TOPICS FOR BASIC NEUROSCIENCE ORAL EXAM

NEUROANATOMY

1. Spinal cord

2. Autonomic nervous system

3. Corticospinal pathways

4. Spinothalamic pathways

5. Spinocerebellar pathways

6. Dorsal columns/lemniscus medialis system

7. Extrapyramidal motor pathways

8. Organization of the gray and white matter in the brainstem

9. Sensory innervation of the head

10. Motor innervation of the head

11. Cranial nerves

12. The cerebellum

13. Hypothalamus

14. Epithalamus

15. Thalamus and metathalamus

16. Subthalamus

17. Basal ganglia

18. Anatomy of the limbic system

19. Hippocampus

20. Amygdala

21. White matter of the telencephalon

22. Development of the central nervous system

electrophysiology

1. Resting potential

2. Nernst's potential

3. Action potential

4. Postsynaptic potential

5. Synapse

6. Excitatory postsynaptic potential

7. Inhibitory postsynaptic potential

8. Reversal potential

9. Receptors

10. Ionotropic receptors

11. Metabotropic receptors

12. Ion channels

13. Voltage gated sodium channel

14. Voltage gated potassium channel

15. Ligand-gated channels

16. Spatial and temporal summation

17. Na+/K+ pump

18. Neurotransmitters

19. Glutamate

20. GABA

21. Serotonin

22. Acetylcholine

23. Dopamine

SENSORY SYSTEMS

1. Middle ear

2. Internal ear

3. Organ of Corti

4. Physiology of sound

5. The auditory pathway

6. Deafness (types, degrees)

7. Retina and retinal layers

8. Primary visual pathway

9. Injuries of the visual pathway

10. Primary visual cortex

11. M and P system

12. ON and OFF system

13. Nociceptors and thermoreceptors

14. Pain and temperature pathway

15. Descending pathways in the control of pain sensation

16. Primary somatosensory cortex

17. Types of mechanoreceptors

18. Pathway for touch sensation

19. Smell sensation

20. Taste sensation

21. General organization of sensory systems

MOTOR SYSTEMS

1. Reflex

2. Muscle sensory receptors

3. The cerebellum

4. Olivocerebellar pathway

5. Mossy pathway

6. Types of cerebellar cells

7. Basal ganglia

8. Direct pathway of the basal ganglia

9. Indirect pathway of basal ganglia

10. Hypokinetic syndrome

11. Hyperkinetic syndrome

12. Types of movement

13. Motor cortex

14. Types of motor neurons

15. Eye movements; Saccadic movements

18. Descedent pathways in maintaining body posture

19. Spinal cord injuries

20. Spinal shock

21. Tetraplegia, diplegia, hemiplegia, monoplegia

22. Decerebration and decortication rigidity

GENERAL BRAIN FUNCTIONS

1. Synaptic plasticity

2. Explicit and implicit memory

3. Sleep stages

4. Electroencephalography (EEG)

5. Sexual differentiation of the brain

6. Neuroanatomy of memory

7. Associative and non-associative learning

8. Cellular mechanisms of learning and memory

9. Limbic system functions