Written Q

1. ***Explain mechanism of hair cell in inner ear = explain mechano-transduction of inner ear hair cell ?***
2. ***Enumerate functions of vestibular apparatus ?***
3. ***Effect and mechanism of pronlonged exceesive rotation on heart rate and blood pressure ?***
4. ***Def and mechanism of vertigo ?***
5. ***Def and causes or types of nystagmus ?***

Formative MCQ

6. Part of inner ear responsible for sense of balance : *a) Scaaule and malleus* *b) Utricle and stapes* *c) SCC and vestibule* *d) Cochlea and SCC* *e) Cochlea and vestibule*	**C**
7. Vertigo: *a) Results from stimulation of macula.* *b) Means oscillatory eye movement.* *c) Results from crista ampullaris stimulation.* *d) Means sense of rotation in the presence of rotation.* *e) "b" and "d" are correct.*	**C**

8. Macula (otolith) organ: *a) Detects angular acceleration.* *b) is stimulated by movement of endolymph.* *c) Detects linear acceleration.* *d) is the receptor in the semicircular canal.* *e) Leads to vertigo when stimulated.*	**C**
9. Otolith membrane is located in : *a) Ampula of SCC* *b) Cochlea* *c) Endolymphatic sac* *d) Modiolus* *e) Utricle*	***E***
10. Postrotatory nystagmus is caused by continued movement of: *a) Aqueous humor over the ciliary body in the eye.* *b) Cerebrospinal fluid over the parts of the brainstem that contain vestibular nuclei.* *c) Endolymph in the semicircular canals, with bending of the cupula and stimulation of hair cells.* *d) Endolymph toward the helicotrema.* *e) Perilymph over hair cells that have their processes embedded in the tectorial membrane.*	**C**
11. About the macula (otolith organ), one of the following is correct: *a) Detects angular acceleration.* *b) Is stimulated by movement of endolymph.* *c) Detects linear acceleration.* *d) Is the receptor in the semicircular canal.* *e) Leads to vertigo when stimulated.*	**C**

12. Which structure in the vestibular apparatus is responsible for the detection of angular acceleration: *a) Otolith meintrane.* *b) Saccule.* *c) Macula,* *d) Crista ampullaris* *e) Utricle.*	***D***
13. Stimulation of crista ampullaris: *a) Results in kinetic tremors.* *b) is caused by weight of otoconia.* *c) Occurs when kinocilium bends towards stereocilia.* *d) Leads to nystagmus.* *e) Results in decreased muscle tone in the side of stimulated canal.*	***D***
14. Depolarization of the hair cells in the cochlea is caused primarily by the flow of : *a) K+ into the hair cell.* *b) Na+ into the hair cell* *c) Cl out of the hair cell.* *d) Ca++ into the hair cell.* *c) Mg++ into the hair cell.*	***A***

15. Stimulation of crista ampullaris leads to: *a) Vertigo.* *b) Static tremors.* *c) Dysdiadokinesia.* *d) Shuufling gait.* *e) Hypertonia.*	***A***
16. Crista ampullaris of horizontal semicircular canal is stimulated: *a) When cupula is moved toward the utricle.* *b) At the start of rotation due to momentum of endolymph.* *c) During rotation with constant speed.* *d) By high weight otoconia.* *e) After stoppage of rotation due to inertia of endolymph.*	***A***
17. Stimulation of crista ampullaris: *a) Results in kinetic tremors.* *b) Is caused by weight of otoconia.* *c) Occurs when kinocillium bends toward sterocilia.* *d) Leads to nystagmus.* *e) Results in decreased muscle tone in the side of stimulated canal.*	***D***
18. Stimulation of the semicircular canals causes: *a) Rotator nystagmus whose fast component is in the opposite direction of rotation.* *b) Vertigo which is a false sensation of rotation in the direction of rotation.* *c) Autonomic responses include nausea, vomiting and hypertension.* *d) Increased muscle tone in the stimulated side.* *e) All of the above are correct.*	***D***

19. Which of the following structures is maximally sensitive to linear head movements in the vertical plane? *a) Macula of the utricle.* *b) Macula of the saccule.* *c) Crista ampullaris of the anterior semicircular duct.* *d) Crista ampullaris of the horizontal semicircular duct.*	***B***
20. Which of the following structures in the vestibular apparatus is responsible for the detection of angular acceleration? *a) Statoconia.* *b) Macula.* *c) Semicircular canals.* *d) Saccule.* *e) Ampullae.*	***C***
21. The following are components of the vestibular apparatus. except: *a) crista ampullaris* *b) vestibular hair cells* *c) vestibular nucleus* *d) saccule*	***C***
22. Which of the following are co-planar canals: *a) Anterior vertical canal on one side and posterior vertical canal of same side* *b) Anterior vertical canal on one side and posterior vertical canal of opposite side* *c) Anterior vertical canal on one side and anterior vertical canal of opposite side* *d) Anterior vertical canal on one side and anterior vertical canal of same side*	***B***

23. The crista ampularis is sensitive to: *a) sound vibrations* *b) force of gravity* *c) linear acceleration* *d) angular acceleration*	***D***
24. Vestibular hair cells: *a) are provided with cilia allover their surfaces* *b) are innervated by cochlear neve fibers* *c) are stimulated by a chemical transmitter released from the terminals of the innervating nerve fibers* *d) are sensitive to mechanical stimuli*	***D***
25. Hair cells of the cristae are stimulated by: *a) bending of their stereocilia toward any direction* *b) movement of endolymph in any direction* *c) bending of stereocilia toward kinocilium* *d) bending of stereocilia away from kinocilium*	***C***
26. Maculae of vestibular apparatus are: *a) stimulated by movement of endolymph over their surface* *b) stimulated during standing upright but inhibited in sitting* *c) alter the pattern of their discharge by head tilting* *d) contain otoconia that press on hair cells to initiate resting basal discharge*	***C***

27. Vertigo: *a) post-rotational sense of being rotated toward opposite side of original rotation* *b) post-rotational sense of being rotated toward same side of original rotation* *c) Rotational sensed of being rotated toward opposite side of original rotation* *d) Rotational sense of being rotated toward same side of original rotation*	***A***
28. Nystagmus: *a) occurs as a result of symmetrical bilateral discharge from SCCs at onset of rotation* *b) occurs as a result of symmetrical bilateral discharge from SCCs at end of rotation* *c) prevents stabilization of the eye balls on visual objects* *d) is a vestibula-ocular reflex*	***D***
29. Vestibular apparatus: *a) Represent the auditory part of the labyrinth.* *b) May help in initiating the voluntary movements.* *c) contain receptors concerned with body posture and equilibrium.* *d) Has no role in perception of acceleration*	***C***
30. The semicircular canals: *a) 3 pairs on each side* *b) Detect the angular acceleration* *c) contains fluid rich in Anions* *a) d) Its receptors show depolarization when Na influx in the apical border of its hair cells.*	***B***

31. The hair cells in the vestibular receptors organs: *a) Only stimulated during acceleration.* *b) Show hyper-polarization when stereocilia deviated towards kinocilium.* *c) Show depolarization when stereocilia deviated towards kinocilium.* *d) Show depolarization when stereocilia deviated away kinocilium.*	***C***
32. All of the following statements about the vestibular apparatus are true except: *a) It consists of semicircular canals and two small sacs, utricle and saccule* *b) The semicircular canals contains sensory organs called crista* *c) The utricle and saccule are concerned with perception of tinea acceleration.* *d) concerned with regulation of muscle tone during performance of fine skilled movement.*	***D***
33. Endolymph: *a) It is found within the membranous labyrinth.* *b) Has a K concentration closes to that of the extra-cellular fluid.* *c) Is electrically negative with respect to the perilymph.* *d) Inertia has no role in the stimulation of receptors in the semicircular canals during rotation.*	***A***
34. Which of the following statements is false? *a) The semicircular canals (S.C.C.s) detect angular acceleration* *b) In the neck statotonic reflexes the forelegs (forelimbs) extend as the neck is "dorsiflexed.* *c) Labyrinthectomy causes loss of all postural reflexes haying their centers in the medulla oblongata.* *d) The receptor cells in the utricle are stimulated by the weight or the otoconia*	***D***

35. About nystagmus and vertigo: a) *The center of nystagmus is the inhibitory reticular formation while that of vertigo is the facilitatory reticular formation.* b) *The pathway of nystagmus includes the flooculonodular lobe of the cerebellum while that of vertigo include the medial longitudinal bundle.* c) *The slow phase of nystagmus is in the direction of rotation.* d) *Vertigo is a sensation of spinning in the direction of rotation.* e) *Post rotatory nystagmus is due to continuous movement of the endolymph after rotation stops.*	***E***
36. Rotation leads to all the following except: a) *A false sensation of counter-rotation after rotation stops* b) *Nystagmus the fast component of which occurs in a direction opposite to that of endolymph displacement.* c) *increased muscle tone of the ipsilateral side.* d) *Past pointing in the direction of rotation* e) *Autonomic responses including hypertension.*	***E***
37. About the labyrinthine receptors all the following is true except: a) *The otolith organs are responsible for detection of linear acceleration* b) *The cristae ampullaris contain cupulae but not otoconia* c) *The kinocilia in the horizontal S.C.Cs are located at the canal side* d) *in the horizontal SCCs displacement of the stereocilia depolarizes (stimulates) the hair cells* e) *The maculae of the utricle & saccules are normally stimulated by the weight of the otoconia.*	***C***

38. As regard Semicircular canals: *a) They are 4 on each side* *b) Its ampulla contain the macula* *c) The anterior vertical on one side is co-planed with the anterior vertical on the opposite side* *d) Open to the utricle by 5 separate openings* *e) In Horizontal S.C.Cs; the Kinocilium are directed away from the utricle*	***D***