

MCQ (nerve and muscles)

Choose the best (✓) answer:

1- The energy of muscle contraction is derived from the following except:

- a- ATP.
- b- muscle glycogen.
- c- lactic acid.
- d- Creatine phosphate.

c

2- The frequency needed to produce tetanus:

- a- is increased by cooling.
- b- is decreased in red muscles.
- c- is increased in fatigue.
- d- is decreased in the pale muscles.

b

3- Depolarization:

- a- is associated with increase in membrane permeability to Na^+ .
- b- is terminated with closure of voltage activated K^+ channels.
- c- is followed by muscle relaxation.
- d- is caused by K^+ efflux.

a

4- Action potential:

- a- is a graded potential.
- b- is produced by sub threshold stimulus.
- c- starts with repolarization caused by outward movement of Cl^- .
- d- is conducted slower in thin nerve fibers.

d

5- RMP of a nerve:

- a- is caused by equal distribution of ions along both sides of the membrane.
- b- is caused by selective permeability of the membrane to the ions.
- c- $\text{Na}^+ - \text{K}^+$ pump has no role in RMP.
- d- is caused mainly by inward movement of Na^+ ions.

b

6- As regard conduction of action potential in a nerve:

- a- in thick myelinated nerve fibers can reach up to 120 meter / second.
- b- can be increased by increase calcium.
- c- can be increased by cooling.
- d- is conducted with decrement.

a

7- Pale (fast) fiber:

- a- contains much blood capillaries.
- b- doesn't show fatigue.
- c- contains low concentration of myoglobin.
- d- depends on aerobic oxidation.

c

8- About cellular sheath (sheath of Schwann):

- a- It acts as an electric insulator around the nerve fiber.
- b- It surrounds the axons of all neurons inside and outside the CNS.
- c- It is responsible for the color of the white matter of the spinal cord.
- d- It is essential for regeneration of the damaged nerve fibers.

d

9- Myelin sheath:

- a- Present in the myelinated and unmyelinated nerve fibers.
- b- Formed of lipoprotein complex and acts as electric insulator.
- c- It is formed of successive wrappings of the membrane of Schwann cells.
- d- It is the cause of decreased conduction of nerve impulse.

b

10- Chronaxia:

- a- is the minimal stimulus which produce response after relatively long time.
- b- is the minimal time needed by the strong stimulus to produce response.
- c- is the time required to stimulate the nerve by a minimal stimulus.
- d- is the time required to stimulate the nerve by a stimulus which is double rheobase.

d

11- During depolarization:

- a- voltage activated Na^+ channels open.
- b- the membrane becomes impermeable to Na^+ .
- c- when membrane potential reaches -55 m.v Na^+ & K^+ fluxes occur at the same time.
- d- K^+ ions diffuse outside.

a

12- The resting membrane potential is caused by:

- a- Diffusion of K^+ ions outside the nerve fibers.
- b- Diffusion of Na^+ ions inside the nerve fibers.
- c- Opening of the chemically activated ion channels.
- d- Opening of the voltage activated ion channels.

a

13- To measure resting membrane potential:

- a- We use a special voltmeter or cathode ray oscilloscope (CRO).

- b- We put the two electrodes outside the nerve fiber.
- c- We stimulate the nerve by an effective stimulus.
- d- We put the two electrodes inside the nerve fiber.

a

14- Repolarization:

- a- Occurs at first gradual then becomes fast.
- b- Results from closure of sodium gates and opening of potassium gates.
- c- is represented by the ascending limb of the spike.
- d- is followed by appearance of response.

b

15- Continuous conduction:

- a- occurs in myelinated nerve fibers.
- b- occurs by jumping of charges from one node of Ranvier to another.
- c- is relatively slow 0.5-2.0 meter / second.
- d- occurs in the neuro-muscular junction.

c

16- Saltatory conduction:

- a- occurs in unmyelinated nerve fibers.
- b- may reach up to 120 meter / second.
- c- occurs by jumping from one neuron to another.
- d- decreases gradually with distance till it disappears.

b

18- In monophasic action potential:

- a- One electrode is put inside and the other is put outside the same nerve fiber.
- b- The spike is a large wave of short duration.
- c- The spike is followed by positive after potential then negative after potential.
- d- The ascending limb of the spike is due to K^+ efflux.

b

19- Local excitatory state is characterized by the following except:

- a- its magnitude is directly proportional with the intensity of the sub-minimal stimulus.
- b- does not obey all or non rule.
- c- can be summated.
- d- propagated without decrement.

d

20- About A fibers all are true except:

- a- They have the greatest diameter.
- b- They conduct impulses with the greatest velocity (10-120 met./sec)
- c- They include somatic sensory and motor fibers.
- d- They are very sensitive to local anesthetic drugs.

d

21- In all or non rule:

- a- A minimal stimulus produces a maximal response.
- b- The response in a single nerve fiber increases with increase intensity of stimulus.
- c- The nerve trunk either respond maximally or not respond at all.
- d- Minimal stimulus produces minimal response.

a

22- Excitation contraction coupling involves all the following except:

- a- Release of Ca^{++} from troponin.
- b- Formation of cross bridges between actin and myosin.
- c- Spread of depolarization along the transverse tubules.
- d- Hydrolysis of ATP to ADP.

a

23- Muscle fatigue is due to:

- a- Inability of the action potential to spread over the muscle.
- b- Failure of transmission in the motor nerve.
- c- Failure of neuro-muscular transmission.
- d- Depletion of energy stores.

a

24- An-electrotonus :

- a- is a localized area of depolarization.
- b- results from stimulation by effective galvanic current .
- c- is associated with decreased excitability.
- d- used to stimulate the nerve fibers

c

25- Nerve block is produced by:

- a- Sever cooling.
- b- Strong catelectrotonus.
- c- Decrease Ca^{++} ions.
- d- Increased Na^+ ions.

a

26- Which of the following has the lowest conduction velocity:

- a- A α fibers.
- b- A β fibers.
- c- B fibers.
- d- C fibers.

c

27- The function of tropomyosin in skeletal muscle include:

- a- binding to myosin during contraction

- b- acting as a relaxing protein at rest by covering the binding sites on actin.
- c- sliding on actin to produce shortening.
- d- releasing Ca^{++} after propagation of action potential.

b

28- Contraction of skeletal muscles:

- a- produces more work when the muscle contracts isometrically than when the muscle contracts isotonicly.
- b- depends on external Ca^{++} .
- c- decrease in magnitude with rapid repeated stimulation.
- d- does not depend on action potential.

c

29- The motor end plate potential is produced by:

- a- opening of Na^+ channels.
- b- opening of Na^+ channels then opening of K^+ channels.
- c- opening of Na^+ and K^+ channels at the same time.
- d- opening of Ca^{++} channels.

c

30- Nerve block is produced by all the following except:

- a- local anesthetics.
- b- excessive cooling.
- c- deep pressure.
- d- strong cat-electrotonus.

d

31- As regard neuro-muscular transmission all are true except:

- a- it shows fatigue due to depletion of acetylcholine vesicles.
- b- occurs from nerve to muscle i.e. one way conduction.
- c- it is stimulated by succinyl choline.
- d- it is blocked by botulinum toxins.

c

32- Red (slow) fibers are characterized by the following except:

- a- contains much blood capillaries.
- b- glycogen stores is low.
- c- contains high concentration of myoglobin.
- d- depends on anaerobic oxidation.

d

33- Neuromuscular transmission is blocked by:

- a- prostigmine .
- b- increase Ca^{++} ions.
- c- acetylcholine .

d- succinylcholine.

d

34- All about the Sarcomere are true except:

a- is the distance between myosin and actin.

b- is the distance between two Z membranes.

c- is the contractile unite of the muscle.

d- shorten when the muscle contracts.

a

35- Excitability of nerve fibers:

a- is increased by decreased temperature.

b- is increased by decreased Na^+ .

c- is decreased by decrease Ca^{++} ions.

d- is completely lost by local anesthetic drugs.

d