**ST MARY’S UNIVERSITY**

**TWICKENHAM, LONDON**

BA/BA(ITT)/BSc Degree Examination students registered for

Level **Five**

Title**: Physiology of Training**

Code: **SPS5011**

Semester: **One**

Date: **9th January, 2020** Time: **1:30 – 3:30 PM**

TIME ALLOWED: **TWO** HOURS

**SECTION A:** Answer **ALL** questions from this section (70% total marks)

**SECTION B:** Answer **ALL** questions from this section (30% total marks)

**Section A:**

1. What is the immediate source of energy for muscle contraction? Which part of the muscle machinery utilises it? (2 marks)
2. What is an enzyme? (2 marks)
3. Rank the following in the order of fastest rates of ATP resynthesis: Beta-oxidation, anaerobic glycolysis, PCr system, aerobic glycolysis. (4 Marks)
4. What are the four by-products (metabolites) generated by the Krebs cycle? (4 marks)
5. During anaerobic glycolysis how many ATP are produced from one molecule of glycogen? (2 marks)
6. Name the missing enzyme in the chemical reaction below? (1 mark)

ADP + PCr + H+ ← ? → ATP + Cr

1. Define phosphorylation (2 marks)
2. During anaerobic glycolysis, how many ATP are produced from one glucose molecule? (2 marks)
3. After a short period of strength training there are significant neural adaptations; name three of these adaptations. (3 marks)
4. What happens to the muscle fibre type spectrum after prolonged strength training? (2 marks)
5. Which chemical ion triggers the sliding of muscle filaments? (1 mark)
6. What are the three components that make up the thin filaments in a sarcomere? (3 marks)
7. What is the function of the sarcoplasmic reticulum? (2 marks)
8. With regard to muscle contraction, what does RFD stand for? (1 mark)
9. What changes occur to the lactate threshold after a prolonged period of endurance training? Use a diagram to help illustrate your answer (4 marks)
10. Endurance training induces a decrease in heart rate at a given exercise intensity. Explain this observation with reference to increased O2 extraction. (3 marks)
11. There are three traditional determinants of endurance performance, what are they? (3 marks)
12. List three muscle fibre changes that occur at a muscular level after endurance training (3 marks)
13. The recommended training intensity for power training is said to be 90% of 1RM (please answer in exam booklet)? (1 mark)

**TRUE** or **FALSE?**

1. Define Stroke Volume (1 mark)
2. Define cardiac output (2 marks)
3. What are the units of measurement for absolute and relative $\dot{V}O\_{2 max}$?

(2marks)

1. Define of muscle fatigue (2 marks)
2. Inorganic phosphate (Pi) can cause fatigue during exercise: by which mechanism does this occur? (4 marks)
3. Explain where central fatigue occurs, and which functions it disrupts. (3 marks)

1. Match each word in column 1 to the correct formula in column 2. Use each formula only once (Please answer this clearly in booklet). (5 marks)

Column 1 Column 2

1.\_\_\_\_Calcium A. H2CO3-

2.\_\_\_\_Hydroxide ions B. H+

3.\_\_\_\_Sodium C. Pi

4.\_\_\_\_Potassium D. Ca2+

5.\_\_\_\_Carbonic acid E. K+

 F. Na+

 G. OH-

1. What is a taper? When and why would we use one in a training programme? (4 marks)
2. What is meant by the term ‘peaking’ when referring to a training programme? (2 marks)

**Section B:**

Answer the question in a separate booklet from part A.

Describe the central and peripheral adaptations to the cardiorespiratory system following a period of prolonged endurance training? (20 marks) Explain how these adaptations improve endurance performance? (10marks)

**END OF EXAMINATION**