Written Q

1. ***Compare () chemical and electrical synapse ?***
2. ***Compare () EPSP and IPSP ?***
3. ***Def and mechanism of presynaptic inhibition ?***
4. ***Effect and mechanism of repeated stimulation of synapse ?***
5. ***Compare () post tetanic facilitation and long term facilitation ?***
6. ***3 causes of synaptic delay ?***
7. ***Enumerate properties of synaptic transmission ?***

Formative and Exams MCQ

1. Synaptic transmission can be inhibited by: *a) hypercalcemia.* *b) Alkalosis.* *c) Acidosis.* *d) Thyroid hormones.* *e) Caffeine.*	**C**
2. The most common site for the electrical synapses in C.N.S: *a) Inner ear "cochlea"* *b) Cerebral cortex.* *c) Reticular activating system.* *d) Hippocampus.* *e) Raphi magnus nucli*	***D***
3. Prolonged changes in neuronal activity are usually achieved through the activation of: *a) Voltage-gated chloride channels.* *b) Transmitter-gated sodium channels.*	**C**

c) G-protein-coupled channels. *d) Voltage-gated potassium channels.* *e) Voltage gated Ca channels*	
4. Post-tetanic facilitation is Thought to be the result of: *a) opening voltage-gated sodium channels.* *b) A buildup of calcium in the presynaptic terminal* *c) electrotonic conduction*	***B***
5. The EPSP recorded from a cell body in the CNS: *a) Is an all or none response.* *b) Always follows the development of an axon spike.* *c) Always initiates an action potential.* *d) Lasts for only the duration of the presynaptic potential.* *e) Can be temporally summated.*	***E***

Other MCQ

1. Which of the following is correct: *a) Synaptic fatigue means presynaptic neuron fails to discharge.* *b) Synaptic fatigue is mainly due to depletion of neurotransmitter in postsynaptic knobs.* *c) Synaptic fatigue is mainly due to depletion of neurotransmitter in presynaptic knobs.* *d) Secondary hyperalgesia is due to hypersensitivity of pain receptors.* *e) In pathway of crude touch, 3rd order neurons terminate in motor cortex.*	***C***
2. The release of neurotransmitter at a chemical synapse in the central nervous system is dependent upon which of the following? *a) Synthesis of acetyl cholinestrase.* *b) Hyperpolarization of the synaptic terminal.* *c) Opening of ligand-gated ion calcium channels.* *d) Influx of calcium into the presynaptic terminal.*	***D***
3. Hypoventilation has which of the following effects on neuronal activity? *a) Depresses neuronal activity.* *b) Increases neuronal activity.* *c) Increases synaptic delay.* *d) Increase transmitter release. E) Increase no. of post-synaptic receptor*	***A***
4. The excitatory or inhibitory action of neurotransmitter is determined by which of the following? *a) Function of its postsynaptic receptor.* *b) Molecular composition.* *c) Shape of the synaptic vesicle in which it is contained.* *d) Distance between the pre- and the post-synaptic membranes.* *e) Number of receptors on the post-synaptic membrane.*	***A***

5. Which of the following represents an activity performed by the activated second messenger? *a) Closure of a membrane channel for sodium or potassium.* *b) Activation of cyclic amp or cyclic gmp.* *c) Inactivation of enzymes that initiate biochemical reactions in the postsynaptic neuron.* *d) Inactivation of gene transcription in the postsynaptic neuron.* *e) Inactivation of ca++ channels.*	***B***
6. Temporal summation: *a) Occurs when several presynaptic fibers are stimulated simultaneously.* *b) Occurs when presynaptic fiber is repeatedly stimulated.* *c) Is due to overlap of the discharging zone.* *d) Is due to overlap of the subliminal zone.* *e) None of the above is correct.*	***B***
7. Synaptic transmission: *a) Is inhibited by hypercalcemia.* *b) Is stimulated by alkalosis.* *c) Does not show fatigue.* *d) Is stimulated by acidosis.* *e) Shows delay about 15 m.sec.*	***B***
8. When an excitatory neurotransmitter is released it may lead to: *a) Potassium entry.* *b) Calcium entry.* *c) Hyperpolarization.* *d) Chloride entry.* *e) EPSP.*	***E***

9. Synaptic transmission my involve: *a) Release of neurotransmitter from post synaptic neuron.* *b) Entry of Ca++ to postsynaptic neuron.* *c) Occurrence of EPSP in presynaptic neuron.* *d) Outflow of K from presynaptic neuron.* *e) Na+ entry to postsynaptic.*	***E***
10. Fatigue in synapses may be related to which of the following: *a) Adaptation of the presynaptic nerve fiber.* *b) Progressive decrease in Ca++ available for neurotransmitter release.* *c) Progressive inactivation of many of post synaptic receptors.* *d) Development of abnormal high concentration of K+ ions inside the post synaptic neuron.* *e) Development of high concentration of Cl- inside the post synaptic neu*	***C***
11. Post-tetanic facilitation is thought to be the result of: *a) Opening voltage-gated sodium channels.* *b) Opening transmitter gated potassium channels.* *c) A buildup of calcium in the presynaptic terminal.* *d) Electrotonic conduction.* *e) A build up of calcium in the part synaptic hormone.*	***C***
12. Which of the following is characteristic of the events occurring at an excitatory synapse? *a) There is a massive efflux of calcium from the presynaptic terminal* *b) Synaptic vesicles bind to the postsynaptic membrane* *c) Voltage-gated potassium channels are closed* *d) Ligand-gated channels are opened to allow sodium entry into the post synaptic neuron*	***D***

13. Which of the following electrical events is characteristic of inhibitory synaptic interactions? *a) A neurotransmitter agent that selectively opens ligand-gated chloride channels is the basis for an inhibitory postsynaptic potential* *b) Because the Nernst potential for chloride is about −70 mV, chloride ions tend to move out of the cell along its electrochemical gradient* *c) A neurotransmitter that selectively opens potassium channels will allow potassium to move into the cell* *d) An increase in the extracellular sodium concentration usually leads directly to an inhibitory postsynaptic potential*	***A***
14. Forced rapid breathing results in alkalization of the blood which would lead to which of the following changes in neuronal activity? *A) Decrease in neuronal activity* *B) Increase in neuronal activity* *C) Initial decrease followed by an increase* *D) No change in neuronal activity*	***B***
15. Temporal summation of EPSP results from: *a) simultaneous stimulation of multiple knobs.* *b) repetitive stimulation of a single knob.* *c) convergence.* *d) divergence.* *e) lateral inhibition.*	***B***
16. Connexons of gap junctions in electric synapses: *a) are Ligand gated* *b) are voltage gated* *c) allow transmission of potential changes in both directions between the pre and post- synaptic neurons* *d) close whenever the presynaptic neuron becomes hyperpolarized*	***C***

17. Chemical synapses in the nervous system: *a) allow diffusion of chemical substances form the presynaptic neuron into the postsynaptic neuron* *b) allow transmission of potential changes in one direction on from the presynaptic to the postsynaptic neurons* *c) have potential-gated ionic channels* *d) more numerous in peripheral nervous system than central nervous system*	***B***
18. Synaptic cleft: *a) is the space between two synapses on the surface of neurons* *b) allow diffusion of transmitters between neurons* *c) is filled with intracellular fluid* *d) ranges between 20-30 mm in Width*	***B***
19. Synaptic transmission depends upon: *a) direct transmission of impulse from pre-synaptic to post- synaptic neuron* *b) diffusion of neurotransmitters from synaptic knobs into the soma and dendrites of postsynaptic neurons* *c) presence of voltage-gated Ca channels in membrane of synaptic knobs* *d) presence of voltage-gated Ca channels in the subsynaptic membrane*	***C***
20. Postsynaptic receptors include all following types, except: *a) G-protein coupled receptors* *b) ligand-gated cation channels* *c) G-protein regulated K channels* *d) voltage-gated Cl channels*	***D***
21. Opening of ligand-gated Cl channels causes: *a) inhibition of the postsynaptic neuron* *b) depolarization of the postsynaptic neuron* *c) initiation of an action potential* *d) block of ligand-gated cation channels*	***A***

22. IPSP differs from EPSP in: *a) being of shorter duration* *b) being unable to summate spatially* *c) moving the membrane potential away from threshold* *d) depending upon opening of voltage K channels*	***C***
23. IPSP could result from: *a) opening of K channels* *b) opening of ligand-gated cation channels* *c) closure of Cl channels* *d) closure of potential-gated Ca channel*	***A***
24. Synaptic transmission is terminated by: *a) block of postsynaptic receptors* *b) elevation of Ca concentration in synaptic cleft* *c) reuptake of neurotransmitters by postsynaptic neurons* *d) degradation of neurotransmitters by specific enzymes*	***D***
25. In Chemical synapses, transmission occurs in a forward direction because: *a) neurotransmitter receptors are found only in the postsynaptic membrane* *b) the subsynaptic membrane does not contain neurotransmitter vesicles* *c) the subsynaptic membrane is more sensitive than the membrane synaptic knob to the effect of neurotransmitters* *d) the subsynaptic membrane contains both ligand-gated and voltage gated ionic channels*	***B***
26. Synaptic delay: *a) is the time needed for release of neurotransmitter from synaptic vesicles* *b) the minimal delay time in the central nervous system is about 0.5 millisecond* *c) is determined by the type of the neurotransmitter* *d) is determined by the number of postsynaptic receptors*	***B***

27. Synaptic fatigue is due to: *a) decreased synthesis of neurotransmitters* *b) inability to release neurotransmitters by exocytosis* *c) failure of action potentials to open voltage-gated Ca channels in presynaptic terminal* *d) imbalance in between rates of synthesis and release of neurotransmitters*	***D***
28. Synaptic transmission is inhibited by all the following. except: *a) oxygen lack* *b) alkalosis* *c) acidosis* *d) prolonged activity of synapse*	***B***
29. Post-tetanic Potentiation in synapses: *a) is due to increased Ca concentration in postsynaptic neurons* *b) is due to increased Ca influx into presynaptic neurons* *c) results from slow prolonged stimulation of synapse* *d) causes fatigue of the synapse*	***B***
30. Long-term potentiation of synaptic transmission: *a) is involved in pain control system* *b) results from fast prolonged stimulation of synapses* *c) results from fast repetitive stimulation of synapse* *d) is associated with decreased Ca concentration if postaynaptic neurons*	***C***
31. Drugs which open Cl channels in synapses: *a) cause depolarization of postsynaptic membrane* *b) cause hyperpolarization of postsynaptic membrane* *c) enhance release of neurotransmitters from synaptic knobs* *d) enhance response of postsynaptic neurons*	***B***

32. Concerning synapses all the following is true except: *a) Transmission across synapses is mostly chemical* *b) In some synapses, transmission is electrical.* *c) At a few conjoint synapses, transmission is both chemical & electrical* *d) Electrical synapses are resistant to drugs but chemical are not* *e) The delay of transmission at chemical synapses is about 3 milliseconds*	***E***
33. The excitatory postsynaptic potential (EPSP): *a) Produced as a result of release of GABA* *b) A state of partial depolarization* *c) Due to increased permeability to Cl in the postsynaptic membrane* *d) Unable to undergo summation*	***B***
34. The inhibitory postsynaptic potential (IPSP) is: *a) Produced as a result of release of acetylcholine.* *b) Involved in the gate theory of pain control* *c) A state of hyperpolarization* *d) Due to increased Na permeability in the postsynaptic membrane*	***C***
35. The synaptic transmission is accelerated by: *a) Acidosis* *b) Caffeine* *c) O2 lack* *d) Anesthetics* *e) Tranquilizers*	***B***
36. The ion responsible for the IPSP is: *a) Na moving into the cell body.* *b) Cl moving into the cell body.* *c) K moving into the cell body.* *d) k moving out of the cell body* *e) Both (B) and (D)*	***E***

37. Temporal summation: *a) Occurs when a single presynaptic neuron is repetitively stimulated* *b) Occurs when many presynaptic neurons are simultaneously stimulated* *c) Is more important in C.N.S than spatial summation* *d) None of the above*	***A***
38. An excitatory post-synaptic potential: *a) Is the depolarization of a post-synaptic nerve cell membrane that occurs when a presynaptic neuron is stimulated.* *b) Involves reversal of polarity across the post-synaptic membrane.* *c) May be recorded from a posterior root ganglion cell.* *d) Is propagated at the same rate as an action potential.* *e) Is caused by electrical field induced by activity in the pre-synaptic nerve*	***A***