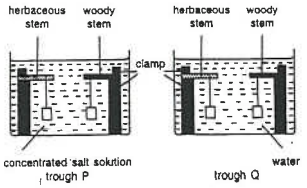
Past HKCEE Questions
Support and Movement
Paper I

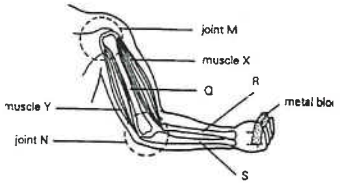
1. The diagram below shows an experimental set-up in which straight stems of similar length and diameter were immersed in troughs containing different liquids. A 5 g weight was suspended from each stem.



(i) After three hours what would be the appearance of the stems in
(1) trough P?
(2) trough Q?
(ii) Explain the expected observation in the herbaceous stem in trough P.
(iii) What possible conclusion could be drawn from this experiment about the means of support in
(1) herbaceous stems?
(2) woody stems?

(8 marks)
(HKCEE 1984)

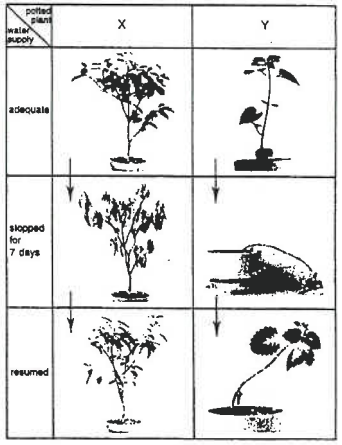
2. The diagram below shows the arm muscles and bones of a man:



(i) Both muscles X and Y are involved in raising the metal block.
(1) Which is the extensor?
(2) Which is the flexor?
(3) What is the term used for describing this pair of muscles for this mode of action?
(ii) What is the tissue connecting
(1) bone Q to bone S?
(2) muscle X to bone R?
(iii) After rotating the arm vigorously for some time, the man felt tired.
(1) Which joint, M or N, was involved in this movement?
(2) Which carbon compound, stored in the muscles, was used to provide the energy for this movement?
(3) Which carbon compound, accumulating in the muscles, caused muscle fatigue?
(iv) If the man were blindfolded, what type of sensory receptor would enable him to detect a drawing pin dropped on his hand
(1) with its blunt end downwards?
(2) with its pointed end downwards?

(HKCEE 1985)

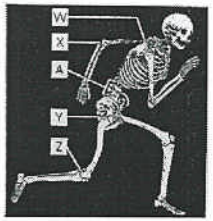
3. In an experiment, two different potted plants X and Y, kept under the same laboratory conditions, were given varying supplies of water. The changes in their appearance are shown in the series of photographs below:



(i) With reference to the appearance of plants X and Y after receiving no water supply for 7 days,
(1) explain the change in X.
(2) draw a labelled diagram of a mesophyll cell of X as seen under high-power magnification.
(3) point out the difference in appearance of the stems in X and Y.
(4) state one feature, related to their structures, that caused the difference in (3).
(ii) With reference to the effects on plants X and Y after the water supply was resumed, state the cell(s) concerned and the process involved for
(1) entry of water from soil to root,
(2) movement of water along the stem, and
(3) water to reach the leaves for photosynthesis.

(13 marks)
(HKCEE 1986)

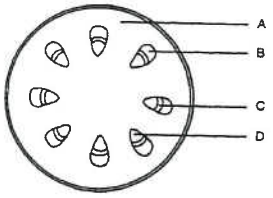
4. The photograph below shows the side view of a human skeleton:



(i) Give three functions of structure A. (3 marks)
(ii) Name the type of movable joint to which
(1) both W and Y belong.
(2) both X and Z belong. (2 marks)
(iii) State the difference in the range of movement allowed by joint W and joint Z. (2 marks)

(HKCEE 1987)

5. The diagram below shows a cross section of a young stem:



(i) Using the letters in the diagram, state TWO different parts which provide support to the stem.
Based on its structure, explain how each part can carry out this support function. (6 marks)
(ii) When this plant is placed in direct sunlight for a few hours, explain why the stem might be unable to remain upright. (2 marks)

(HKCEE 1988)

6. Figure 1 below shows a human leg. Figure 2 shows a model used to demonstrate leg movement.

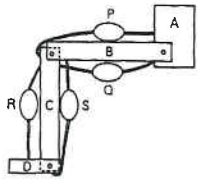


Figure 2

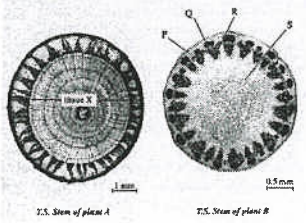
The component parts of the model and their corresponding structures in the human leg are summarised in the table below:

component part in the model	material used in the model	corresponding structure in the human leg
⬭	balloon	muscle
▭	wooden board	X
o	screw	joint
═	inelastic string	Y

(i) Name the type of structures represented by X and Y respectively. (2 marks)
(ii) If the model were set to a position to show the human leg standing erect on tiptoe, which balloons (P, Q R or S) would appear to be thinner and longer? (2 marks)
(iii) Put P, Q R and S into two categories according to the function of the muscles they represent. Explain your answer. (4 marks)
(iv) Explain why the relative movement between the wooden boards A and B carrot fully illustrate the degree of movement between the corresponding structures in the human leg. (2 marks)

(HKCEE 1989)

7. The photomicrographs below show the transverse sections of stems taken from two plants

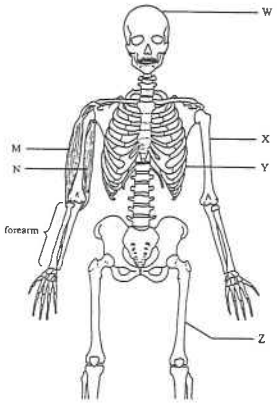


T.S. Stem of plant A T.S. Stem of plant B

(1) On a hot sunny afternoon, plant B becomes wilted and its stem bends. Explain why this occurs. (4 marks)
(2) In contrast to plant B, the stem of plant A remains upright under the same conditions. Account for this. (2 marks)

(HKCEE 2001)

8. The diagram below shows the human skeleton and two muscles of the right arm, M and N:

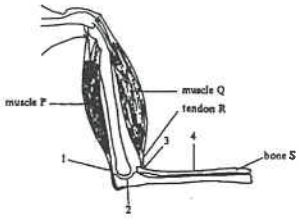


(i) Deficiency of vitamin D in childhood will lead to deformity of bones.
(1) Using the letters in the diagram, indicate which part of the skeleton is most easily deformed. Explain your choice. (3 marks)
(2) Apart from diet, suggest another way by which the body gets vitamin D. (1 mark)
(ii) Why are muscles M and N described as an antagonistic (opposing) pair? (1 mark)
(iii) Draw a diagram to show the lever system involved in lifting the right forearm. Indicate the positions of the load, the effort and the fulcrum in your diagram. In lifting the right forearm, what will form the load, the effort and the fulcrum respectively? (5 marks)

(HKCEE 2002)

Past HKCEE Questions
Support and Movement
Paper II

90.
Directions: Questions 40 to 42 refer to the diagram below which represents the relative positions of the bones, associated muscles and tendons of the human arm:



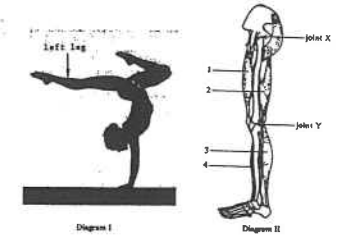
90-40
What is the advantage of having the tendon R attached to position 3 rather than to position 4 of the bone S?
A. to provide a stronger surface for tendon attachment
B. to produce a greater forearm movement when muscle Q contracts
C. to prevent dislocation of the joint
D. to counteract the contraction of muscle P more effectively

90-41
Which of the following happens when muscle Q contracts?
A. Muscle P increases in length.
B. Muscle Q decreases in thickness.
C. The tension on tendon R is reduced.
D. The arm straightens out.

90-42
Cartilage is found at
A. position 1.
B. position 2.
C. position 3.
D. position 4.

91-29
Which of the following descriptions about skeletal muscles are correct?
(1) They are attached to bones by ligaments.
(2) Their activities are usually under voluntary control.
(3) They become fatigued easily during exercise.
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

92.
Directions: Questions 31 and 32 refer to diagrams I and II below. Diagram I shows a girl maintaining a posture on a balance beam. Diagram II shows some muscles associated with bar left leg.



92-31
Which of the following muscles in the girl's left leg are contracting when she keeps such a posture?
A. (1) and (3)
B. (1) and (4)
C. (2) and (3)
D. (2) and (4)

92-32
The degree of movement allowed in joints X and Y are:

	Joint X	Joint Y
A.	in one plane	in one plane
B.	in one plane	in all planes
C.	in all planes	in as plane
D.	in all planes	in all planes

93-9
When compared with woody plants, young herbaceous plants are less tolerant to a temporary shortage of water supply because
A. they are smaller in size.
B. they have less food reserves.
C. they have a faster growth rate.
D. they rely on cell turgidity for support.

93.
Directions: Questions 37 and 38 refer to the diagrams below which show the conditions of certain muscles associated with the hind limb of a rabbit. Diagram I shows the condition when the rabbit is about to jump. Diagram II shows the condition at a later stage when the rabbit's hind limb is about to lift off from the ground:

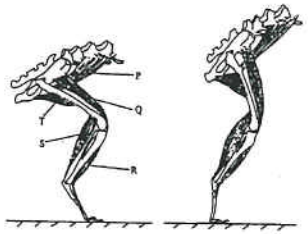
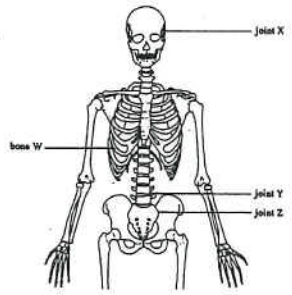


Diagram I Diagram II

93-37
Which muscles contract to effect a change from the condition shown in Diagram I to that in Diagram II?
A. P, Q and R
B. P, Q and S
C. P, R and T
D. Q, S and T

93-38
Apart from tea structures labelled, which of the following are essential for support in the rabbit?
(1) bone
(2) tendons
(3) ligaments
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

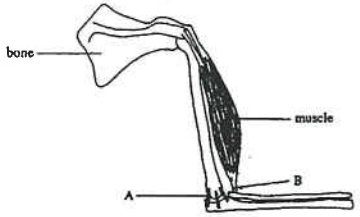
94.
Directions: Questions 33 and 34 refer to the diagram below which shown part of the human skeleton:



94-33
Which of the following functions are carried out by bone W?
(1) producing red bloat cells
(2) helping in ventilation of this lungs
(3) protecting internal organs
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

94-34
Which of the joints X, Y and Z allow(s) movement between the bones?
A. Y only
B. Z only
C. X and Y only
D. Y and Z only

94.
Directions: Questions 35 and 36 refer to the diagram below which shows some structures associated with the elbow joint:



94-35
Which comparison between structures A and B is correct?

	Structure A	Structure B
A.	rigid	soft
B.	elastic	not elastic
C.	can stand a high tension	cannot stand a high tension
D.	contains a large amount of calcium salts	contains a small amount of calcium salts

94-36
Which of the following correctly describes the functions of structures A and B?

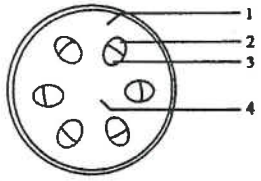
	Structure A	Structure B
A.	holding the bones together	transmitting force to the bone
B.	acting as a pivot	protecting the joint
C.	protecting the joint	preventing dislocation of the joint
D.	transmitting force to the bone	acting as a pivot

94-37
The diagram below shows a man at a certain stage of swimming:

Which of the following combinations correctly describes the conditions of his arm muscles at this stage?

	Left arm		Right arm	
	Biceps	Triceps	Biceps	Triceps
A.	contracted	relaxed	relaxed	contracted
B.	relaxed	contracted	contracted	relaxed
C.	contracted	relaxed	contracted	relaxed
D.	relaxed	contracted	relaxed	contracted

95.
Directions: Questions 28 to 30 refer to the diagram below which slows a section of a certain part of a plant:

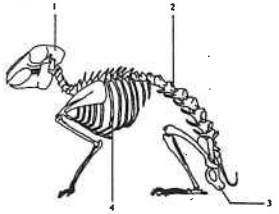


95-28
This section is takes from
A. a yours stem.
B. young root.
C. woody stem.
D. a woody root.

95-29
Which regions provide support by cell turgidity?
A. 1 and 2
B. 1 and 4
C. 2 and 3
D. 3 and 4

95-30
Which region is responsible for the transport of sugars?
A. 1
B. 2
C. 3
D. 4

95.
Directions: Questions 31 and 32 refer to the diagram below which shows the skeleton of a rabbit:

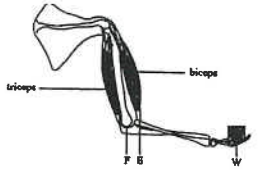


95-31
Which structures are parts of the axial skeleton?
A. 1, 2 and 3
B. 1, 2 and 4
C. 1, 3 and 4
D. 2, 3 and 4

95-32
Which of the following correctly lists the structures protected by the different parts of the skeleton?

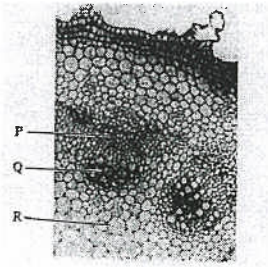
	1	2	3
A.	brain	aorta	stomach
B.	ears	aorta	heart
C.	brain	spinal cord	heart
D.	ears	spinal cord	stomach

95-33
The diagram below show a human arm holding a weight:



'The length of EF is shorter than the length of WF. What is the advantage of this arrangement?
A. The biceps would not become fatigue easily.
B. This would make the biceps stronger than the triceps.
C. Less energy would be used by the biceps in supporting the weight.
D. A small contraction of the biceps would move the weight through a large distance.

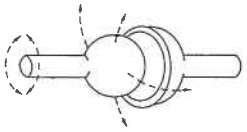
96-32
The photomicrograph below shown part of a: section through a plant organ



Which of the following correctly states the functions of P, Q and R?

	P	Q	R
A.	food transport	water transport	photosynthesis
B.	water transport	food transport	support
C.	food transport	support	support
D.	photosynthesis	water transport	food transport

96-34
The diagram below shows a model of a movable joint:

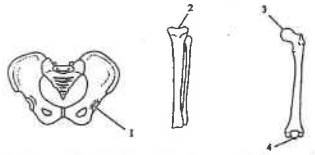


Key : ←→ direction of possible movements

Which of the following combinations is correct?

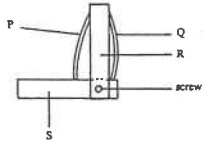
	Type of joint represented by the model	Example
A.	hinge joint	knee joint
B.	hinge joint	shoulder joint
C.	ball and socket joint	shoulder joint
D.	ball and socket joint	knee joint

96-35
The diagrams below show three sets of bones of the human skeleton:



The type of joint shown by the model in question 34 can be formed between
A. 1 and 3.
B. 1 and 4.
C. 2 and 3.
D. 2 and 4.

96.
Directions: Questions 59 and 60 refer to the model below which is used to illustrate the movement at the elbow join:



Key : P and Q are rubber bands
R and S are wooden planks

96-59
Which of the following occurs when Q is shortened?

	P	S
A.	shortened	raised
B.	shortened	lowered
C.	stretched	raised
D.	stretched	lowered

96-60
This model is useful for demonstrating
A. the movement of the upper arm.
B. that the joint allows 360° movement.
C. that the biceps is stronger than the triceps.
D. the actions of a pair of antagonistic muscles.

99.
Directions: Questions 31 and 32 refer to diagrams I and II below. Diagram I shows a certain posture of a dancer. Diagram II shows some of the muscles associated with her right leg.

Diagram I

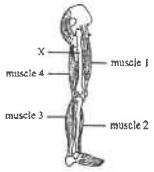


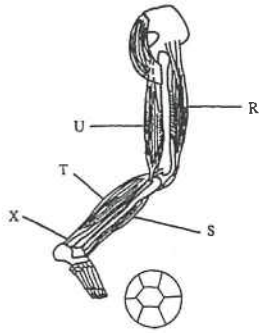
Diagram II

99-31
Which muscles of the right leg of the dancer are contracting when she maintains the posture shown in diagram I?
A. muscles 1 and 2
B. muscles 1 and 3
C. muscles 2 and 4
D. muscles 3 and 4

99-32
Which of the following can be found in structure X?
(1) vitamin D
(2) living cells
(3) calcium salts
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

00-24
Which of the following does not contain cartilage?
A. teeth
B. trachea
C. rib cage
D. vertebral column

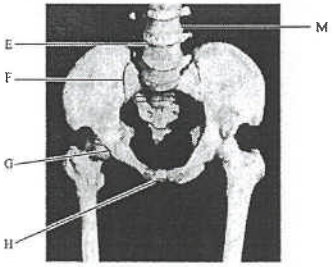
00.
Directions: Questions 25 and 26 refer to the following information:
A football player is going to kick a ball with his right leg. The diagram below shows his right leg and its associated muscles:



00-25
At this moment, which muscles are in the contracted state?
A. R and S
B. R and T
C. S and U
D. T and U

00-26
Which of the following correctly describes structure X?
A. It is inelastic.
B. It is hard and rigid.
C. It is rich in calcium.
D. It is able to contract.

00.
Directions: Questions 27 to 29 refer to the photograph below, which shows the hip girdle and the associated structures:



00-27
Which joints allow movement between the bones?
A. E and F
B. E and G
C. F and H
D. G and H

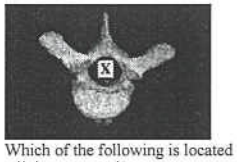
00-28
Which of the following is not a function of bone M?
A. formation of white blood cells
B. breakdown of old red blood cells
C. protection of the central nervous system
D. providing surfaces for muscle attachment

00-29
In a pregnant woman, which of the following may be supplied by bone M for the growth of the foetus?
A. blood cells
B. protein
C. iron
D. calcium

01-3
Which of the following are the functions of ribs?
(1) supporting body weight
(2) producing red blood cells
(3) protecting internal organs
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

D. They can replicate rapidly during infection.

01-19
The photograph below shows a mammalian vertebra:



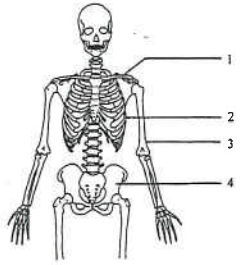
Which of the following is located in position X in a living mammal?
A. artery
B. muscle
C. cartilage
D. spinal cord

01-20
Skeletal muscles usually work in pairs because
A. a pair of muscles is stronger than a single muscle.
B. when one muscle is damaged, the other can still function.
C. the two muscles of the same pair cannot contract at the same time.

D. two muscles are required for producing movements in opposite directions.

02-47
When there is bone fracture, the broken parts can reconnect and the bone heals after some time. This shows that
A. bone is a living tissue.
B. bone growth is unlimited.
C. bone can respond to an external stimulus.
D. the healing of the bone is an immune response.

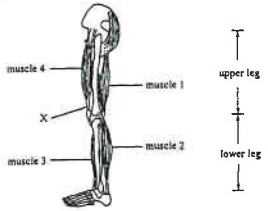
03.
Directions: Questions 21 and 22 refer to the diagram below, which shows part of the human skeleton



03-21
Which structures are parts of the appendicular skeleton?
A. 2 and 3 only
B. 3 and 4 only
C. 1, 2 and 4 only
D. 1, 3 and 4 only

03-22
Which of the following is *not a* function of structure 2?
A. assisting ventilation
B. storing red blood cells
C. giving shape to the body
D. protecting internal organs

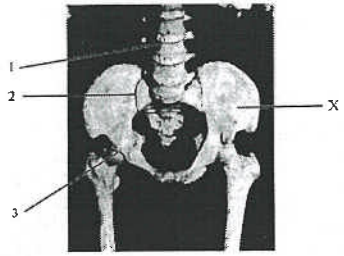
03.
Directions: Questions 33 and 34 refer to the diagram below, which shows some muscles of the leg:



03-33
Which of the following muscles are flexors?
A. 1 and 2
B. 1 and 3
C. 2 and 4
D. 3 and 4

03-34
If structure X is broken, which of the following will occur?
A. The lower leg cannot move properly.
B. The upper leg cannot move properly.
C. The knee joint can move in many planes.
D. When muscle 1 contracts, muscle 4 becomes extended.

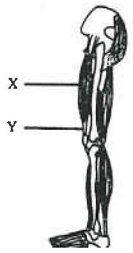
04.
Directions: Questions 6 and 7 refer to the photograph below, which shows part of the human skeleton:



04-06
Which joints allow movement between the bones?
A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 1, 2 and 3

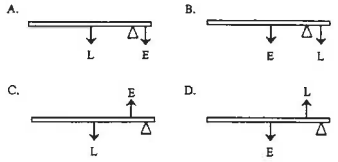
04-07
Which of the following is a function of structure X?
A. storing iron
B. protecting the spinal cord
C. destroying red blood cells
D. producing white blood cells

Directions: Questions 26 and 27 refer to the diagram below, which shows the muscles associated with the leg of a person:

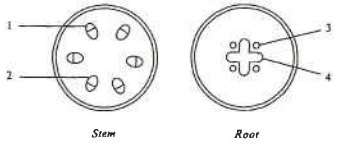


04-26
When X contracts, Y will
(1) become shorter.
(2) become thicker.
(3) increase in tension.
A. (1) only
B. (3) only
C. (1) and (2) only
D. (2) and (3) only.

04-27
Which of the following correctly represents the lever system involved in the straightening of the leg at the knee joint?
(Key: E = effort; L = load)

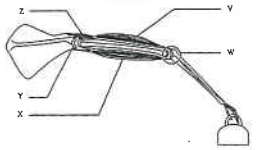


05-22
The root of a leafy plant was immersed in a red dye solution for several hours. Transverse sections of the stem and root were then prepared and examined under the microscope. Referring to the diagram below, which tissue of the stem and root would be stained red?



	Stem	*Root*
A.	1	3
B.	1	4
C.	2	3
D.	2	4

06
Directions: Questions 7 and 8 refer to the diagram below, which illustrates a human arm holding a case:

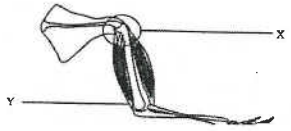


06-7
While holding the case and maintaining the position as shown in the diagram,
A. V is contracting and Z is shortened.
B. V is contracting and Z is under tension.
C. X is contracting and Z is lengthened.
D. X is contracting and Z is slackened.

06-8
Which of the following correctly describes the functions of structures W and Y?

	Structure W	*Structure Y*
A.	allows movement in one plane	reduces friction during movement
B.	allows movement in one plane	produces fluid for lubrication
C.	allows movement in all planes	reduces friction during movement
D.	allows movement in all planes	produces fluid for lubrication

07
Directions: Questions 33 and 34 refer to the diagram below, which shows the skeleton and the associated muscles of a human upper limb.



07-33
Which of the following correctly describes joint X?
A. The ends of the bones at X are ball-shaped.
B. The degree of movement at X increases with age.
C. X is surrounded by ligaments to reduce the chance of dislocation.
D. X is a hinge joint because it allows the upper limb to move in a single plane.

07-34
Which of the following is a correct description of structure Y?

	Property	Importance during movement
A.	elastic	allows the attached bones to move more freely
B.	inelastic	transmits forces to bone with minimum loss
C.	rich in protein	creates a smooth surface to reduce friction
D.	rich in glucose	releases more energy for muscle contraction

Past HKCEE Questions
Support and Movement
Suggested Answers

1. (i) (1) herbaceous stem – bends downwards 1
woody stem – remains straight / unchanged 1
(2) both stems - remain straight / unchanged 1

(ii)

because	salt solution	cell sap	
concentration	high	low	any 1
osmotic potential	lower	higher	
water potential	lower	higher	

water moves out of cells by osmosis 1
cells become plasmolysed / flaccid / decrease in turgor 1

(iii) (1) herbaceous stems - mainly by turgidity of cells 1
(2) woody stems – mainly supported by thick-walled cells / xylem 1

2. (i) (1) muscle Y 1
(2) muscle X 1
(3) antagonistic / opposing muscles 1
(ii) (1) ligament 1
(2) tendon 2
(iii) (1) Joint M 1
(2) glycogen (NOT carbohydrate, starch, glucose) 1
(3) lactic acid 1
(iv) (1) touch receptor 1
(2) pain receptor 1

3. (i) (1) transpiration (water loss) > absorption (water gain) 1
(2) labels: *cell wall, *cell membrane, *nucleus, *cytoplasm, *vacuole, *chloroplast
any 4 (0.5 x 4) 2
accuracy: showing plasmolysis 1
(3) X shows no bending while Y shows bending
(4) xylem / vascular / strengthening / woody tissues in Y (or more in X) 1

(ii)

	cells	processes	
(1)	root hair	osmosis / diffusion	1, 1
(2)	xylem	transpiration / capillarity / root pressure	1, 1
(3)	mesophyll cells	osmosis / diffusion	1, 1

4. (i)
- support
- protection of the spinal cord
- muscle attachment / act as a lever system
- production of RBC / WBC

any 3 (1,1,1) 3
(ii) (1) *ball and socket joint 1
(2) *hinge joint 1
(iii) W - allow movement in many planes 1
Z - allow movement in one plane 1
(if, range of movement of W is greater than that of Z, 1 mark only)

5. (i)

cells	A	D	
structure	thin-walled cells	thick-walled cells	1, 1
support	when filled with water, provide turgidity to the stem	provide mechanical support to the stem / they are hard and rigid	1, 1

(ii) the water lost is greater than the water gained by the plant 1
the cells lose their turgidity / become flaccid 1

6. (i) X - *bone 1
Y - *tendon 1
(ii) Q and R (no other alternatives) (1,1) 2
(iii) P and S 1
both are extensors / extend / straighten the joint 1
Q and R
both are flexors / flex / bend the joint 1

(iv) In the model : movement in one plane only 1
In actual case: movement in 3 planes 1

7. (1) The support of the stem of plant B is mainly due to the turgidity of cells in region S / thin-wall cells 1
Under a hot and sunny condition, 1
the rate of transpiration of the plant becomes greater than the rate of water absorption 1
The cells in region S lose water 1
And hence lose their turgidity / become flaccid 1
And thus causing the bending of the stem
Effective communication (C) 1

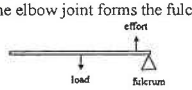
(2) The support of the stem of plant A is due to the presence of xylem / independent of the water content of the plant 1
Because the xylem contains thick-wall cells 1

8. (i) (1) Z 1
Deficiency of vitamin D will lead to poor bone growth 1
As Z is not strong enough; the body weight exerting on it will cause it to bend 1

(2) The body produces its own vitamin D under sunlight / UV light 1

(ii) because when producing movements, one muscle contracts, the other relaxes / the contraction of M bends the arm and that of N extends the arm 1

(iii) Title (T) 0.5
Position of load, effort, fulcrum correct (P) 1
Direction of arrows correct (A)The weight of the forearm forms the load 1
The force generated by the contraction of muscle M forms the effort 1
The elbow joint forms the fulcrum 1



Lever system for lifting the right forearm

Paper II

90-40	B
90-41	A
90-42	B
91-29	C
92-31	A
93-9	D
93-37	D
93-38	D
94-33	D
94-34	A
94-35	B
94-36	A
94-37	A
95-28	A
95-29	B
95-30	B
95-31	B
95-32	C
95-33	D
96-32	C
96-34	C
96-35	A
96-59	D
96-60	D
99-31	D
99-32	C
00-24	A
00-25	C
00-26	A
00-27	B
00-28	B
00-29	D
01-3	C
01-19	D
01-20	D
02-47	C
03-21	D
03-22	B
03-33	B
03-34	A
04-06	B
04-07	D
04-26	B
04-27	C
05-22	D
06-7	B
06-8	A
07-33	C
07-34	B