**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: **January 14th 2019**

Time: **9:30 – 11:30AM**

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. During a maximum 400 m running sprint, lasting approximately 40 seconds, what energy systems would be utilised? **(3 marks)**
3. What is the role of the FADH2, NADH2 coenzymes in aerobic glycolysis? **(3 marks)**
4. Which two energy systems can be considered anaerobic? **(2 marks)**
5. Hexokinase (HK) is an enzyme involved in regulating glycolysis; can you name another two? **(2 marks)**
6. Name the enzyme involved in the reaction below: **(1 mark)**

ATP ---?--> ADP +Pi + Energy

1. What is Henneman’s size principle? **(2 marks)**
2. The recommended training intensity for power training is said to be 90% of 1RM (please answer in exam booklet) TRUE or FALSE? **(1 marks)**
3. With regard to muscle contraction, what does RFD stand for? **(1 mark)**
4. Which part of the muscle machinery does calcium bind to during muscular contraction? **(1 mark)**
5. What changes occur to the lactate threshold after a prolonged period of endurance training? **Use a diagram** to help illustrate your answer **(4 marks)**
6. Describe Starling’s law **(3 marks)**
7. Describe four adaptations that occur in the cardiovascular system following a prolonged period of endurance training? **(4 marks)**
8. There are three traditional determinants of endurance performance, what are they? (**3 marks**)
9. What is the role of haemoglobin? **(2 marks)**
10. Define Stroke Volume **(2 marks)**
11. What is minute ventilation (VE)? **(2 marks)**
12. In the measurement of O2 consumption what is meant by the phrase ‘steady state’? **(3 marks)**
13. Define VO2max? **(2 marks)**

What are the units of measurement for absolute and relative VO2max? (**2marks**)

1. Provide a definition of muscle fatigue **(2 marks)**
2. Explain where central fatigue occurs and which functions it disrupts. **(3 marks)**
3. Name three sites where peripheral fatigue occurs? **(3 marks)**
4. What is a taper? When and why would we use one in a training programme? **(4marks)**
5. What is overtraining? **(2marks)**
6. On the line to the left of each component in column 1, write the formula that matches each word in column 2. Use each formula only once (Please answer this clearly in your booklet). **(5 marks)**

|  |  |
| --- | --- |
| **Column 1** | **Column 2** |
| 1. Calcium | A. H2CO3- |
| 1. Hydroxide ions | B. H+ |
| 1. Sodium | C. Pi |
| 1. Potassium | D. Ca2+ |
| 1. Carbonic Acid | E. K+ |
|  | F. Na+ |
|  | G. OH- |

1. What are the percentages of oxygen and carbon dioxide in the air at sea-level?

**(2 marks)**

1. What is the function of the sarcoplasmic reticulum **(2 marks)**
2. What happens to the muscle fibre type spectrum after a period of prolonged strength training? **(2 marks)**

**Section B:**

Discuss the determinants of VO2max **(10 marks)** and how endurance training **(10** **marks)** can lead to adaptations in VO2max and endurance performance **(10 marks).**

**END OF EXAMINATION**