Section 1  Eye

A) Accessory Eye Structures
   1) ________________________________ Protects
   2) ________________________________
      a) mucous membrane covers anterior sclera and inner eyelid
      b) lubricate/rinse the surface
      c) Conjunctivitis: inflammation of the conjunctiva
   3) ________________________________
      a) structures that produce tears
      b) ________________________________ antimicrobial enzyme
      c) Cleans/rinses/moistsens
   4) ________________________________ Move eye in orbit—follow objects without moving head

B) Eyeball (1” sphere)

C) 1) (outermost Layer) ________________________________
    a) ________________________________ ‘white ball’
       dense fibrous connective tissue
    b) ________________________________ ‘clear’ fibrous
       connective tissue
       (1) Highly innervated → blink/tear
       (2) Avasculaar → transplanted

   2) (Middle Layer) ________________________________
      a) ________________________________ Dark
         (1) Vascular
         (2) Function: ________________________________
      b) ________________________________
         (1) Smooth muscle
         (2) Attached to the __________________ by suspensory ligaments/ciliary zonules
         (3) Constrictions change shape of lens to ________________
      c) ________________________________
         (1) Crystallin protein (clear/transparent)
         (2) Changes shape to bend the image/light onto the ________________
         (3) Divides sphere into two segments:
            (a) Anterior segment: __________________ Watery/nourishes/removes wastes
            (b) Posterior segment: __________________ Clear Gel—maintains eyeball shape
d) _______________________
   (1) Doughnut of Smooth muscle
      (a) ____________________
         1. pupil diameter increases
         2. _____________ light enters
      (b) ____________________
         1. pupil diameter decreases
         2. _____________ light enters
   (c) Controls amount of light entering eye
   (2) Divides the anterior segment into two spaces
      (a) Anterior chamber: between cornea and iris
      (b) Posterior chamber: between iris and lens

3) (innermost layer) _______________
   a) Ganglion cells (axons) form optic nerve
   b) Exit eyeball→ ________________
      (no photoreceptors present)
   a) Bipolar cells
   b) Photoreceptors
      (1) ____________________
          black/white vision (dim light)
      (2) ____________________
          color vision (bright light)
      (3) ____________________
          sharp vision/highest acuity

Section 2  Vision

A) Pathway of light
   1) Cornea
   2) Anterior chamber of the anterior segment
   3) Pupil (iris)
   4) Posterior chamber of the anterior segment
   5) Lens
   6) Vitreous humor of the posterior segment
   7) Retina
B) Visual information pathway
   1) _______________
   2) _______________ information from each eye is transmitted to both cerebral hemisphere’s for processing
   3) _______________ visual processing/overlap images from each eye

C) Sight
   1) Normal vision: image is focused on the retina
   2) Nearsighted: eyeball is elongated so image focused before the retina
   3) Farsighted: eyeball is shortened so image focused passed the retina
   4) Magnifyers: lens loses elasticity

D) ______________
   1) Duct to drain aqueous humor blocked
   2) Aqueous humor made continuously
   3) Increased pressure within eye can damage retina

E) ______________
   1) Lens is occluded/cloudy
   2) Occurs with age/trauma
   3) Remove/replace lens
Section 3 Ear

A) __________________ (outer)

1) Structures:
   a) auricle/pinna
   b) External accoustic meatus (1" long) passes through the ______________ bone
   c) Lined with _______________
      Secrete cerumen (earwax) that traps particles
   d) Filled with: ______
   e) _______________

2) Function: Direct sound toward the middle ear

B) Middle Ear or ___________________________ within temporal bone

1) Structures:
   a) ___________________
   b) 3 ossicles: ___________________
      pound atainst the oval window to transmit sound
   c) Oval window
   d) Round window
   e) Filled with ______
   f) __________________ connects middle ear to nasopharynx (equalizes pressure)
      (1) Connects middle ear to nasopharynx (equalizes pressure)
      (2) Flat but opens during swallowing/yawning

2) Function: Amplify sound/Transmit to inner ear

C) __________________ (inner cavity of the temporal bone)

1) Structures:
   a) Maze/bony labyrinth of spaces
   b) Semicircular canals: __________________
   c) Vestible: __________________
   d) cochlea: __________________
   e) Filled with ______
   f) __________________: sensory receptors/stereocilia sway to generate an action potential

2) Function:
   1) Hearing
   2) equilibrium
Section 4 Hearing & Equilibrium

A) Hearing
   1) Pathway of Sound
      a) auricle/pinna
      b) External accoustic meatus
      c) Tympanic membrane
      d) Ossicles
      e) Oval window
      f) Cochlea--
         (1) Hair cells with hairs/cilia in gel
         (2) Fluid moves cilia in gel
   2) _____________ fluid movements cause stereocilia of hair cells to sway → (threshold) action potential
      a) Cochlear nerve
   3) __________________ sensory receptors stop responding to the same sounds/tones
   4) __________________ hearing loss
      a) Cannot get fluid to move (wax buildup)
      b) Ossicles fused
      c) Rubtured eardrum
      d) Damage to organ of corti/cochlear nearve/auditory cortex
      e) Hearing aids turn up the sound
      f) Cochlear implant: device allows sound to stimulate cochlear nerve directly

B) _____________ sense based on movement of endolymph
   1) Hair cells → vestibular nerve → ________________
      a) ________________ (sensory receptors) from muscles/tendons provide information about body position
      b) Work together to provide smooth/coordinated body movements
2) Dynamic Equilibrium: __________
   a) 3 canals in 3 directions (anterior/superior/horizontal)
   b) stereocilia of hair cells respond to moving endolymph
   c) angular/rotational __________
   d) Motion sickness: continuous fluid movements

2) Static Equilibrium: __________
   a) Otolithic membrane covers stereocilia of hair cells
   b) Otoliths (calcium salts) stones within membrane roll/move with gravity/head movements
   c) Pull on stereocilia $\rightarrow$ vestibular nerve
   d) __________

Section 5  Chemical Senses

A) Chemical senses of the tongue
   1) Structures:
      a) ______________________ : macroscopic
      b) Covered with epithelial tissue
      c) Taste buds:
         (1) ______________________
            chemoreceptor/sensory receptor
         (2) Basal cells--mitotic—replace gustatory cells every 7-10 days
         (3) Located on tongue, soft palate, superior pharynx and inner cheeks
         (4) Facial/glossopharyngeal nerve $\rightarrow$ cerebral cortex

2) 5 basic tastes:
   a) Sweet: alcohol, saccharine, lead salts (paint), sugars
   b) Salts: metal ions (NaCl, K)
   c) Sour: acetic acid (vinegar)
   d) Bitter: caffeine, nicotine, quinine
   e) Umami: ‘beef’/MSG (monosodium glutamate) flavor enhancer
   f) Most taste buds respond to >1 basic tastes/complement each other
   g) Tend to adapt quickly
B) Olfaction

1) Structures:
   1) Nasal cavity
   2) Lined with olfactory epithelium
   3) ________________: hair cells/chemoreceptors/sensory receptor sensitive to molecules dissolved in fluids of the mucosa
   4) Axons pass through ethmoid bone and synapse with olfactory bulb then through limbic system (emotional link) to cerebral cortex

2) Function: Transmit information about smell to the cerebral cortex