Nervous System

Section 1

---

1 Regarding muscle spindles:
   a) are composed of extrafusal fibres
   b) receive δ efferents
   c) all subtypes send afferents via “flower spray” ended 1a nerves
   d) nuclear chain fibres show dynamic response
   e) afferent discharge decreased with muscle stretch

2 Regarding the dorsal column:
   a) carries ipsilateral pain and temperature
   b) ascends to the nuclei gracillis and ?????
   c) receives efferents from contralateral stimuli
   d) sacral efferents lie laterally
   e) runs anteriorly in the cord

3 Temperature sensation:
   a) respond to compartitive temp gradient ??? skin
   b) cold receptors predominate
   c) warm receptors respond 30° - 100°
   d) afferents carried via the dorsal column
   e) warm and cold afferents carried via Ad fibre

4 Regarding visual receptors:
   a) rods predominate in the jovea
   b) rhodopsin is the primary pigment of rods
   c) lie anterior (superficial) to their neural pathway
   d) colour blindness is an autosomal recessive gene
   e) supplied by retinal vessels

5 Regarding sound and hearing:
   a) high pitched sounds are detected at the apex of the cochlear
   b) Harr cells are bathed in endolymph
   c) defected by hair cells found within the tectorium membrane
   d) 95% of afferent neurones → outer ??? cells
   e) ???????

6 Regarding noradrenergic stimulation:
   a) miosis occurs
   b) increases blood flow to the skin
   c) increases thresholds in the reticular formation
   d) causes erection in males
   e) elevates free fatty acid levels

7 Regarding cholinergic stimulation:
   a) causes amylase secretion from salivary glands
   b) decreases secretion from pancreatic ?????
   c) relaxes the gallbladder
   d) has no effect on renal arterioles
   e) relaxes bronchial smooth muscle

8 The emotional component to pain is due to activation of:
   a) post central gyrus
   b) sylvian fissure
   c) hippocampus
   d) cingulated cortex
   e) calcavine fissure

9 The chemical agent that initiates impulses in pain fibres is:
   a) ATP
   b) substance P
   c) Ca^{2+}
   d) H^{+}
   e) K^{+}

10 Regarding thermoceptors:
   a) there are more warm receptors than cold receptors
   b) cold receptors respond to 10-38°C
   c) afferents for cold receptors are C fibres only
   d) afferents found in the ventral spinothalamic tract
   e) respond to the temperature gradient across the skin

11 Regarding body temperature:
   a) humans are poikilothermic
   b) oral temperature is usually higher than rectal temperature
   c) it is usually lowest at 6am
   d) children have more precise temperature regulation
   e) emotion has no effect on core temperature

12 Regarding the hypothalamus:
a) it has neural connections with the anterior pituitary gland
b) it integrates the vomiting reflex
c) the anterior hypothalamus responds to cold
d) it controls circadian rhythms via the supraoptic nuclei
e) it has osmoreceptors in the anterior hypothalamus to stimulate thirst and vasopressin release

13 Regarding the vomiting reflex, which is INCORRECT?
a) it is integrated by the medilla
b) breath is held in expiration
c) the glottis closes
d) it involves salivation
e) there are afferents from vestibular nuclei

14 Herring bodies are:
a) nuclei of the hypothalamus
b) secretory granules in the posterior pituitary
c) circumventricular organs
d) neurons connecting vestibular nuclei with the vomiting centre
e) vesicles containing ACTH, TSH, GH, FSH, CH and PRL

15 The neurotransmitter secreted by primary afferent fibres for severe pain is:
a) glutamate
b) acetylcholine
c) substance P
d) opioid peptides
e) noradrenaline

16 Regarding rods and cones:
a) Na^+ channels are closed in the dark
b) light striking the outer segments results in a depolarising receptor potential
c) the receptor potentials are all-or-nothing
d) rhodopsin is a serpentine receptor
e) acetylcholine is released from the synaptic terminal

17 The visual cortex is situated at the:
a) parieto-occipital sulcus
b) cuneus
c) calcanine fissure
d) lateral geniculate body
e) angular gyrus

18 In the visual pathway:
a) the lateral geniculate bodies are made up of t layers
b) fibres for reflex pupillary constriction leave the optic nerve at the optic chiasm
c) pituitary tumours can cause homonymous hemianopia
d) macular sparing may or may not occur with lesions in the geniculocalcanine tract
e) binasal visual field fibres decussate at the opticchiasm

19 When a normal innervated skeletal muscle is stretched, the initial response is contraction, but with increasing stretch, the muscle suddenly relaxes because:
a) with strong stretch, the efferent discharge is decreased
b) with strong stretch, the discharge from the annulospiral endings of afferent nerve fibres is inhibited
c) with strong stretch, there is decreased activity in the afferent nerve fibres from the Golgi tendon organs
d) with strong stretch, there is increased activity in the afferent nerve fibres from the Golgi tendon organs
e) because of reciprocal innervation, there is increased discharge in the afferent nerve fibres from the antagonists to the stretched muscle

20 With regard to spinal tracts, which is INCORRECT?
a) lateral corticospinal fibres decussate in the pyramids of the medulla
b) ventral corticospinal fibres decussate at the level of synapse in spinal cord
c) dorsal column fibres synapse in gracile and cuneate nuclei with decussating
d) lateral spinothalamic tract carries pain and temperature fibres
e) ventral spinothalamic tract decussates at the medial lemniscus

21 In a polysynaptic reflex, which of the following happen when the strength of the adequate stimulus is increased?
a) the amplitude of the motor response is increased
b) the motor response spreads to include other muscles and even other limbs
c) there is increased inhibition of stretch reflexes
d) the duration of the motor response increases
e) all of the above are true

22 A tumour causing external compression to the anterior cervical spinal cord would be expected to:
a) impair pressure and pain sensation mostly from sacral and lumbar areas
b) impair fine touch and vibration mostly from sacral and lumbar areas
c) impair pain only from cervical areas
d) impair vibration sense only from cervical areas
e) impair joint position from sacral areas only

23 Which of the following need to be intact for normal stereognosis:
a) dorsal columns
b) parietal lobe
c) pressure pathways
d) all of the above
e) none of the above

24 Bitemporal hemianopia is most likely to be caused by a lesion at the:
a) optic nerve
b) optic chiasm
c) optic tract
d) optic radiation
e) visual cortex

25 Regarding temperature regulation, which is NOT true?
a) the anterior hypothalamus contains temperature sensitive cells
b) shivering is activated by the posterior hypothalamus
c) the anterior hypothalamus controls mechanisms activated by heat
d) horripilation acts to increase heat production
e) fever is produced by the action of cytokines on the hypothalmus

26 When a visual stimulus falls on a given point in the retina for a long time:
a) the image becomes more clearly focused
b) there is adaptation in the visual cortex
c) the discharge rate in the bipolar cells increases
d) the pupils constrict
e) the image fades and disappears

27 Which of the following affect visual activity?
a) cataracts
b) vitamin A deficiency
c) astigmatism
d) contrast between stimulus and background
e) all of the above

28 The ‘tympanic reflex’:
a) is activated by foreign bodies in the external auditory canal
b) results in vertigo
c) is activated by high-pitched sounds only
d) results in the decreased transmission of sound
e) none of the above

29 If one leg is immersed in ice water, the subject's immediate response(s) include:
a) generalised vasoconstriction
b) increased secretion of adrenaline
c) shivering
d) all of the above
e) none of the above

30 Regarding pain transmission, which is NOT true?
a) 'fast pain' fibres are Aδ fibres
b) 'slow pain' fibres are C fibres
c) substance P is the central transmitter
d) all impulses pass through the central horn
e) pain sensation results from over-stimulation of other sensory modalities

31 Which is NOT a part of the basal ganglia?
a) caudate nucleus
b) cuneate nucleus
c) substantia nigra
d) putamen
e) globus pallidum

32 With regard to pain pathways, all the following are true EXCEPT:
a) peripheral afferents are transmitted along A (delta) and C fibres
b) an intact cerebral cortex is necessary for pain sensation
c) the synaptic transmitter released by primary afferent fibres subserving pain is substance P
d) afferent fibres subserving pain sensation from viscera reach the CNS by both sympathetic and parasympathetic pathways
e) the sensory organs for pain are marked nerve endings

33 Cerebellar disease in humans causes all of the following EXCEPT:
a) dysmetria
b) scanning speech
c) lead pipe rigidity
d) rebound phenomenon
e) dysdiadockokinesia

34 The righting reflex is pronounced after sectioning of the neural axis above which level:
a) spinal cord
b) medulla
c) mid-brain
d) subcortical nuclei
e) all above intact but decerebellate

35 Regarding muscle spindles, which is NOT true?

a) they contain nuclear bag and nuclear chain fibres
b) they receive a motor supply via $A\gamma$ fibres
c) they discharge more upon stretching of the muscle
d) they are responsible for the inverse stretch reflex
e) they relay information to the cord via Ia fibres

Nervous System

Section 1 – Answers

1	B
2	B
3	B
4	B
5	E
6	D
7	D
8	A
9	B
10	C
11	E
12	B
13	B
14	C
15	D
16	C
17	D
18	D
19	E
20	?
21	A
22	D
23	B
24	D
25	E
26	A
27	E
28	D
29	?
30	E
31	B
32	B
33	C
34	C
35	D

Section 2

---

1 The action potential of a neuron (influx):
   a) is initiated by efflux of Na^+
   b) is terminated by efflux of K^+
   c) declines in amplitude as it moves along the axon
   d) results in transient reversal of the concentration (?electrical) gradient of Na^+ across the cell membrane
   e) is not associated with any net movement of Na^+ of K^+ across the cell membrane

2 The functions of tropomyosin in skeletal muscle include:
   a) releasing Ca^{2+} after an action potential
   b) sliding on actin to produce shortening
   c) binding to myosin during contraction
   d) acting as a “relaxing protein” at rest by covering up the sites where myosin binds to actin
   e) generating ATP which passes to the contractile mechanism

3 Regarding the autonomic nervous system:
   a) it does not have a reflex arch like the somatic nervous system
   b) it has dopamine as the main transmitter
   c) it has cholinergic division which increases activity of the intestinal musculature and increases gastric excretion
   d) neurotransmitter noradrenaline is metabolised by pseudocholinesterase
   e) it is not onvolved with visceral sensation (?involved)

4 Which of the following does NOT act via an intracellular receptor?
   a) atrial natriuretic peptide
   b) cortisol
   c) thyroxine
   d) aldosterone
   e) retinoic acid

5 Which of the following phosphate compounds is MOST important in the production of energy?
   a) AMP (adenosine monophosphate)
   b) ADP (adenosine diphosphate)
   c) ATP (adenosine triphosphate)
   d) GTP (guanosine triphosphate)
   e) CTP (cytidine triphosphate)

6 Steps involved in skeletal muscle contraction include all of the following EXCEPT:
a) binding of acetylcholine to nicotinic receptors
b) increased Na^+ and K^+ conductance in end plate membrane
c) spread of depolarisation along T tubules
d) binding of calcium to troponin T, with uncovering of its actin-myosin binding site

7 Regarding the resting membrane potential in peripheral nerves:
a) membrane permeability of potassium ions via K^+ leak channels produces the resting potential
b) a decrease in extracellular Ca^{2+} decreases excitability
c) decreasing external Na^+ concentration lowers the resting membrane potential
d) changing the external Na^+ concentration has no effect on the action potential
e) decreasing the external K^+ concentration increases the resting membrane potential

8 Regarding excitation-contraction coupling in skeletal muscle, which statement is INCORRECT?
a) calcium ions bind to troponin T
b) troponin I – tropomyosin complex constitutes a “relaxing protein”
c) each cycle of attachment and detachment shortens muscle length by about 1%
d) ATP is the immediate source of energy
e) globular head of myosin – II possesses actin binding site

9 Microglia:
a) are involved with myelin production
b) are scavenger cells
c) are performed in the brain
d) are important in GABA uptake
e) induce capillaries to form tight junctions and thus the blood brain barrier

10 The action potential:
a) is always monophasic
b) has an absolute refractory period lasting to the start of the after depolarisation
c) has a relative refractory period lasting until repolarisation is complete
d) requires opening of voltage gated Na^+ channels
e) results in $\downarrow K^+$ conductance

11 Which of the following nerve fibre types is MOST sensitive to hypoxia?
a) A-alpha
b) A-beta
c) A-delta
d) B
e) C

12 Regarding smooth muscle contractility, which statement is INCORRECT?
a) increased by acetylcholine
b) decreased by activation of phospholipase C
c) increased by cold
d) decreased by cAMP
e) increased by stretch

13 Regarding smooth muscle, which statement is INCORRECT?
a) multi-unit smooth muscle is present in the jejunum
b) may exhibit pacemaker potentials
c) mechanical response is much slower than striated muscle
d) the membrane potential is unstable
e) functions as a syncytium in viscera

14 A sarcomere:
a) contains two separate halves of an A-band and an I-band
b) is the space between two A-bands
c) is between two Z-lines
d) has the T-system of the sarcotubular system at sarcomere junctions
e) contracts when the troponin molecule binds to the myosin head

15 Type I muscle fibres:
a) have fast glycolytic rates
b) have low oxidative capacity
c) are more commonly found in muscle that performs explosive work
d) do not have a very high glycolytic capacity
e) are not abundant in endurance athletes

16 Regarding cardiac muscle, which statement is INCORRECT?
a) resting membrane potential is about -90mV
b) energy source at rest is mainly fat
c) mechanical response lasts about twice as long as electrical response
d) tetanus cannot occur
e) it has an all-or-nothing contractile response

17 Regarding denervation:
a) it causes skeletal muscle hypertrophy
b) does not lead to fibrillation
c) causes hyposensitivity to acetylcholine in skeletal muscle
d) smooth muscle is able to contract if it occurs in vivo
e) causes fasciculations

18 Which of the following nerve fibre types is MOST sensitive to pressure?
a) A-beta
b) A-gamma
c) A-delta
d) B
e) C

19 Regarding decerebration:
a) decerebration produces spinal shock
b) decerebrate rigidity is spasticity due to diffuse facilitation of stretch reflex
c) there is increased rate of discharge in the α afferent neurons
d) spasticity produced by decerebration is more marked in flexor muscles
e) most commonly produces upper limb flexion and lower limb extension

20 Which of the following nerve fibre types has the LARGEST diameter?
a) C
b) A-alpha
c) B
d) A-gamma
e) A-beta

21 The following are NOT energy sources of muscle:
a) phosphorylcreatine
b) fatty acids
c) glucose
d) glycogen
e) creatine

22 Regarding sensory organ stimulation, which statement is INCORRECT?
a) adaptation occurs over the temperature range 20-40°C
b) pain is sensed by naked nerve endings
c) pacinian corpuscles are rapidly adapting touch-pressure receptors
d) naked nerve endings can detect all four cutaneous sensory modalities
e) any given nerve ending can signal more than one sensory modality

23 Regarding neurotransmitters, which of the following is INCORRECT?
a) glutamate is excitatory
b) GABA is inhibitory at presynaptic neurons
c) glycine is excitatory at postsynaptic neurons
d) GHB (gamma hydroxybutyrate) is inhibitory
e) aspartate is excitatory

24 The stretch reflex:
a) is classically initiated by tapping on the quadriceps muscle
b) is initiated by stretch of the muscle
c) involves impulses being conducted from the muscle spindle to the motor cortex
d) involves extrafusal fibres stimulating annulospiral and flowerspray sensory fibres
e) involves gamma afferents of leksell

25 Which of the following is NOT present in smooth muscle cells?
a) actin
b) myosin-II
c) tropomyosin
d) almodulin
e) troponin

26 Regarding the structure of cardiac muscle, which statement is INCORRECT?
a) T-system lies at Z-lines
b) functions as a syncytium due to the presence of tight junctions
c) intercalated discs occur at Z-lines
d) contains large numbers of elongated mitochondria
e) thin filaments include troponin T, C and I

27 Regarding the cardiac muscle action potential, which statement is INCORRECT?
a) sodium ions enter via “fast” channels in phase 0
b) chloride ions may enter cell during phase 1
c) sodium ions enter via “slow” channels in phase 2
d) relative refractory period ends in phase 3
e) class I anti-arrhythmics reduce the slope of phase 4

28 Which of the following nerve fibre types represents the efferent limb of the muscle spindle reflex arc?
a) A-alpha
b) A-beta
c) A-gamma
d) A-delta
e) B

29 Regarding neuromuscular transmission, which statement is INCORRECT?
a) smooth muscle cells possess synapses en passant
b) about 10 times as much acetylcholine as is required is released at skeletal muscle neuromuscular junctions
c) antibodies can develop to calcium channels in nerve endings at neuromuscular junctions
d) more than one nerve fibre ends on each end-plate in skeletal muscle
e) acetylcholine is released by exocytosis

30 Regarding the structure of skeletal muscle, which statement is INCORRECT?
a) thick filaments consist of myosin
b) actin forms a double helix
c) thin filaments include tropomyosin
d) troponin-I inhibits interaction between actin and myosin
e) T-system lies at Z-lines

31 Which of the following nerve fibre types has the fastest conduction velocity?
a) B
b) A-delta
c) A-beta
d) A-gamma
e) C

32 Regarding the nerve fibre action potential, which statement is INCORRECT?
a) does not involve calcium ions
b) after-depolarisation commences when repolarisation is 70% complete
c) total number of ions involved is minute compared to the total number present
d) spike potential peaks at sodium equilibrium potential
e) firing level (threshold) is at about -55mV

33 Which of the following nerve fibre types is MOST sensitive to local anaesthetic blockade?
a) A-alpha
b) A-gamma
c) A-delta
d) B
e) C

34 Regarding neurotoxins, which statement is INCORRECT?
a) tetrodotoxin is a sodium channel blocker
b) tetraethylammonium is a potassium channel blocker
c) tetanospasmin interferes with GABA release
d) botulinum toxin blocks release of acetylcholine
e) latrotoxin causes explosive release of acetylcholine

35 Regarding conduction of nerve impulses, which statement is INCORRECT?
a) it is an active, self-propagating process
b) salutatory conduction occurs in unmyelinated neurons
c) axons can conduct impulses in either direction
d) conduction velocity is proportional to nerve fibre diameter
e) “current sink” occurs in neuronal cell membrane ahead of impulse

36 B nerve fibres transmit impulses of which modality?
a) proprioception
b) preganglionic autonomic
c) temperature
d) postganglionic sympathetic
e) somatic motor

37 Regarding nerve fibres, which statement is INCORRECT?
a) resting membrane potential is about -90mV
b) action potentials are generated at the initial segment in spinal motor neurons
c) myelin produces up to 50 times faster conduction of impulses
d) membrane is more permeable to potassium than sodium at rest
e) sodium channels are highly concentrated at the nodes of ranvier

38 Regarding skeletal muscle, which statement is INCORRECT?
a) resting membrane potential is about -90mV
b) resting length is the length at which active tension in the muscle is maximal
c) total glycogen stored is about 0.4kg
d) energy source at rest is mainly glucose
e) resting heat production is due to basal metabolic processes

39 Which of the following nerve fibre types has the LEAST myelin?
a) A-alpha
b) A-beta
c) A-gamma
d) B
e) C

40 A-alpha nerve fibres transmit impulses of which modality?
a) proprioception
b) pain
c) pressure
d) touch
e) motor to muscle spindles

41 Unmyelinated neurons:
a) do not have Schwann cells associated with them
b) display salutatory conduction
c) constitute most of the cell population in the human central nervous system
d) do not occur in humans
e) none of the above are true

42 In skeletal muscle:
a) thick filaments which are made up of myosin and tropomyosin are lined up to form A bands
b) the dark A band has a light H band in its centre which in turn has an M line in its middle
c) think filaments are made up of actin, tropomyosin and troponin and form the H band
d) Z lines are connected to the thick filaments
e) during contraction, the width of the A band reduces

43 Dorsal root (type C) fibres:
a) conduct proprioception
b) are amongst the largest of the nerve fibres
c) are the fibres most susceptible to hypoxia
d) administration of lignocaine suppresses transmission in C fibres before affecting A fibres
e) are myelinated

44 Saltatory conduction:
a) only occurs in myelinated neurons
b) is slower than non-saltatory conduction
c) is unaffected by local anaesthetics
d) does not occur with anti-dromic conduction
e) is directly proportional in rate to the size of the action potential

45 A motor unit is made up of:
a) a flexor muscle and an extensor muscle
b) a single skeletal muscle and all the motor neurons that supply it
c) a single motor neuron and all the muscle fibres it innervates
d) a large bundle of muscle fibres
e) all the motor neurons in which responses are observed after maximal stimulation of a single sensory nerve

46 The role of calcium in excitation/contraction couple in skeletal muscle is:
a) by binding troponin C it uncovers the binding site of actin to interact with the myosin head
b) by binding troponin I, it uncovers the binding site of actin to interact with the myosin head
c) by binding to tropomyosin, it allows troponic to bind to myosin
d) by binding to troponin C, it allows the myosin head to disengage resulting in relaxation
e) it causes depolarisation to spread along the tubules

47 A decrease in extracellular K^+:
a) makes the resting membrane more negative in nerve cells
b) causes a similar effect in nerve cells as a decrease in extracellular Na^+
c) has little effect in nerve cell membrane potential
d) may decrease nerve cell action potential size
e) cause a similar effect in nerve cells as an increase in extracellular Ca^{++}

48 Tetanic contraction of skeletal muscle:
a) occurs because of the short refractory period of skeletal muscle
b) is due to increased calcium available for binding to troponin C
c) enables a tension development of approximately four times that of individual twitch contraction
d) occurs only with isometric contractions
e) has the same mechanism of that of cardiac muscle

49 With respect to nerve fibre types:
a) the speed on conduction is inversely proportional to the diameter of the fibre
b) C fibres are more susceptible to local anaesthetics than A fibres
c) Aδ fibres are concerned primarily with somatic motor function
d) pain may be relayed by all fibre types
e) Aδ fibres are efferent only

50 In visceral smooth muscle:
a) Ca^{2+} for contraction is released from sarcoplasmic reticulum
b) membrane potential has a resting value of -90mV
c) the excitation contraction coupling time is rapid (<10ms)
d) muscle contracts when stretched in absence of innervation
e) binding of acetylcholine to nicotine receptors increases Ca^{2+} influx

51 Inhibitory post synaptic potentials involve:
a) localised increase in membrane permeability to Na^+
b) localised decrease in membrane permeability to Cl^-
c) localised increase in membrane permeability to PO_4
d) localised increase in membrane permeability to Cl^-
e) localised decrease in membrane permeability to K^+

52 In skeletal muscle relaxation:
a) there is a spread of depolarisation along T tubules
b) Ca^{2+} is released from troponin
c) there is increase Na^+ and K^+ conduction in the end plate membranes
d) a resting membrane potential of -65mV is finally reached
e) Mg^{2+} has a crucial role

53 Regarding synapses:
a) the synaptic cleft is 30-50mm wide
b) transmitters are released from synaptic knobs secondary to Na^+ triggers
c) the amount of transmitter released is proportionate to Ca^{2+} efflux
d) acetylcholine is present in granulated vesicles in synaptic knob
e) the EPSP is caused by Na^+ influx

54 Which of the following is inhibitory neurotransmitter?
a) gallamine
b) acetylcholine
c) glutamate
d) glycine
e) aspartate

55 Which of the following nerves is NOT of fibre type A?
a) proprioception
b) touch
c) motor to muscle spindles
d) somatic motor
e) dorsal root pain and temperature

56 Which nerve fibre is MOST susceptible to local anaesthetics?
a) proprioception
b) touch
c) motor to muscle spindles
d) somatic motor
e) dorsal root pain and temperature

57 Which nerves have the biggest diameter and faster conduction velocity?
a) group A alpha
b) group A beta
c) group A gamma
d) group A delta
e) group C

58 In excitation-contraction of skeletal muscle, calcium binds to:
a) tropomyosin
b) myosin
c) troponin I
d) troponin C
e) troponin T

59 Myosin binding sites on actin are normally covered by:
a) troponin I
b) troponin C
c) troponin T
d) tropomyosin
e) ryanodine molecule

60 With regard to skeletal muscle, which is INCORRECT?
a) the terminal cisterns of sarcoplasmic reticulum lie in contact with T tubules
b) the T tubules surround the muscle at its Z lines
c) the Z line lies within the I band
d) the M line is due to a central bulge in each of the thick filaments
e) the area between two adjacent Z lines is called a sarcomere

61 Noradrenaline:
a) is the main neurotransmitter of the parasympathetic nervous system
b) acts as sympathetic neuromuscular junctions in skeletal muscle and vascular smooth muscle
c) is secreted by the adrenal medulla
d) causes pupillary constriction
e) reduces blood pressure

62 Acetylcholine:
a) is a major neurotransmitter in the spinal cord
b) is degraded within the neuromuscular end-plate by dehydration
c) is important in the stimulation of pancreatic function
d) is the neurotransmitter involved in vagal stimulation of the heart
e) is antagonised by neostigmine

63 The action potential of a neuron:
a) is initiated by efflux of Na^+
b) is terminated by efflux of K^+
c) declines in amplitude as it moves along the axon
d) results in transient reversal of the concentration gradient of Na^+ across the cell membrane
e) is not associated with any net movement of Na^+ or K^+ across the cell membrane

64 The functions of tropomyosin in skeletal muscle include:
a) releasing Ca^{2+} after an action potential
b) sliding on actin to produce shortening
c) binding to myosin during contraction
d) acting as a “releasing protein” at rest by covering up the sites where myosin binds to actin
e) generating ATP which passes to the contractile mechanism

65 Membrane potential:
a) is only found in nervous tissue
b) is not contributed to by the Na^+ /K^+ pump
c) magnitude does not change from tissue to tissue
d) is negative inside in relation to the outside
e) is mainly caused by leaking Na^+ / K^+ channels

66 Gamma amino butyric acid:
a) is an excitatory mediator in the brain
b) is formed by decarboxylation of glutamate
c) acts at three different classes of GABA receptors
d) is mostly secreted unchanged in the urine
e) is the main mediator in glutamate

67 Substance P:
a) is a carbohydrate
b) is a polypeptide found in the intestine and nervous tissue
c) is a β II amino acid residue mainly found in the liver
d) is not involved in the neuroendocrine system
e) is a lipid

68 Opioid peptides:
a) are not formed from precursors
b) include morphine as an example
c) form the opioid receptors in the brain
d) are mainly found in the brain and gastrointestinal tract
e) are almost always excreted unchanged

69 Regarding the autonomic nervous system:
a) does not have a reflex arc like somatic nervous system
b) has dopamine as the main transmitter
c) has cholinergic division which increases activity of the intestinal musculature and increases gastric secretion
d) neurotransmitter noradrenaline is metabolised by pseudocholinesterase
e) is not involved with visceral sensation

70 Contraction of skeletal muscle is initiated by Ca^{++} binding to:
a) tropomyosin
b) myosin
c) actin
d) troponin C
e) troponin I

71 The stretch reflex in skeletal muscle:
a) is a feedback reflex aimed at maintaining muscle length
b) is a polysynaptic reflex
c) maintains muscle strength at various levels of muscle strength
d) is not elicited in the knee jerk which occurs after tapping
e) none of the above are true

72 Excitary amino acids in the brain are:
a) glutamate and GABA
b) GABA and glycine
c) glutamate and glycine
d) glycine and aspartate
e) glutamate and aspartate

73 The opioid δ receptor is involved in:
a) analgesia
b) respiratory depression
c) miosis
d) dependence
e) all of the above

74 With regard to contraction and relaxation of skeletal muscle, all of the following are true EXCEPT:
a) contraction involves the release of K^+ from the terminal cisterns
b) relaxation involves the release of Ca^{2+} from troponin
c) prior to contraction, increase Na^+ and K^+ conduction occurs in the end-plate membrane
d) relaxation involves cessation of the interaction between actin and myosin
e) contraction involves inward spread of depolarisation along T tubules

75 Regarding nerve fibres:
a) type C myelinated fibres in the dorsal root conduct impulses concerning pain and temperature
b) type A α unmyelinated fibres conduct impulses concerning proprioception
c) type A β unmyelinated fibres conduct impulses concerning light touch

d) type A γ unmyelinated fibres conduct impulses to muscle spindles
e) type B myelinated fibres are located in preganglionic autonomic region

76 With regard to chemoreceptors, all of the following are true EXCEPT:
a) the medullary chemoreceptors respond to a change in blood pCO_2
b) the medullary chemoreceptors respond to blood (H^+)
c) the predominant peripheral chemoreceptors are located in the carotid and aortic bodies
d) the peripheral chemoreceptors respond to pO_2
e) the peripheral chemoreceptors respond to blood (H^+)

77 In the autonomic nerve system, β antagonism results in:
a) constriction of the renal vasculature
b) decreased velocity of conduction in the atrioventricular node
c) decreased velocity of conduction in the HIS/Purkinje system
d) decreased ventricular contractility
e) increased insulin and glucagon secretion

78 The reticular activating system:
a) has depressed conduction during anaesthesia
b) is located in the pons
c) is a simple collection of parallel nerve fibres
d) has no input from the cranial nerves
e) is electrically isolated from the cerebral cortex

Section 2

Answers

1	E
2	D
3	C
4	E
5	C
6	E
7	A
8	A
9	B
10	D
11	D
12	B
13	A
14	C
15	D
16	C
17	D
18	A
19	B
20	B
21	E
22	E
23	C
24	B
25	E
26	B
27	A
28	C
29	D
30	E
31	C
32	D
33	E
34	C
35	B
36	B
37	A
38	D
39	E
40	A
41	E
42	C
43	D
44	A
45	C
46	A
47	E
48	C
49	B
50	D
51	D
52	B
53	E
54	D
55	E
56	E
57	A
58	D
59	D
60	B
61	C
62	C
63	B
64	D
65	D
66	B
67	B
68	D
69	C
70	D
71	A
72	E
73	A
74	A
75	E
76	B
77	E
78	A