**Task 7 Solutions**

**Question 1**

**(a)**

**(b) Any 5:**

* Articular cartilage softens/ degenerates/ roughens / wears away
* Bone tissue exposed
* Ends of bones rub together
* Bone spurs develop/ joint deformity / ends of bones thicken/ bone wears away / joint loses normal shape
* Restricted movement / causes pain with movement
* Inflammation / swelling at the joint

Any 5

**Question 2**

(a) Name and describe how the THREE types of muscle tissue involved in: peristalsis within the alimentary canal, the beating of the heart muscle and the movement of your arms differ.

(9 marks)

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Smooth muscle   * no striations * single nucleus * taper at ends | 1  Any 2 (2 marks) |
| Cardiac muscle   * striations * branching fibres * connect to other cells via an intercalated disc * single nucleus per cell | 1  Any 2 (2 marks) |
| Skeletal muscle   * striated * multinucleated (nuclei on periphery of cell) * large/ long and cylindrical cells | 1  Any 2 (2 marks) |

**To receive full marks students must compare the features of each muscle type**

(b) Using your understanding of antagonistic muscles, explain how flexion of the arm is brought about.

(6 marks)

|  |  |
| --- | --- |
| **Description** | **Marks** |
| The muscle that contracts is called the agonist (prime mover) | 1 |
| As the agonist is contracting its paired muscle (the antagonist) relaxes | 1 |
| When flexing the arm the bicep would be the agonist | 1 |
| It is attached to scapula at the non –moving end by a tendon of origin | 1 |
| It is attached to the radius (moving end) by the tendon of insertion | 1 |
| So when the bicep contracts it pulls the radius towards the humerus resulting in flexion of the arm | 1 |
| When flexing the arm, the triceps would be the antagonist | 1 |
| Triceps must be relaxed when the bicep is contracting | 1 |

(c)

* Contraction-Muscle is stimulated
* Triggers release of Ca 2+/diffuses through thick and thin filaments
* Thin-actin and Thick-myosin Diagram required
* Ca2+ exposes binding site on the actin
  + This causes Myosin head to attach to actin/forms crossbridges
  + Actin filaments slide over the myosin filaments
* Contracting sarcomere/shortening sarcomere/Z lines come closer together

All sarcomeres contract in unison

Relax