

Physiology 2nd year, English Module

Nervous System Physiology Lectures - Topics for the test on 5 - 6 December 2019

1. Neuronal and non-neuronal cells: types and characteristics.
2. Features of axoplasmic transport
3. Cell membrane potential: Resting membrane potential. Nernst potential
4. Voltage-gated Na⁺ ion channels
5. Voltage-gated Ca²⁺ ion channels
6. Ion pumps and ions exchangers/carriers: characteristics, functions and examples
7. Membrane responses to stimulus current: hyperpolarization, depolarization and threshold currents
8. Nerve action potential (AP): AP phases; ionic conductance during AP
9. Na⁺ channels distribution and generation of AP. Axon depolarization.
10. Myelin; saltatory conduction
11. Electrical synapse: structure, function, occurrence in the nervous system
12. Chemical synapse: Presynaptic mechanisms - mechanism of transmitter release
13. Chemical synapse: Postsynaptic mechanisms: ionotropic, metabotropic
14. Control of transmitter activity in the synaptic cleft
15. Glutamate and glutamate receptors
16. GABA and GABA receptors
17. Acetylcholine and Ach receptors
18. Norepinephrine and adrenergic receptors
19. Dopamine and dopamine receptors
20. Serotonin and serotonin receptors
21. Excitatory and inhibitory postsynaptic potentials (EPSPs and IPSPs)
22. Glial cell functions at synaptic level
23. Motor unit
24. Neuromuscular junction – components and their roles; Nicotinic receptor
25. AP generation and transmission in the muscular fiber
26. T tubules in the skeletal muscle; triad and tetrad
27. Excitation-Contraction coupling in the skeletal muscle
28. Mechanism of muscle contraction and relaxation
29. Calcium homeostasis in the skeletal muscular contraction
30. Muscle fatigue
31. Classification of the sensory receptors
32. Adaptation of sensory receptors. Tonic vs. phasic receptors
33. Sensory unit and the receptive field
34. Pain receptors and their stimulation
35. Types of pain: fast and slow
36. External layer of the eye- components and function
37. Accommodation
38. Pupillary reflex
39. The lens system of the eye; focal point
40. Emmetropia and refraction errors
41. Visual acuity
42. Photopic and scotopic vision
43. Fluid system of the eye

44. Cellular organisation of the retina
45. Photoreceptor cells
46. Phototransduction
47. Colour vision
48. Optical pathway
49. Cochlea and the Corti organ- structure and function
50. Vestibular receptors- structure and function
51. Air conduction of the sound to the hair cells and signal transduction
52. Hair cells innervation and the main auditory pathway neurons
53. Vestibular pathway- neurons, connections and cortical projection
54. Olfactory mucosa- structure and function
55. Olfactory signal transduction
56. Olfactory pathway- main neurons and cortical projection
57. Taste receptors- location, structure and function
58. Gustative pathway and cortical projection
59. Organization of the visceral control system – the sympathetic division
60. Organization of the visceral control system – the parasympathetic division
61. Classic neurotransmitters of the autonomic nervous system
62. Non-classic transmitters of the autonomic nervous system
63. Effects of the sympathetic system on visceral targets
64. Effects of the parasympathetic system on visceral targets
65. Central nervous system control of the viscera