**
- The cells that exhibit Cytotoxic activity against tumor cells and some virus infected cells are - **NK Cells**
- NK cells can recognise unusual surface, antigens on **tumor cells and virus infected cells.**
- NK cells can attach to antibodies bound to antigens on the- **surface of tumor and virus infected cells.**
- Mononuclear phagocytes are **monocytes of blood and macrophages in tissues.**
- Monocytes differentiate into wandering **macrophages or fixed macrophages.**
- Phagocytes of Connective tissue are **-histiocytes**
- Phagocytes of lung are - **alveolar macrophages**
- Phagocytes of liver are -**Kupffer cells**
- Macrophages of nervous tissue are **microglial cells**
- Macrophages of bones are -**Osteoclasts**
- Polymorphonuclear lencocyutes are- **-neutrophils**
- Phagocytic granulocytes that play a role in defense against parasites are- **Eosinophils**
- Non phagocytic granulocytes that release inflammatory mediators are **-basophils**
- Mast cell precursors differentiate into mast cells in **- tissues**
- Inflammatory mediators like histamine and bradykinin are released by- **Basophils and Mast cells**
- Antigen presenting cells with membrane extensions like nerve cells are called - **dendritic cells**

Soluble mediators of immunity

- A group of serum proteins responsible for inflammation, cytolysis and opsonisation are **- Complement proteins**
- The process by which particulate antigens are made susceptible to phagocytosis is - **Opsonisation**
- Low molecular weight proteins that mediate interaction among cells of immune system are- **Cytokines.**
- Cytokines secreted by leucocytes are **-interleukins**
- Cytokines secreted by certain cells that induce an antiviral state in other cells are- **-interferons**
- Virus infected host cells produce - **alpha and Beta interferons**
- T-lymphocytes produce **gamma interferons**
- Cytokines that induce neighbouring cells to synthesize antiviral proteins are- **Alpha and Beta interferons**
- Antigen binding proteins are - **-antibodies**

- Antibodies are also called - **immunoglobulins**
- Number of poly peptide chains in an antibody **Two heavy (H)chain and Two ligh(L) chain**
- Light and heavy chains are linked by **-disulphide bonds**
- Shape of an antibody is - **'Y' shaped**
- Ends of two arms of Y are called **Variable (V) regions**
- Distal end of each arm of Y is called - **F_{ab} region**
- Antigen always binds to Fab end of - **antibody**
- Stem and lower parts of antibody are called **Constant (C) regions**
- The stem of Y is called **F_C region**
- F_C ends bind to **Complement proteins phagocytes and mast cells** Five Classes of antibodies are **I_gG, I_gM, I_gD, I_gA& I_gE**

Antigens :

- The substance that binds specifically to the receptors of B-cells or along with MHC complex bind to T-cell receptor is – **antigen**
- The substance capable of eliciting an immune response is – **immunogen**
- The portion of the antigen to which an antibody or (MHC-TCR Complex) binds is called epitope as antigenic **determinant**
- The site in the variable region of antibody (or TCR) that binds to an epitope on an antigen is called **paratope**
- An antigen can have repeats of the same epitope or different types of epitopes
- Smaller antigenic molecules (eg. Penicillin) which cannot produce a specific immune response by themselves are called **haptens.**
- Hapten can cause the formation of antibodies when combined with a carrier such as proteins.
- B-cell receptor (BCR) are formed by the **membrane antibodies.**
- Specific antigen receptors are present on **T-cells.**
- The cells that cannot recognize free antigen are **T-cells.**
- The cells that can recognize free antigens are **B-cells.**
- Antigen bound to **self-MHC molecule** on the surface of antigen presenting cells or altered self cells, can be recognized by **T-cells**
- The self molecule that is encoded by genes within major histocompatibility complex is **MHC molecule**
- Class I MHC molecules surface on all **nucleated cells.**
- Class II MHC molecules surface on **antigen presenting cells.**
- Antigens processed into small peptides and presented along with MHC molecules are recognized by **T-cells**
- Exogenous antigens are presented together with MHC II molecules to **CD_4^+ T cells.**
- Endogenous antigens (produced within the host cell) are presented together with MHC I molecules to **$CD8^{\pm}$ T-cells.**

Mechanism of cell mediated immunity:

- T_H cell recognizes and interacts with **antigen class II MHC complex of antigen presenting cells.**
- Activated T_H cells secrete **interleukin-2.**
- T_C cells bind to antigen-class I MHC complex of **altered self cells.**
- Activated T_C cells proliferate & differentiate into CTL by **interleukin-2.**
- Substances released by CTLs are **perforins & Granzymes.**
- Target cell membrane gets perforated by **perforins.**
- Target cell-DNA is fragmented by the entry of **granzymes.**
- T-cells that remain as long lived memory cells are **T_C cells.**

Mechanism of humoral immunity:

– Antigen is engulfed & processed by **immunocompetent B-cell.**
– B-cells are activated by **interleukin-2**
– B-cells divide and differentiate into **memory cells & plasma cells.**
– Antibodies are released into body fluids by **plasma cells.**

IMMUNOLOGICAL DISORDERS

- Immunological disorders include **autoimmunity immunodeficiency & hypersensitivity.**

- Inappropriate immune response against self antigens is called **autoimmunity.**
- Defeciency in immune response is called **immuno deficiency.**
- Exaggerated immune response that causes damage to host tissues is called **hypersensitivity.**
- Immunodeficiency resulting from a genetic or developmental defect in immune system is called **primary immunodeficiency.**
- Defective T-cells, B-cells, phagocytes or complement system cause **primary immunodeficiency.**
- Severed combined immunodeficiency (SCID) is caused due to **defective T-cells or both T & B cells.**
- Exposure to various chemicals (eg. Drugs) or biological (eg. HIV) agents cause **secondary immuno deficiency.**

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

- A collection of symptoms and infections in the final stage of the disease caused by HIV virus is called **AIDS.**
- AIDS was discovered by **Centre for DiseaseControl, U.S.A.**
- Causative Virus of the disease is **HIV**
- Common type of virus is **HIV-1**
- Less pathogenic form is **HIV-2**
- Nature of HIV is **Retrovirus Structure.**
- HIV virus consists of a **nucleocapsid covered by an outer envelope.**
- The envelope is made of **lipid bilayer.**
- Projections of cell membrane are composed of glycoproteins **gp 120 & gp 41.**
- Nucleocapsid consists of a **protein shell, two molecules of single stranded RNA reverse transcriptase, protease & integrase.**

Transmission of HIV

- Transmission of HIV is through **Sexual contact , blood transfusions** etc.
- HIV is transmitted from mother to foetus is through **placenta & breast feeding.**
- HIV transmission does not occur through **insects, shaking hands, sharing house hold items.**
- Main targets of HIV are **T_H cells, macrophages & dendritic cells with CD_4 receptors.**
- Target cells have **CD_4 receptors.**
- Viral RNA in host cell is released and reverse transcribed to form **double stranded DNA**
- Viral DNA gets integrated into chromosomal DNA of host cell forming **provirus**
- The stage that remains latent in the host cell is **provirus.**

Stages of HIV infection :

- Progression of HIV infection to AIDS takes about **10 years.**
- There are three clinical stages or categories : Category A : Asymptomatic or chronic **lymphadenopathy.**
- Category B : Symptomatic stage characterized by **Viral infections, Cervix cancers** etc.
- Category C : Clinical AIDS during which several infections like **pneumonia, toxoplasmosis, kaposi's sarcoma occur**

Diagnosis:

- The most commonly used screening test is **ELISA test**
- Positive ELISA tests are confirmed by **Western blot test.**
- Nucleic acid tests detect viral RNA by using methods such as **PCR.** HIV treatment includes **reverse transcriptase inhibitors & protease inhibitons.** Reverse transcription is inhibited by using nucleoside analogs such as **Zidovudine or Azidothymine.** It is difficult to develop a vaccine for AIDS due to **rapid mutation.**

HEPATITIS

- Hepatitis is caused by **Viruses, bacteria & fungi**
- Inflammation of liver caused by viruses is **hepatitis.**
- **Seven viruses** are identified to cause **Hepatitis (HAV to HGV).**
- Symptoms of hepatitis **Anorexia, Malaise, Jaundice, Nausea, Diarrhoea, Cirrhosis.**

HEPATITIS A is caused by **HAV virus.**

- HAV contains **single stranded RNA** and **lacks an envelope.**
- Infection of HepatitisA is through contaminated food & Water.
- Incubation period is **2-6 weeks.**
- HepatitisA is not **Chronic.**

- Vaccine is by **inactivated whole agent vaccine.**
  HEPATITIS B is caused by **HBV**
- **Hepatitis B** virus has **double stranded DNA & enveloped.**
- Method of infection of HepatitisB is parenteral, perinatal or sexual contact.
- Incubation period is **4-26 weeks.**
  -Vaccine consists of a part of viral protein coat produced by **genetically engineered yeast.**
  HEPATITIS C is caused by **HCV** virus.
- HepatitisC virus has
  single stranded RNA and enveloped.
- Transmission is by **parenteral method.**
- Incubation period is **2-22 weeks.**
- Hepatitis C leads to **chronic hepatitis.**
- Vaccine is not available for **HepatitisC.**
  HEPATITIS D (Delta hepatitis) is caused by **HDV**
- HDV has single stranded RNA. It becomes of HBV.
- Infective when **covered by envelope**
- Method of transmission is **parenteral.**
- Incubation period is **6-26 weeks.**
- HBV vaccine is effective for Delta hepatitis as co-infection is required to cause Hepatitis D
  HEPATITIS E is caused by **HEV virus.**
- HEV contains **single stranded RNA & lacks an envelope**.
  -Method of transmission is **faecal-oral route.**
  -Incubation period is **2-6 weeks.**
  -Vaccine is **not yet developed.**

IMMUNOLOGY

LEVEL - 1

420. Chemo communicators between T cells and B cells with reference to immune reactions are
  1) interferons 2) interleukins
  3) cyclin dependent kinases
  4) major histocompatible protein molecules
421. Transfer of antibodies from an immunised donor to non-immunised individual develops a type of immunity called
  1. Artificial passive acquired immunity
  2. Natural passive acquired immunity
  3. Natural active acquired immunity
  4. Cell mediated immunity
422. Organs that trap antigens and make them available for mature lymphocytes are known as
  1. Primary lymphoid organs
  2. Secondary lymphoid organs
  3. Haemopoietic organs 4. Haemolytic organs
423. The type of lymphocytes that damage the tumour cells and virus infected cells are the
  1. T-cells 2. NK-cells
  3. B-cells 4. Both B-cells and T-cells
424. Antigen presenting cells are
  1. Plasma cells 2. All nucleated
  3. Dendritic cells 4. Platelet cells.
425. The type of T-lymphocytes which interact with mononuclear phagocytes are
  1. T_H cells 2. NK Cells 3. B cells 4. Tc Cells
426. Soluble mediators produced by viral infected cells are
  1. Interferons 2. Interleukins
  3. Lymphokines 4. Bradykinins
427. The cells which act as receptors for antigens bound to APCs or Altered self cells are
  1. Antibodies 2. T-lymphocytes
  3. B-lymphocytes 4. Monocytes
428. Polymorpho nuclear phagocytes among the following
  1. Synovial cells 2. Kupffer cells
  3.Neutrophils 4. Histiocytes
429. An antigen like pencillin, when bound to a 'carrier' induces formation of antibodies is called
  1. Epitope 2) Paratope
  3) Hapten 4) MHC Complex
430. Which of the following has a CD 8 marker
  1. Tc cell 2) T_H cell
  3) B cell 4) Macrophage
431. Which of the following acts as a physiological barrier to provide resistance to diseases?
  1) Complement proteins 2)Secretion of mucous 3)Phagocytosis
  4)Vasodilation
432. Which of the following provide a non-specific second line of defence in human beings?
  1) lysozyme of tears 2) mucous membrane of gut
  3) B-lymphocytes 4) microglial cells
433. Which of the following are LGLs
  1) MNPs 2) PMNs 3) T_h cells 4) NK cells
434. Lymphoid cells which donot possess antigen specific receptors
  1) B-cells 2)NK cells 3)T_H cells 4)T_C cells
435. Which of the following is not a mononuclear phagocyte?
  1)Osteoclasts 2)Neutrophils
  3)Histiocytes 4)Microglial cells
436. Cytokines produced by only leucocytes are
  1) Complement proteins 2) Interferons
  3) Interleukins 4)Antibodies
437. Chronic hepatitis is caused by
  1) HDV, HBV 2) HCV, HEV
  3) HIV, HDV 4) HBV, HIV

438. Immunity provided by transfer of antibodies from mother to child is called ..... immunity.
1) natural active acquired
2) artificial passive acquired
3) natural passive acquired
4) artificial active acquired

439. Which of the following are granulocytic pathogen engulfers
1) Kupffer cells 2) microglial cells
3) PMNs 4) alveolar macro phages

440. ELISA is basically a test to recognise
1) anti HIV antibodies 2) HIV antigens
3) HIV viral coats 4) reverse transcriptase

441. Which of the following is generally associated with clinical AIDS ?
1) prolonged fever 2) lymphadenopathy
3) Kaposi's sarcoma 4) shingles

442. Prophylactic induced immunity is ..... acquired immunity
1) artificial acquired passive
2) natural acquired passive
3) natural acquired active
4) artificial acquired active

443. Antigen fragments are presented on the surface of certain cells by a group of specialised molecules called
1) epitopes 2) paratopes
3) MHC molecules 4) Haptens

444. Lymphadenopathy is of common occurrence in the .....stage of HIV infection
1) Category - A 2) Category - B
3) Category - C 4) Clinical AIDS

445. Incubation period of the hepatitis B virus, common in parenteral drug abusers is
1) 2 - 6 weeks 2) 14 - 26 weeks
3) 10 - 15 days 4) 2 - 22 weeks

446. Which of the following destroy host cells which are infected by pathogens ?
1) Interferons 2) Interleukins
3) a kind of regulatory T cell
4) a kind of effector T cell

447. Which of the following are useful in protecting healthy cells from the viruses of infected cells ?
1) Interleukins 2) a kind of soluble cytokines
3) antibodies of Ig M 4) antibodies of Ig G

448. 'Rubor' term is associted with
1) redness in inflammatory response
2) swelling in inflammatory response
3) heat in inflammatory response
4) pain in inflammatory response

449. The growth and differentiation of cells of immune system is affected by
1) interferons 2) interleukins
3) immunoglobulins 4) immunogens

450. The polypeptide chains in immunoglobulins are linked by these bonds
1) diester 2) peptide 3) disulphide 4)hydrogen

451. Precipitated antigens are engulfed by
1) basophils 2) neutrophils
3) B-lymphocytes 4) macrophages

452. Which of the following cells release antibodies into plasma, lymph and ECF
1) plasma cells 2) B-lymphocytes
3) T_H cells 4) NK cells

LEVEl - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

453. **Assertion (A) :** Interferons are small antiviral proteins produced by viral infected animal cells.
Reason (R) : They provide defence mechanism in the host.

454. **Assertion (A) :** Cytotoxic T - Lymphocyte is an effector cell.
Reason (R) : CTLs bring about direct destruction of body cells affected by pathogens.

455. **Assertion (A) :** In addition to cytokines and immunoglobulins there are other soluble mediators of immunity in the plasma of man.
Reason (R) : Complement proteins are in soluble state occur in the plasma and they bring about enzymatic destructive action on pathogens.

456. **Assertion (A) :** Some antigens cannot function as immunogens
Reason (R) : Some small molecules called haptens cannot induce specific immune response by themselves unless they bind to carrier protein.

457. **Assertion (A) :** Antibodies prevent the attachment of viruses to host cells.
Reason (R) : They neutralise the antigen and block the viral antigen by binding to them.

458. **Assertion (A) :** B-cell differentiation into memory cells and plasma cells is stimulated by T-lymphocytes which possess CD4 markers.
Reason (R) : T_H cell interacts with the antigen - class I MHC molecule complex on B cell and releases IL-2 which stimulates B-cell.

459. Arrange the following events releated to cell mediated immunity
a) release of interleukin - 2

b) release of perforins and granzymes by CTL
c) destruction of infected cell
d) recognitionof antigen bound to APC by T_H cell
e) proliferation of T_C cell into effector CTL
f) attachment of CTL to antigen of infected cell

1) d - e - a - b - f - c 2) d - a - e - f - b - c
3) a - b - d - e - f - c 4) c - d - f - a - b - e

460. Arrange the following events related to humoral immunity in correct sequence
a) Binding of TCR of T_H cell to the antigen bound to MHC II of APC
b) release of IL-2 by T_H cell
c) stimulation of B-lymphocytes
d) Production of plasma cells and memory cells
e) Release of antigen - specific antibodies by the plasma cells

1) a - b - c - d - e 2) a - d - b - c - e
3) b - d - c - a - e 4) c - b - d - a - e

461. Match the following :
correct match is

List-I	**List-II**
A) First line of defence	i) Phagocytes
B) Second line of defence	ii) Skin, lysozyme
C) Third line of defence	iii) Lymphocytes and antibodies

	A	**B**	**C**
1.	i	ii	iii
2.	iii	ii	i
3.	ii	i	iii
4.	iii	i	ii

462. Match the following :

List - I

A) Natural active acquired immunity
B) Artificial passive acquired immunity
C) Artificial active acquired immunity
D) Natural passive acquired immunity

List - II

i) Prophylactic, induced immunity
ii) Transfer of serum from unsensitised donor
iii) Post natal transfer of antibodies through colostrum
iv) Post infection specific immunity
v)Transfer of antibodies

	A	B	C	D
1)	iv	v	ii	iii
2)	iv	v	i	ii
3)	iv	v	i	iii
4)	v	iv	i	iii

463. Match the following

List - I	***List - II***
A. APC	I. Microglial cells
B. Mono nuclear phagocytes	II. Natural Killer cells
C. Large granular lymphocytes	III. T-Cytotoxic cells
D. Regulatory T-lymphocytes	IV. dendritic cells
	V. T_H- cells

	A	B	C	D
1)	I	III	IV	V
2)	II	III	I	V
3)	IV	I	II	V
4)	III	I	IV	II

464. Identify correct set of mathcing

List - I	***List - II***
A. Epithelium of skin	I. Adaptive immunity
B. Interferons	II. Physiological barriers
C. Macrophages	III. Phagocytic barriers
D. Histamine	IV. Inflammatory barriers
E. Immunoglobulins	V. Anatomic barriers

	A	B	C	D	E
1)	I	III	IV	V	II
2)	V	II	III	IV	I
3)	IV	I	II	V	III
4)	III	I	IV	II	V

465. Identify correct set of mathcing

List - I	***List - II***
A. Osteoclasts	I. Liver
B. Kupffer cells	II. Lung
C. Microglial cells	III. Bone
D. Alveolar macrophages	IV. Brain
E. Histiocytes	V. Connective tissues

	A	B	C	D	E
1)	III	I	IV	II	V
2)	V	II	III	IV	I
3)	IV	I	II	V	III
4)	II	I	IV	III	V

466. Identify correct set of mathcing

List - I	***List - II***
A. T_H cell	I. CD4
B. T_C cell	II. CD8
C. B-lymphocyte	III. MHC II
D. Dendritic cells	IV. BCR
E. Neutrophils	V. Bradykinin
	VI. PMN

	A	B	C	D	E
1)	III	I	IV	II	V
2)	V	II	III	IV	I
3)	I	II	IV	III	VI
4)	II	I	IV	III	V

467. Identify correct set of mathcing

List - I	*List - II*
A. Granzymes	I. T_H cells
B. Paratope	II. Viral infected cells
C. Histamine	III. CTL
D. Beta interferons	IV. Mast cell
E. IL-2	V. Immunoglobulins

	A	B	C	D	E
1)	III	V	IV	II	I
2)	V	II	III	IV	I
3)	I	II	IV	III	V
4)	II	I	IV	III	V

468. Spot the correct sequence of changes related to B-lymphocytes differentiation
a) immunocompetent cells
b) Effector cells and memory cells
c) Stem cell d) lymphoid progenitor
1) a - b - d - c 2) d - b - a - c
3) c - d - a - b 4) c - d - b - a

469. Read the statements about soluble mediators of immunity and choose the incorrect statement(s) :
i) F_c end of antibody interacts with phagocytes or complement molecules
ii) Class I MHC molecules present the antigenic peptides bound to them, to the T_8 cell receptors.
iii) Interferons are a kind of cytokines produced by virus infected cells in the body
iv) The portion of an antibody that binds to an antigen is called epitope
1) i & ii 2) iv only 3) i & iii 4) ii only

470. Choose the correct set of statements related to T_H lymphocytes
i. they possess membrane receptors for antigen (TCR)
ii. they have glycoprotein molecules called CD markers which are CD4.
iii. they identify antigens bound to MHC-I complex of infected ells
1) i, ii 2) i, iii
3) ii, iii 4) all

471. Choose the correct statements about inteferons
i. Any viral infected cell can release alpha and beta interferons
ii. they induce antiviral response
iii. leucocytes with CD markers produce gamma interferons.
1) all 2) i, ii
3) i, iii 4) ii, iii

472. Choose the incorrect statement about hapten
i. it is antigenic but cannot induce immune response by itself
ii. it becomes immunogenic when it binds to a carrier protein
iii. pencillin alone can induce specific immune response
1) i, ii 2) i, iii
3) ii, iii 4) iii only

473. Choose the correct set about histamine and bradykinin
i. They are the inflammatory mediators secreted by mast cells and basophils
ii. They cause vasodilation and increase capillary permeability
iii. they form second line of defence
1) all 2) i, ii
3) ii, iii 4) i, iii

474. Choose the correct combination.

Cell	Character	Function
i) Neutrophil	Multilobed nucleus	Phagocytosis
ii) Mast cell	Granules in cytoplasm	engulf clots
iii) T_C cell	with CD8 marker	Secretion of granzymes
iv) T_H cell	with CD4 marker	Secretion of gamma interferons

1. ii, iv 2. ii, iii
3. i, iv 4. iii, iv

475. Choose the incorrect set about innate immunity

Barrier	Type	Line of defence
i) Skin	Anatomic	First
ii) Interferons	Physiological	Second
iii) histamine	Inflammatory	Second
iv) antibodies	anatomic	third

1. iv only 2. iii only
3. i, iii 4. ii, iii

476. Monocytes and neutrophils are important cells participating in **(JIPMER 2000)**
1) antibody production 2) passive immunity
3) phagocytosis 4) perforin production

477. Antibody is produced by **(JIPMER 2005)**
1) B-Lymphocyte 2) Heparin
3) T-Lymphocyte 4) Both 1 & 2

478. Which of the following has the function of engulfing foreign materials **(AFMC 2000)**
1) mast cells 2) macrophages
3) lymphocytes 4) plasma cells

479. Interferon is **(AFMC 2002)**
1) antibacterial protein 2) antiviral protein
3) antifungal protein 4) antisnake venom

IMMUNOLOGICAL DISORDERS

LEVEL - 1

480. Which of the following viruses is without an envelope around the capsid?
1) HBV 2) HAV 3) HCV 4) HDV

481. HIV proteins of the outer lipid layer are a type of
1. Lipoproteins 2. Mucoproteins
3. Glycoproteins 4. Phosphoproteins

482. Asymptomatic stage in HIV infected persons is characterised by
1) Shingles 2)Cervix cancer
3) Swollen lymph nodes 4)Toxoplasmosis of brain

483. The target cells of HIV are
1) T_H cells 2) macrophages
3) dendritic cells 4) All the above

484. The main target cells of AIDS virus are
1. Blood platelets 2. Thrombocytes
3. Osteoblasts 4. T_H Lymphocytes

485. Test used to confirm HIV infection in a person is
1. Southern blotting test
2. Immuno compatibility test
3. Western blotting test 4. Immuno Assay test

486. The glycoproteins in the envelope of HIV
1) gp 120 and gp 41 2) CD4 and MHC II
3) protease, integrase 4) CD4 and protease

487. The nucleocapsid of HIV virion consists
1) protease, gp 120, gp 41
2) protease, integrase, RNA and reverse transcriptase
3) protease, RNA and gp 120
4) protease, DNA and DNA polymerase

488. Vaccine is not available for
1) HIV, HBV 2) HAV, HEV
3) HIV, HEV, HCV 4) HDV, HBV, HIV

489. This virus cannot cause infection independently
1) HBV 2) HDV
3) HCV 4) HIV

490. The use of reverse transciptase in HIV
1) Synthesis of double stranded RNA
2) Synthesis of double stranded DNA
3) Synthesis of single stranded RNA
4) all the above

LEVEL - II

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

491. **Assertion (A) :** In a population with a high incidence of HBV, improving hygiene and sanitary conditions will reduce the spread of hepatitis-B.

Reason (R) : HBV is a DNA virus mostly spread through contaminated food and water in overcrowded areas.

492. ***Assertion (A) :*** ELISA conducted on the serum of a person infected by HIV, immediately after sexual exposure to a known case of HIV positive person, will not be useful for the preliminary screening for HIV.

Reason (R) : ELISA is a test which primarily detects HIV antigens more easily than antibodies in the human serum.

493. **Assertion (A) :** Zidovudine is widely used in the treatment of AIDS

Reason (R) : It inhibits reverse transcription in HIV

494. **Assertion (A) :** A child born to a HIV positive mother suffers from AIDS

Reason (R) : HIV is transmitted from the mother to the foetus through placenta.

495. **Assertion (A) :** It is difficult to develop vaccine against HIV

Reason (R) : It exhibits rapid mutations

496. Identify correct set of mathcing

List - I	***List - II***
A. HAV	I. 2 - 22 weeks
B. HBV	II. 6 - 26 weeks
C. HCV	III. 4 - 26 weeks
D. HDV	IV. 2 - 6 weeks
	V. 10 - 20 days

	A	**B**	**C**	**D**
1)	III	I	IV	II
2)	IV	III	I	II
3)	I	II	IV	III
4)	II	I	IV	III

497. Arrange the following symptoms related to clinical stages of AIDS in a sequence
a) swollen lymph nodes b) shingles
c) toxoplasmosis of brain
1) a-b-c 2) b-c-a 3) a-c-b 4) c-b-a

498. Read the following statements and choose the right combination with reference to HIV infection :
i) HIV-1 is more pathogenic than HIV-2.
ii) Chronic lymphadenopathy is characteristic of clinical AIDS.
iii) Malignancies such as kaposis sarcoma may affect HIV infected person in the terminal stage.
1) all 2) only i 3) only i & iii 4) only ii & iii

499. The following statements refer to hepatitis.
i) Hepatitis B is a DNA containing virus and without envelope.
ii) Spreading of HAV and HEV can be prevented by maintaining hygiene.
iii) A person immunised for HBV is automatically protected from Hepatitis D virus infection / multiplication
Choose the correct statements :
1) All 2) only i & ii 3) only i & iii 4) only ii & iii

500. The following are the statements about HIV & AIDS and choose the right combination :

i. DNA formed from RNA of HIV by reverse transcriptase and intergrated with host cell's DNA is called provirus.
ii. HIV target cells include macrophages, T_H cells and dendritic cells which carry HIV to central nervous system.
iii. Lymphadenopathy is characteristic of HIV in man.
1) All are true 2) only i & ii 3) i & iii 4) ii & iii

501. Choose the correct set about HIV
i. HIV-2 is less pathogenic than HIV-1
ii. It is a retrovirus with two non-identical single stranded RNA
ii. the provirus may remain latent within the host cell
1) all 2) i, ii 3) i, iii 4) ii, iii

502. Choose the correct set about hepatitis
i. HAV and HEV donot cause chronic hepatitis
ii. Inactivated whole agent vaccine is given against Hepatitis -A
iii. Vaccine against HCV has a portion of viral protein coat produced by genetically engineered yeast
1) i, ii 2) i, iii 3) ii, iii 4) all

503. Study the following table and choose correct combination.

Column A	Column B	Column C
i) Cytokines	Secreted by immune cells or infected cells	Stimulate phagocytosis and cytolysis of the infected cells
ii) Antigens	Substances which can induce detectable immune response	Recognised by B-cells only
iii) AIDS	Transmissible, lethal, sexually transmitted	Caused by a retrovirus
iv) HIV	Infects two types of cells	Target cells are chiefly cells with CD4 markers

1. i and ii are correct 2. i, iii and iv are correct 3. ii and iii are correct 4. iii and iv are correct

504. Read the following statements and choose the combinations with correct set of characters :

Organism/Cell type	*Character - I*	*Character-II/Distribution/Function*
i) HIV	Synthesizes DNA by reverse transcription in the host cell	Glycoproteins of the outer coat bind to host cell surface receptors.
ii) Hepatitis B virus	has DNA and is enveloped	Can cause chronic hepatitis
iii) B-cells	Regulatory cells	Regulate the destruction of host cell laden with pathogens by interleukins.
iv) Natural killer cells	A type of large granular lymphocytes	Destroy malignant cells by phagocytosis in an antibody dependent manner.

1) i & ii 2) i & iii 3) iii & iv 4) ii & iv

505. Read the following statements and choose the combinations with correct set of characters :

Organism/Cell type/disease	Character-1	Character-II/Function
i) HIV	Glycoproteins of the outer coat recognise host cells	Its RNA can integrate with the host cell's genome and lie dormant for some time
ii) T_H cells	identify antigens on APC	Stimulate B cells to produce plasma cells
iii) Hepatitis A virus	Long incubation hepatitis	Multiplies in the liver
iv) SCID	acquired immunodeficiency	defects in T cells

1) i, ii & iii only 2) ii & iv only 3) iii & iv only 4) i & iv only

506. Choose the correct combination.

Virus	Character	Mode of transmission
i) HBV	double stranded DNA, with envelope	Contaminated food
ii) HEV	single stranded RNA, without envelope	Contaminated food and water
iii) HCV	single stranded RNA, without envelope	injections, blood transfusion
iv) HIV	single stranded RNA with envelope	injections, blood transfusion

1. i, ii 2. ii, iii 3. i, iii 4. ii, iv

507. AIDS disease was first reported in **(JIPMER 2003)**
1) Russia 2) Germany 3) USA 4) France

LEVEL - III

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1) A and R are correct but R is not the correct explanation of A
2) A and R are correct but R is not the correct explanation of A
3) A is true but R is false.
4) Both A and R are flase.

508. Study the following

Name of Endocrine gland	Common Name	Hormone
i. Pituitary gland	4S gland	Somatotropin
ii. Pancreas	Mixed gland	Glucagon
iii. Adrenal gland	Master gland	Chorionic Gonadotropin

1) i is only correct 2) ii is only correct
3) iii is only correct 4) i, ii and iii are correct

509. Match the following and choose the right combination

List - I	List - II
1. Secretin	A. Inhibits **HCl** Secretion
2. Gastrin	B. Seminiferous tubules
3. F.S.H.	C. Stomach
4. Enterogastrone	D. Pancreas

	1	2	3	4
1	D	C	B	A
2.	B	C	D	A
3	A	B	C	D
4.	B	C	A	D

510. Match the following and choose the right combination

List - I	List - II
1. Relaxin	A. Thyroid
2. Calcitonin	B. Placenta
3. Melatonin	C. Pituitarygland
4. Oxytocin	D. Pineal gland

	1	2	3	4
1	A	B	C	D
2.	D	C	B	A
3	A	C	D	B
4.	B	A	D	C

511. Match the following and choose the right combination

List-I	List-II
a) Pineal body	i) Immunity
b) Hypophysis	ii) 4 S gland
c) Adrenal gland	iii) Isthmus
d) Thyroid gland	iv) Sellaturcica
	v) Melatonin

	A	B	C	D
1.	i	iii	ii	v
2.	iv	ii	v	iii
3.	iii	iv	i	ii
4.	v	iv	ii	iii

512. Match the following and choose the correct combination

List - I	List - II
a) Vasopressin	i) Adenohypophysis
b) Prolactin	ii) Duodenum
c) Progesterone	iii) Placenta
d) Secretin	iv) Neurohypophysis
	v) Hypothalamus

	A	B	C	D
1.	v	ii	iii	iv
2.	iii	v	iv	i
3.	iv	ii	iii	i
4.	v	i	iii	ii

513. Match the following choose the correct combination

List-I

A) Release of bile juice is stimulated by
B) Hormones of adrenal cortex
C) Dilation of the trachea and bronchioles
D) Secondary sexual character development

List-II

i) Adrenalin
ii) Steroidal hormones
iii) Gonadialatrophy
iv) Thyroxine
v) Cholecystokinin

	A	B	C	D
1.	v	iii	i	iv
2.	v	ii	i	ii
3.	iv	iii	v	i
4.	iv	iii	ii	i

514. Assertion (A): Relaxin helps in relaxing the pelvic ligaments to facilitate the easy birth of the young ones
Reason (R): Oxytocin stimulates contraction of uterine muscles and thus facilitates child birth
1) Both A & R are true. R is correct explanation of A
2) Both A & R are true. R is not the correct explanation of A
3) A is true R is false 4) A is false R is true

515. Assertion (A): Progesterone prepares the uterus for implantation of the zygote to establish pregnancy
Reason (R): Chorionic gonadotropin is secreted from corpus luteum

516. Assertion (A) : Reabsorption of Na+ into blood from nephron is exercised by mineral corticoids
Reason (R) : Levels of aldosterone decrease when levels of Na+ increase in blood

517. Assertion (A) : Iodine deficiency leads to cretinism in children
Reason (R) : Depressed thyroid output stunts mental as well as physical growth

518. Identify the correct answer
Assertion (A) : Pituitary hormones FSH and LH influences the ovary of rabbit
Reason (R) : The graffian follicles undergo maturation, contain a secondary oocyte and produce female sex hormone and ovulation

519. Identify the correct answer from the given choices
Assertion (A) : Thymus gland helps in immunity
Reason (R) : Thymosin produced by thymus gland stimulates lymphocytes and destroys microorganisms and antigens

520. Match the following and choose the correct option:

Hormone	**Description / Symptom**
A.Glucocorticoids and aldosterone	a) fight or flight hormone
B.Cortisol	b) Maternity hormone
C. Epinephrine	c) Bronzing of skin
D. Melatonin	d)Biological clock
	e) Pendulous abdomen

	A	B	C	D
1)	e	c	a	d
2)	c	e	a	d
3)	c	e	d	a
4)	c	a	d	b

521. Study the following

Name of hormone	**Name of Endocrine gland**	**Affecting organ**
i. Somatotropin	Pituitary	Adrenal gland
ii. Leutinizing hormone	Thyroid	Leydig cells
iii. Cholecystokinin	gastric mucosa	Liver

1) i, ii & iii are correct
2) ii & iii are correct
3) ii is only correct
4) i, ii & iii are false

522. Following are the statements about placenta and its hormones.
A) It secretes chorionic gonadotropin, which helps in maintaining pregnancy.
B) Relaxin helps in facilitating easy child birth.
C) Placenta also secretes FSH
1) A & B are true 2) A & C are true
3) B & C are true 4) A, B and C are true

523. Which of the following sets of endocrine glands are 'bilobed'
1) Pituitary and Pineal glands
2) Thyroid & Pituitory glands
3) Thyroid & Thymus glands
4) Thymus & Pineal glands

524. Which among the following is/are incorrect
I) Melanin acts as a neuro-endocrine transducing substance.
II) The secretion of F-cells inhibits the action of somatostatin of hypothalamus
III) Sella turcica is on the roof of cranium to lodge the pituitary gland.
IV) FSH and LH are the gonadatropic hormones secreted by the gonads.
1) All except I 2) All except III
3) All except I & II 4) All the above

525. Statement (I): Hormones are never accumulated in the body of rabbit.
Statement (II): After the hormonal activity on the specific type of cells in definite parts of the body, the hormones disintegrate and are neither excreted or inactivated.
1) Both I and II are true and II is correct explanation to I
2) Both I and II are false
3) I is true but II is false
4) Both I and II are true but II is not the correct explanation to I

526. Study the following statements about the hormones of anterior lobe of pituitary gland.
I) Somatotropin is important for proper and normal growth of the body.
II) Leutinizing hormone is a gonadotropin.
III) Prolactin stimulates the function of corpus luteum during pregnancy.
IV) ICSH stimulates secretion of testosterone
Which of the above are correct?
1) All except – I 2) All except – II
3) All except – III 4) All except – IV

527. Arrange the following in a sequence according to the secretion of hormones from the gland to target gland.
A) Adrenal cortex B) Blood
C) Pituitary gland D) Adrenocorticoids
E) ACTH
1) B – D – A – E – C 2) C – E – B – A – D
3) B – E – A – D – A 4) D – B – A – C – B

528. Which of the following is correct pertaining to a hormone derived from Tryptophan.
1) It inhibits sexual maturation in mammals.
2) It causes the darkening of the skin in lower vertebrates.
3) It helps in increasing the oxygen consumption in kidneys and liver.
4) It intensifies cardiac output and cardiac contraction.

529. Assertion (A): Parathormone helps in homeostasis by regulating the amount of calcium and phosphorous in ECF.
Reason (R): Over secretion of parathormone decreases the level of calcium in ECF.
1. Both A and R are true and R is the correct explanation of the A.
2. Both A and R are true but is not correct explanation of the A.
3. A is true and R is false.
4. A is false and R is true.

530. Study the following and choose the correct combinations.

Endocrine gland	**Secretion**
Function	
I) Anterior lobe of pituitary	Somatostatin
Promotes biosynthesis of DNA, RNA	
II) Adrenal medulla	Adrenalin
Increased cardiac contraction	
III) Gastric mucosa	Enterogastrone
Inhibits gastric secretion	
IV) Duodenal mucosa	
Cholecystokinin	Stimulates the contraction of gall bladder.

1) I & III 2) II & IV
3) I, III & IV 4) II, III & IV

531. Match the following and choose the **correct answer.**

Hormone(s)	Function
A) Progesterone	I) Gluconeogenesis
B) L H	II) Stimulates leydig cells
C) Glucocorticoids	III) Chorionic gonadotropin
D) Oxytocin	IV) Prepare the uterus for implantation of blastocyst
	V) Normalising the uterus after delivery

	A	B	C	D
1)	III	I	V	IV
2)	IV	II	V	I
3)	IV	II	I	V
4)	II	III	IV	I

532. Following are the hormones secreted by endocrine glands located at different region of human body.
A) Somatotropin B) Testosterone
C) Cortisol D) Parathormone
Arrange them from anterior to posterior side of body
1) ADCB 2) ABCD
3) BACD 4) DCBA

533. Match the following and choose the right combination

List - I	**List - II**
1. Acromegaly	A. Hypersecretion of adrenocorticoids
2. Cushing disease	B. Hypersecretion of paratharmone
3. Osteoporosis	C. Hypersecretion of growth hormone
4. Cretinism	D. Hyposecretion of thyroxine

	1	**2**	**3**	**4**
1	A	B	C	D
2.	C	A	B	D
3	B	A	D	C
4.	C	D	A	B

534. Match the following

List - I	**List - II**
1. Gigantism	A. Thyroxine
2. Addison's disease	B. Somatotropin
3. Myxoedema	C. Adreno corticoids
4. Diabetes mellitus	D. Insulin

	1	**2**	**3**	**4**
1	B	C	A	D
2.	C	B	D	A
3	A	B	C	D
4.	D	C	B	A

535. Match the following and choose the correct combination

List-I	**List-II**
a) Myxoedema	i) Hypothyroidism
b) Addison's disease	ii) Hyper secretion of Somatotropin
c) Acromegaly	iii) Under secretion of corticoids
d) Diabete smellitus	iv) Vassopressin
	v) Insulin deficiency

	A	**B**	**C**	**D**
1.	i	iii	**i**	iv
2.	i	iii	**i**	v
3.	**i**	iv	i	v
4.	**i**	iii	i	iv

536. Study the following

Name of the Hormone	**Hypersecretion disorder**	**Hyposecretion disorder**
i. Thyroxine	Cretinism	Myxoedema
ii. Adreno corticoids	Cushings disease	Addison's disease
iii. paratharmone	Tetany	Osteoporosis

1) i & iii Correct 2) i only correct
3) ii & iii are Correct 4) ii only correct

537. Assertion (A) : A person with diabetes insipidus is subjected to urinate so much
Reason (R) : Reduction in ADH decreases water reabsorption in the kidneys

538. Assertion (A) : Diabetes mellitus is resulting from insulin deficiency
Reason (R) : In glucose homeostasis antagonistic control of glucagon is impaired

539. Read about the following diseases
a) Diabetes mellitus b) Graves's disease
c) Addison's disease d) Diabetes inspidus
e) Myxoedema
Arrange the above in a proper sequence with respect to hypothyroidism, adrenal disorder, ADH, hyperthyroidism and pancreas?
1. a - c - b - d - e 2. b - c - d - e - a
3. e - c - d - b - a 4. e - c - d - a - b

540. **Assertion(A) :** Hypoparathyroidisn causes the condition tetany of muscles
Reason(R) : Defeciency of calcium causes depolarisation of muscles, nerves and produce action potentials spontaneously.

541. Study the following

Name of gland	Hormone	Disorder
i. Pancreas	Insulin	Diabetes mellitus
ii. Thyroid	Thyroxin	Acromegaly
iii. Pituitary	Vasopressin	Diabetes insipidus

1) i & ii are correct 2) ii and iii are correct
3) i, ii & iii are correct 4) i & iii are correct

542. Study the following statements about suprarenal glands
I) Adrenaline is released, when the animal is stimulated by emergency of stress conditions.
II) Hypersecretion of adrenal cortex causes Addison's disease.
III) Hypersecretion of adrenocorticoids causes hyperglycemia.
IV) Hyposecretion of adrenocorticoids causes Cushing's disease.
The correct combination is
1) I & IV 2) II & III
3) I, II & III 4) I & III

543. Assertion (A): Defficiency of iodine in food causes simple goitre in a human being.
Reason (R): In an effort to obtain more iodine from blood for normal secretion of thyroxine, the thyroid gland enlarges by increasing the number of follicles.

544. Study the following and find out the correct combination.

Endocrine gland	Disorder due to hypersecretion	Disorder due to hyposecretion
I) Adrenal cortex	Groans	Tetany
II) Adrenal medulla	Pendulous Abdomen	Moon Face
III) Thyroid	Grave's disease	Myxoedema
IV) Pituitary	Acromegaly	Dwarfism

1) I, II and III 2) II and IV
3) II, III and IV 4) III and IV

545. Match the following and choose the correct combination.

List – I	List – II
A) Osteitis fibrosa cystica	i) Hyper or hypothyroidism
B) Dwarfism	ii) Hypersecretion of growth hormone
C) Gigantism	iii) Hyper-parathyroidism
D) Endemic goitre	iv) Hyposecretion of growth hormone

	A	B	C	D
1)	II	I	IV	III
2)	IV	II	I	III
3)	I	III	IV	II
4)	III	IV	II	I

546. Study the following 3 columns matching

Deficiency disorder	Hormone	Gland
I) Addison's disease	Adrenocorticoids	Adrenal cortex
II) Hypocalcemia	Parathormone	Thyroid
III) Myxoedema	Thyroxine	Parathyroid
IV) Hyperglycemic coma	Insulin	Pancreas

Which of the above are correct?
1) I & IV 2) II and III
3) II & IV 4) III & IV

547. Study the following and select the correct combination

Hormone	Hypersecretion	Hyposecretion
I) Adrenal corticoids	Cushing's syndrome	Addison's disease
II) Parathormone	Hypercalcaemia	Tetany
III) Insulin	Hypoglycemia	Diabetes mellitus

1) I and II are correct 2) All are correct
3) Except I all are correct
4) I & III only correct

548. Match the following

Set A	Set B
A) Hyperparathyroidism	I) Graves disease
B) Hyperthyroidism	II) Ostatis fibrosacystica
C) Hypothyroidism	III) Tetany
D) Hypo parathyroidism	IV) Myxoedema

	A	B	C	D
1)	II	I	IV	III
2)	II	I	III	IV
3)	I	II	IV	III
4)	II	III	IV	I

549. Autoimmune hyperthyroidism is
1) Graeve's disease 2) Cushing's syndrome
3) Addison's disease 4) Myxoedema

550. Assertion (A): In Diabetes mellitus patients glucose concentration increases in blood.
Reason (R): Insulin deficiency presents the efficient uptake and utilization of glucose by a few cells of the body only.

551. Which of the following is/are true with reference to 'refractory period' of the neuronal transmission?
I) The absolute refractory period is the 'interval' during which a second action potential cannot be initiated at all, no matter how large the stimulus applied
II) The relative refractory period is the 'interval' in the course of an action potential, during which initiation of a second action potential is inhibited but not impossible.
III) Refractory periods ensure/create a situation that the action potentials travel in one direction only (unidirectional) along the axon.
IV) Relative refractory period coincides with the 'closed' stage of the voltage gated channels of K^+.
1) I, II and IV only 2) III and IV only
3) I, II and III only 4) I, II, III and IV

552. With reference to axon of a neuron, if the sodium – potassium pump' is 'blocked' (hypothetically). Which of the following is most likely to happen?
1) Na^+ and K^+ will increase outside the axon
2) Na^+ will increase outside the axon
3) Na^+ will increase inside the axon
4) K^+ will increase inside the axon

553. Spot the wrong statements from the following with reference to nerve impulse.
1) During resting phase, Na^+ activation gates and K^+ channels are closed.
2) During depolarization phase both gates of Na^+ channels and K^+ channels are opened.
3) During hyperpolarizing phase both gates Na^+ channels are closed but K^+ channels are opened.
4) During repolarising phase K^+ channels and Na^+ activation gates are opened.

554. Hormones have the following features : (EAMCET 2006)
I. Adenohypophysis produces gonadotropins.
II. Besides sex cells, hormones are also produced by testis and ovary
III. Testosterone is produced by Leydig cells.
IV. Estrogen is produced by ovary.
Which of the above factors influence secondary sexual characters ?
1) III and IV 2) II, III and IV
3) II and IV 4) All

555. Read the statements : (EAMCET 2008)
A. Preganglionic nerve fibres of III, VII, IX and X cranial nerves are a part of the parasympathetic nervous system
B. V, VII, IX and X cranial nerves are mixed nerves
C. Trochlear nerves are the largest cranial nerves
D. Abducens nerves are motor and originate from the gasserian ganglia
Which of the above statements are correct ?
1) A and D 2) A and B
3) B and C 4) A and C

556. Study the following table (EAMCET 2008)

Endocrine gland	Hormone	Deficiency disorder
A. Neurohypophysis	Vasopressin	Diabetes insipidus
B. Adrenal cortex	Corticosteroids	Addison's disease
C. Parathyroid glands	Parathormone	Myxoedema
D. Thyroid gland	Calcitonin	Acromegalyad

The correct set is
1) B and C 2) A and B
3) C and D 4) A and D

557. **Assertion (A) :** It is the brain, not the sense organs, that interprets the stimulus. **(AIIMS 1999)**
Reason (R) : Sense organs are transducers, they transform the energy of a stimulus to the energy of nerve impulses.

558. **Assertion (A) :** Histamine is involved in allergic and inflammatory reactions **(AIIMS 2002)**
Reason (R) : Histamine is a vasodilator.

559. **Assertion (A) :** Mast cells in the human body release excessive amounts of inflammatory chemicals which cause allergic reactions.. **(AIIMS 2003)**
Reason (R) : Allergens in the environment on reaching human body stimulate mast cells in certain individuals.

EXERCISE NERVOUS SYSTEM
KEY

1) 2 2) 2 3) 2 4) 1 5) 1 6) 2
7) 2 8) 4 9) 3 10) 4 11) 2 12) 1
13) 1 14) 2 15) 2 16) 4 17) 2 18) 3
19) 1 20) 4 21) 3 22) 2 23) 1 24) 1
25) 2 26) 1 27) 3 28) 1 29) 2 30) 3
31) 1 32) 1 33) 1 34) 1 35) 2 36) 3
37) 2 38) 1 39) 2 40) 3 41) 2 42) 1
43) 2 44) 2 45) 2 46) 2 47) 3 48) 1
49) 3 50) 1 51) 2 52) 2 53) 4 54) 4
55) 3 56) 1 57) 1 58) 3 59) 4 60) 1
61) 1 62) 2 63) 1 64) 1 65) 1 66) 2
67) 4 68) 4 69) 3 70) 1 71) 3 72) 1
73) 2 74) 3 75) 3 76) 2 77) 3 78) 3
79) 4 80) 4 81) 1 82) 3 83) 2 84) 1
85) 3

SPINAL CORD

86) 4 87) 4 88) 2 89) 1 90) 4 91) 1
92) 3 93) 3 94) 2 95) 1 96) 1 97 1
98) 2 99) 2 100) 4 101) 3 102) 1 103) 3
104) 4 105) 2 106) 3

CRANIAL NERVES

107) 3 108) 2 109) 3 110) 3 111) 3 112) 3
113) 1 114) 2 115) 3 116) 2 117) 1 118) 1
119) 4 120) 3 121) 2 122) 3 123) 3 124) 2
125) 2 126) 3 127) 1 128) 2 129) 3 130) 4
131) 1 132) 1 133) 2 134) 2 135) 2 136) 2
137) 4 138) 2 139) 4

SPINAL NERVES

140) 1 141) 4 142) 1 143) 2 144) 4 145) 4
146) 3 147) 3 148) 1 149) 2 150) 2 151) 2
152) 1 153) 2

AUTONOMIC NERVOUS SYSTEM

154) 2 155) 4 156) 1 157) 3 158) 2 159) 2
160) 1 161)3 162) 1 163) 4 164) 1 165) 4
166) 3 167) 3 168) 3 169) 1 170) 1 171) 3
172) 1 173) 3 174) 2 175) 3 176) 2

NERVE IMPULSE

177) 4 178) 1 179) 1 180) 3 181) 4
182) 3 183) 3 184) 3

ACTION POTENTIAL

185) 4 186) 3 187) 2 188) 4 189) 3
190) 2 191) 2 192) 4 193) 1 194) 4
195) 2 196) 1 197) 1 198) 3

SYNAPTIC TRANSMISSION

199) 3 200) 3 201) 3 202) 2 203) 3
204) 2 205) 2 206) 3 207) 4 208) 4

ENDOCRINE SYSTEM

209) 1 210) 4 211) 2 212) 1 213) 2
214) 3 215) 2 216) 3 217) 3 218) 4
219) 4 220) 4 221) 1 222) 2 223) 4
224) 4 225) 3 226) 3 227) 1 228) 2

ENODOCRINE GLANDS OF RABBIT

229) 2 230) 4 231) 2 232) 2 233) 1
234) 2 235) 1 236) 1 237) 2 238) 2
239) 4 240) 1 241) 1 242) 1 243) 2
244) 1 245) 3 246) 1 247) 2 248) 4
249) 2 250) 2 251) 4 252) 4 253) 2
254) 4 255) 2 256) 4 257) 2 258) 2
259) 1 260) 2 261) 3 262) 2 263) 2
264) 3 265) 2

THYROID GLAND

266) 4 267) 2 268) 2 269) 2 270) 2
271) 2 272) 2 273) 2 274) 2 275) 2
276) 1 277) 2 278) 1 279) 2 280) 1

PARATHYROID GLANDS

281) 2 282) 1 283) 1 284) 3 285) 4
286) 3

ADRENAL OR SUPRA RENAL GLANDS

287) 2 288) 1 289) 1 290) 2 291) 4
292) 2 293) 2 294) 1 295) 1 296) 3
297) 4 298) 4 299) 2 300) 2 301) 2
302) 3 303) 4 304) 4 305) 4 306) 1
307) 4 308) 4 309) 4 310) 4 311) 1
312) 4 313) 1 314) 4 315) 4

THYMUS GLAND

316) 3 317) 4 318) **3**

PINEAL GLAND

319) 2 320) 3 321) 3 322) 4 323) 1
324) 4 325) 2 326) 2 327) 1 328) 2
329) 1

MIXED GLAND PANCREAS

330) 3 331) 4 332) 1 333) 2 334) 3
335) 1 336) 1 337) 1 338) 3 339) 4
340) 2 341) 2 342) 1 343) 2 344) 2
345) 2 346) 1 347) 2

GONADS

348) 1 349) 2 350) 2 351) 3 352) 1
353) 3 354) 2 355) 2 356) 1 357) 1
358) 4 359) 4 360) 3 361) 2 362) 1

GASTRO INTESTINAL MUCOSA

363) 4 364) 3 365) 3 366) 3 367) 1
368) 3 369) 1

ENDOCRINE DISORDERS IN HUMAN BEINGS
PITUITARY GLAND DISORDERS

370) 2 371) 1 372) 3 373) 1 374) 4
375) 2 376) 2 377) 2

THYROID GLAND DISORDERS

378) 4 379) 1 380) 2 381) 2 382) 3
383) 3 384) 1 385) 2 386) 3 387) 1
388) 2 389) 1 390) 2

PARA THYROID GLAND DISORDERS

391) 1 392) 3 393) 2 394) 2 395) 2
396) 1 397) 2 398) 1

ADRENAL GLAND DISORDERS

399) 2 400) 2 401) 2 402) 2 403) 2
404) 2 405) 3 406) 3 407) 2 408) 1
409) 4 410) 4 411) 4 412) 2

PANCREATIC ISLET DISORDERS

413) 1 414) 1 415) 2 416) 2 417) 2
418) 3 419) 2

IMMUNOLOGY

420) 2 421) 1 422) 2 423) 2 424) 3 425) 1
426) 1 427) 2 428) 3 429)3 430)1 431)1
432) 4 433) 4 434) 2 435) 2 436) 3 437) 1
438) 3 439) 3 440) 1 441) 3 442) 4 443) 3
444) 1 445) 2 446) 4 447) 2 448) 1 449) 2
450) 3 451) 4 452) 1 453) 1 454) 1 455) 1
456) 1 457) 1 458) 3 459) 2 460) 1 461) 3
462) 3 463) 3 464) 2 465) 1 466) 3 467) 1
468) 3 469) 2 470) 1 471) 1 472) 4 473) 1
474) 3 475) 1 476) 3 477) 1 478) 2 479) 2

IMMUNOLOGICAL DISORDERS

480) 2 481) 3 482) 3 483) 4 484) 4 485) 3
486) 1 487) 2 488) 3 489) 2 490) 2 491) 4
492) 3 493) 1 494) 1 495) 1 496) 2 497) 1
498) 3 499) 4 500) 1 501) 1 502) 1 503) 2
504) 1 505) 1 506) 4 507) 3

LEVEL - III

508) 2 509) 1 510) 4 511) 4 512) 4
513) 2 514) 2 515) 3 516) 1 517) 1
518) 1 519) 1 520) 2 521) 4 522) 1
523) 3 524) 4 525) 3 526) 3 527) 2
528) 2 529) 3 530) 2 531) 3 532) 1
533) 2 534) 1 535) 2 536) 4 537) 1
538) 1 539) 3 540) 1 541) 4 542) 4
543) 1 544) 4 545) 4 546) 1 547) 4
548) 1 549) 1 550) 1 551) 3 552) 3
553) 2 554) 4 555) 2 556) 2 557) 1
558) 1 559) 1