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Family Name					
Given Name/s					
Student Number					
Teaching Period	Semester 2, 2017				

SBI261 – Functional Anatomy	DURATION	
	Reading Time:	10 minutes
	Writing Time:	180 minutes
INSTRUCTIONS TO CANDIDATES		
EXAM CONDITIONS		
<p><u>You may begin writing from the commencement of the examination session.</u> The reading time indicated above is provided as a guide only.</p>		
This is a CLOSED BOOK examination		
Any non-programmable calculator is permitted		
No handwritten notes are permitted		
No dictionaries are permitted		
ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED	
No additional printed material is permitted	1 x 20 Page Book 1 x Scrap Paper Faculty/School Multiple Choice Answer Sheet Reference Information	

**THIS EXAMINATION IS PRINTED
DOUBLE-SIDED.**

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LEFT BLANK.**

Section A

Multiple Choice Questions

Total number of Marks for this section: 50 marks

This section should be answered on the Answer Sheet provided. Please ensure that your name and student number have been written on the Answer sheet and place in the completed answer Booklet.

**Marks for each question are indicated. Suggested time allocation for
Section A: 50 mins**

Section B

Short Answer Questions

Total number of Marks for this section: 50 marks

This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested Time allocation for Section B: 65 mins

Question 51

- a) Please explain why is there a duty of care to know what you can advise and assist clients relative to when they should return to training or competition after an injury?

(Marks: 3)

- b) What are the five key areas where negligence can occur for an exercise professional?

(Marks: 5)

(Total marks: 8)

Question 52

Describe the purpose of synovial fluid and the role ligaments play in joint function.

(Marks: 4)

Question 53

Identify the main difference between a saddle joint and a gliding joint.

(Marks: 2)

Question 54

Going from a seated position to a standing position, the hips and knees both extend simultaneously. Therefore the biarticulate muscles acting over both joints appear to be lengthening and shortening at the same time. Relative to muscle activity, describe what is occurring. Furthermore, it appears that the muscle is extending and contracting simultaneously. Can this happen and if not, what is occurring?

(Marks: 8)

Question 55

The Q angle is different between genders. Why is this the case? What is the typical difference? With reference to females, what effects may the Q angle have on any joints, both directly and indirectly related?

(Marks: 7)

Question 56

The clavicle plays a critical role in the functions of the shoulder complex and upper limb. Describe the functional movements of the scapula that the clavicle is an integral component.

(Marks: 8)

Question 57

Lowering a weight very slowly i.e. resisting the gravitational force is said to be better for strength training than letting it free-fall (drop). Why is this the case?

(Marks: 5)

Question 58

Following are two paragraphs taken from two separate journal articles. Then there is a paragraph summarising the first two journal extracts.

Read the each of the paragraphs.

Article 1 from:

(A) Lee, J., James, D., Ohgi, Y., & Yamanaka, S. (2012). Monitoring sprinting gait temporal kinematics of an athlete aiming for the 2012 London Paralympics. *Procedia Engineering*, 34, 778-783.

“Due to the reported outcomes here, which are in line with previous research that show similarities between anatomical and transtibial amputee prosthetic outcomes, the technology will be a viable method for monitoring the athlete’s performance leading up to the London Paralympics. The research here also generally reflects outcomes of able body athlete temporal kinematics.”

Article 2 from:

(B) Lee, J., Leadbetter, R., Ohgi, Y., Thiel, D., Burkett, B., & James, D. A. (2011). Quantifying and Assessing biomechanical differences in swim turn using wearable sensors *Sports Technology*, 4(4-3), 128-133.

“This research was designed as a proof of concept to ascertain whether inertial technology could detect the second rotation component of a freestyle turn. The study indicates that the technology can carry out this monitoring. The detection whether a swimmer rotated past 90° during longitudinal rotation relative to the push off was clearly detected by the sensors. Therefore, this proven outcome, along with other validated functions of inertial sensors indicate the technology as a viable tool to assess tumble turn performance and providing an option for further research in turns. Furthermore, it would be a relatively inexpensive tool that may aid coaches in improving the performance of their swimmers, which in this case is freestyle tumble turns.”

Summary paragraph

Inertial sensor and wearable technology research has shown a large variety of applications when monitoring sporting performance. These devices have been shown to be capable of monitoring turn kinematics in freestyle swimming (Lee et al 2011) and performance assessment of athletes with limb amputations (Lee et al 2012). Therefore future performance assessment of running and swimming based sports may often be carried out with data collected using inertial sensor based technologies.

a) In your opinion, does the summary paragraph breach academic integrity: does it plagiarise either or both of the two journal extracts? Yes or No

(Marks: 0.5)

b) Justify your opinion. Why did you decide the summary paragraph was or was not a breach?

(Marks: 7.5)

(Total marks: 8)

This is the end of Section B. Total 50 marks.

Please ensure you have written your name and student number on your answer booklet.

Section C

Short Essay Questions

Total number of Marks for this section: 50 marks

This section should be answered in the Answer Booklet provided.

Please Note that in Question 6 both (a) and (b) should be answered.

Marks for each question are indicated. Suggested Time allocation for Section C: 65 mins

Question 59

The vertebral column has many functions. Please describe these functions. Furthermore, in your discussion please include (but not limit to) the following:

- List the primary functions of the spine.
- What are the movements, including direction, that are possible in spinal joints?
- Describe the structure and function of intervertebral disks.

(Marks: 10)

Question 60

Describe the spring mass model of running gait. You should include descriptions kinematic outputs of stride, step, and stance phases of the gait cycle. Additionally, describe the difference of the spring mass model to what is known as the inverted pendulum model.

(Marks: 10)

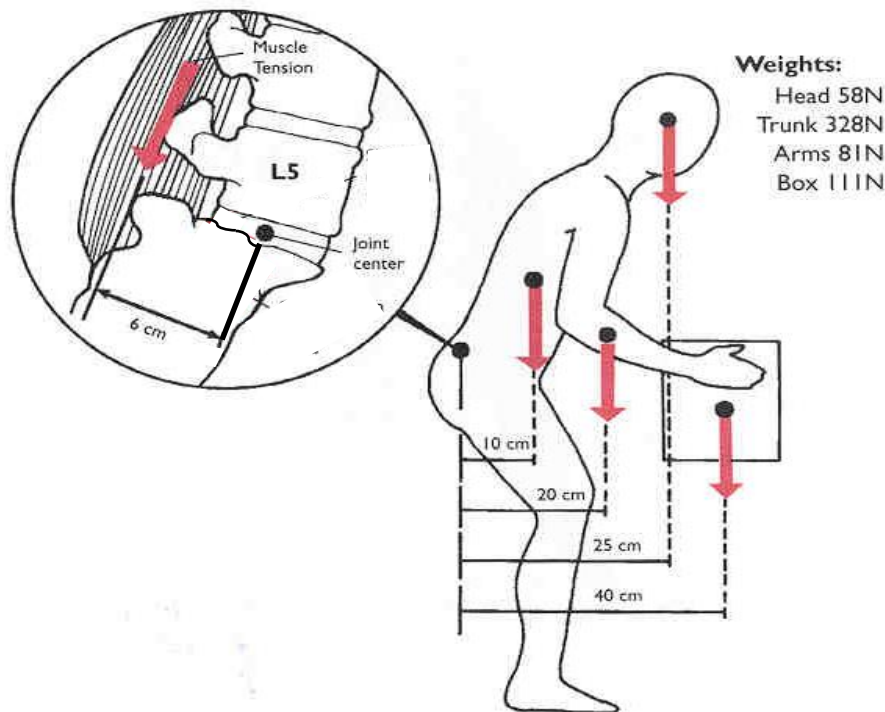
Question 61

When an athlete is injured, there are 3 phases the injured site goes through. Is the fibroblastic repair phase, the 1st, 2nd, or 3rd phase? Please describe the fibroblastic repair phase.

(Marks: 10)

Question 62

Maintaining a good posture during lifting is important for several reasons. One of these is to maintain correct loading of the spine's intervertebral disks, especially at the L5-S1 intervertebral joint (Figure 1). What is the muscle force required to counter the total weight forces of lifting a box with a mass of 11.3 kg (assume that the erector spinae is the only active muscle). Details of the weights and moment arm lengths involved are provided in the diagram.



(Marks: 10)

Question 63

When a person correctly performs a push up, the elbow joint opens up. Please describe this functional move and include:

- What is the appropriate elbow joint movement description?
- In which plane does this movement occur?
- What are the predominant functional muscles involved in a push up that are directly acting on the elbow.
- What is the muscle contraction type of the muscle(s) you have identified?
- What are the main antagonist and antagonist muscles?

(Marks: 10)

This is the end of Section C. Total 50 marks.

Please ensure that you have written your name and student number on your answer booklet.