

POSSIBLE ANSWERS FOR:**PHYSIOLOGY SG****TIME: 3 hours****MARKS: 300****SECTION A****QUESTION 1****MULTIPLE-CHOICE QUESTIONS**

1.1	A
1.2	A
1.3	B
1.4	D
1.5	D
1.6	D
1.7	B
1.8	C
1.9	A
1.10	B
1.11	A
1.12	D
1.13	A
1.14	A
1.15	C
1.16	D
1.17	A
1.18	D
1.19	B
1.20	D
1.21	C
1.22	B
1.23	A
1.24	C
1.25	A
1.26	D
1.27	A
1.28	B
1.29	A

- 1.30 D
- 1.31 C
- 1.32 C
- 1.33 D
- 1.34 A
- 1.35 A
- 1.36 A
- 1.37 B
- 1.38 A
- 1.39 A
- 1.40 D

40X2 = (80)

QUESTION 2

- 2.1 C – free nerve endings (2)
 - 2.2 G – Organ of Corti in Cochlea. (2)
 - 2.3 F – round window (2)
 - 2.4 E – semicircular canals or H – Sacculus. (2)
 - 2.5 J – fungiform papillae (2)
- [10]**

QUESTION 3

- 3.1 urether
- 3.2 wider
- 3.3 ADH
- 3.4 organs of Ruffini
- 3.5 radiation
- 3.6 fissure of Rolando
- 3.7 inner ear
- 3.8 pupil
- 3.9 glucagon
- 3.10 adrenalin (10)

TOTAL SECTION A: [100]**SECTION B****QUESTION 4**

- 4.1.1 Convection
- Radiation
- Conduction
- Evaporation
- Excretion (5)

4.1.2 Conserving body temperature

- Blood vessels to the skin will constrict. Less warm blood will flow to the skin resulting in less heat loss by radiation.
- Erector muscles of the hairs in the skin will contract lifting the hair and trapping air between them. Less heat is lost because air and hairs are poor conductors of heat.
- Sweat glands receive less blood due to the blood vessels constriction therefore decreasing sweat production. (8)

4.1.3 He will become badly sunburnt and might suffer from heatstroke. (2)

4.1.4 The malpighian layer contains melanocytes that increase in number to darken the skin in order to protect it from harmful ultraviolet rays. (4)

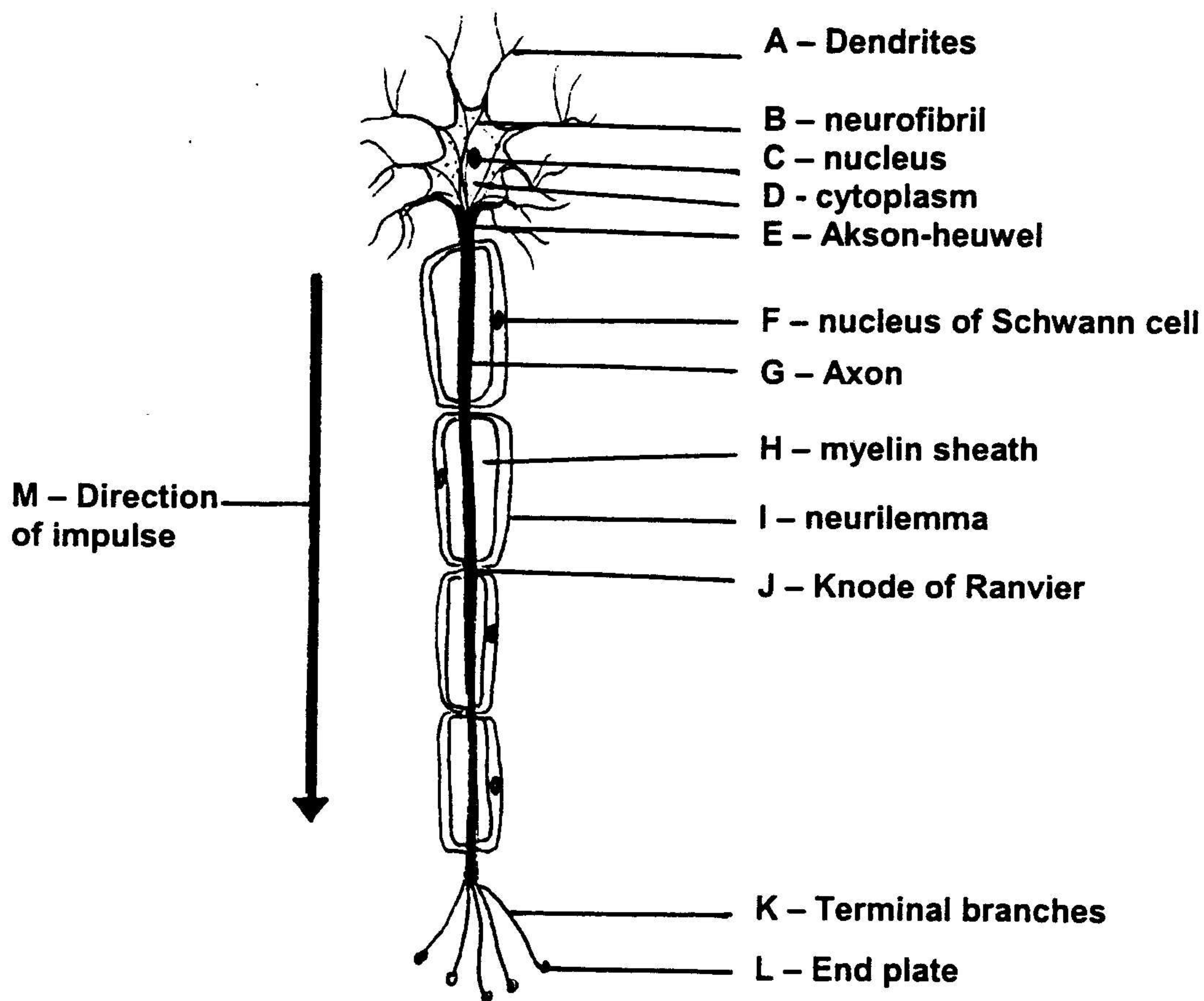
If person stays too long, exposure can lead to sunburn – headaches, epithelial dehydration – Damage to skin / cancer (chronic conditions)

4.2 Skin functions

- Cornified layer protects the skin against minor mechanical injuries.
- Cornified layer prevents entry of germs.
- It forms a waterproof layer, preventing excessive water loss.
- Melanin in melanocytes protects the skin against harmful effects of the sun.
- Vitamin D is synthesised in the skin.
- Skin acts as a sense organ.
- Skin acts as a secretory organ, e.g. sebum, milk, cerumen.
- Skin acts as an excretory organ, e.g. metabolic waste.
- Secretion of sweat cools the body down.
- Fat is stored in dermis as food storage and insulation.
- Plays a thermoregulatory role. (any 6) (6)

4.3.1 Photoreceptors – eyes (Electromagnetic receptors) – eyes
 Mechanoreceptors – skin / ears
 Thermoreceptors – skin
 Chemoreceptors – tongue / nose
 Proprioceptors – muscles / tendons / joints
 Osmoreceptors – main arteries / kidneys (12)

4.3.2 MULTIPOLAR NEURON



(13)
[50]

QUESTION 5

- 5.1.1
- 1 - Cerebrum
 - 2 - Cerebellum
 - 3 - Pons
 - 4 - Medulla Oblongata

(4)

5.1.2

CEREBRUM	CEREBELLUM
- Surface is highly convoluted with many folds	- Surface convolutions are shallow and run parallel
- White matter has no pattern	- White matter forms Arbor Vitae
- Two hemispheres joined by the corpus callosum	- Two hemispheres joined by the vermis
- Involved in higher mental activities	- Co-ordinate the voluntary actions and maintain balance

(any 3)

(6)

- 5.1.3 Brain is protected by the:
- cranium
 - dura mater
 - pia mater
 - arachnoid
 - cerebrospinal fluid
 - curvature of the spine
 - arches of the feet
 - cartilaginous discs between vertebrae (any 6) (6)
- 5.2 A reflex action is an autonomic response of a muscle or gland to a stimulus received by a receptor organ. (3)
- 5.3 Sneezing, blinking, coughing or salivation. (any 3) (3)
- 5.4 Reading, tying shoes laces, driving a motor car or playing the piano. (4)
- 5.5.1
- 1 – Afferent arteriole
 - 2 – Efferent arteriole
 - 3 – Glomerulus
 - 4 – Podocytes
 - 5 – Bowman's capsule (5)
- 5.5.2
- Glomerular membrane is very porous
 - basement membrane is very thin
 - capillary wall forms a single layer
 - podocytes of the Bowman's capsule have filtration slits
 - Blood pressure is high due to wider afferent arteriole than efferent arteriole
 - Surface area is very large due to cup shape of Bowman's capsule and large number of capillaries. (any 5) (5)
- 5.6
- (a) water, urea, inorganic salts, creatinine, ammonia, foreign substances. (6)
 - (b) water, glucose, and amino acids (3)
 - (c) blood corpuscles, plasma proteins (2)
 - (d) water (1)
 - (e) urea, ammonia. (2)
- [50]**

QUESTION 6

- 6.1.1
- eyes converge
 - pupils constrict
 - ciliary muscles contract
 - suspensory ligaments slacken
 - elastic lens becomes more convex
 - light rays are refracted more
 - clear, sharp image formed on the retina. (6)

6.1.2 conjunctiva
cornea
aqueous humor
pupil
biconvex lens
vitreous humor
focused on yellow spot / fovea centralis / retina
optic nerve (8)

6.2 eye protection

- bony socket
- socket is lined with a fatty layer for shock absorption
- eye browbone and cheekbones
- eyebrows prevent salty sweat from running into the eyes
- eyelids and eyelashes prevent dust from entering
- conjunctiva has pain receptors and acts reflexively to close the eye
- glands of Meibom secrete oily fluid – free movement (any 5) (5)

6.3 lachrymal fluid

- washes away dust particles
- destroys germs
- prevents eye from desiccation
- lubricates movement of the eyelids
- distributes warmth across the eye surface. (5)

6.4 Pupil of the eye is an opening in the iris that controls the amount of light entering the eye. It will constrict if light is very bright and in dim light it will be dilated. (3)

6.5 Myopia – (short / near-sightedness) – distant objects appear blurred. Image falls in front of retina.

Hypermetropia – (far-sightedness) – near objects appear blurred. Image falls behind retina.

Presbyopia – eyes lose the power to accommodate. Lens loses its elasticity.

Astigmatism – curvature of the lens or cornea is not uniform. Image is distorted. (8)

6.6.1 Hormones

- They are organic and mainly proteins
- They are secreted by ductless glands and carried in the blood stream to target organs.
- Usually a stimulant
- Effective in small amounts
- Cannot be stored and only temporary active
- Activities controlled by hormones are generally slower but longer lasting than those under nervous control. (any 5) (5)

- 6.6.2 (a) growth hormone – hyposecretion
 (b) thyroxin – hyposecretion
 (c) thyroxin – hypersecretion
 (d) ADH – hyposecretion
 (e) Insulin – hyposecretion (10)
 [50]

- 6.6.3 • I – not available (Iodine)
 • Tyrosine accumulates in follicles of thyroid
 • Follicles shell as well as thyroid gland
 • Goitre develops

QUESTION 7

- 7.1.1 A. urether
 B. bladder
 C. seminal vesicle
 D. Cowper's gland
 E. Vas deferens
 F. Epididymus
 G. Scrotum
 H. Testes
 I. Prostate gland
 J. Urethra (10)

- 7.1.2 (a) F
 (b) H
 (c) G
 (d) I
 (e) J
 (f) B
 (g) C
 (h) D
 (i) E (9)

- 7.2 Venereal disease
 Unwanted pregnancies
 HIV – AIDS (3)

7.3 (a) boys

- Growth in height
- External genitalia increase in size
- Hair grows in pubic area, under arms and on the chin
- Larynx increases in size and voice deepens
- Skeletal muscles develop, particularly in the chest and thighs
- Skin thickens
- Red blood cells are produced in greater number (any 5) (5)

(b) girls

- Pelvis widens
- Fat is deposited on the hips, thighs and buttocks
- Breasts develop
- Hair grows in pubic area and under arms
- The 28-day menstrual cycle begins
- Growth in height occurs
- External genitalia increase in size (any 5) (5)

7.4 Amniotic fluid protects the foetus against:

- mechanical shock
- dehydration
- changes in temperature
- malformations due to effects of gravity

foetus can also move freely in this medium

any sharp noise is softened (any 5) (5)

7.5 Parental care:

- strongest natural urge of human beings – motherly urge
- highest form of parental care is found in humans
- baby is suckled by mother – strong bond develops
- baby is nurtured by providing for its physical needs as well as mental needs until it becomes independent and can take care of itself. (5)

7.6

FEMALE HORMONES		FUNCTIONS	
	FSH	1	Stimulate the formation of the primary follicle
2	LH		It causes ovulation
	PROGESTERONE	3	maintains the endometrium throughout pregnancy
		4	inhibits production of FSH and LH
		5	thickens the mucous of the cervix creating a barrier
6	OESTROGEN		Repairs the enometrium after menstruation
		7	develops the female secondary sexual characteristics
		8	thins the mucous in the cervix helping sperm movement.

(8)
[50]

TOTAL FOR SECTION B: [200]

TOTAL: 300