S6 Physical Education Practice Paper: Exercise Physiology and Energy Systems, Biomechanics and Movement Analysis, Fitness Testing and Assessment, Training Principles and Periodisation, Sports Psychology and Skill Learning, Sport in Society and Health Promotion

S6 | Physical Education | Time: 75 minutes | Total: 100 marks | 24 questions

---

Part A: Exercise Physiology and Energy Systems (16 marks)

Show your working and include units in your answers.

1. An athlete has a resting heart rate of 60 bpm and a maximum heart rate of 200 bpm. Using the Karvonen (heart rate reserve) method, find the target heart rate at 70% intensity. [4]

2. A student covers 2,400 m in the Cooper 12-minute run. Use VO2max = (distance - 504.9) / 44.73 to estimate maximum oxygen uptake. [4]

3. Explain two differences between the ATP-PC system and the aerobic system in terms of peak intensity and sustainable duration. [4]

4. A student weighs 62 kg and is 1.68 m tall. Calculate the BMI and classify it using under 18.5 underweight, 18.5-22.9 normal, 23-24.9 overweight, 25 or above obese. [4]

Part B: Biomechanics and Movement Analysis (17 marks)

Take g = 9.81 m/s2 and ignore air resistance.

5. A football is kicked at 12 m/s at an angle of 30 degrees. Find the horizontal range. [4]

6. Using the same kick, find the maximum height reached by the ball. [4]

7. A force of 250 N acts perpendicular to a lever arm 0.35 m from the axis. Find the moment about the axis and state two ways to increase the moment. [4]

8. An athlete lifts a 50 kg barbell through 1.2 m ten times in 20 seconds. Find the total work done and the average power. [5]

Part C: Fitness Testing and Assessment (17 marks)

Give the sample standard deviation to 2 decimal places.

9. Eight students score the following sit-up counts in one minute: 24, 30, 28, 35, 22, 26, 31, 29. Find the mean and the sample standard deviation. [4]

10. Using the data above, find the z-score of the student who scored 35 and explain its meaning. [4]

11. An athlete weighs 70 kg with 18 percent body fat. Find the fat mass and the lean body mass. [4]

12. Explain what validity and reliability of a fitness test mean, and give one practical way to improve reliability. [5]

Part D: Training Principles and Periodisation (17 marks)

Include units and show the calculation.

13. An athlete has a 1RM of 80 kg and trains at 75 percent 1RM for 3 sets of 10 repetitions. Find the load used and the total training volume in kg. [5]

14. An athlete has a maximum heart rate of 200 bpm. Using the percentage of maximum heart rate method, find the target heart rate range for 60 to 80 percent. [4]

15. A runner covers 30 km in week one and increases the weekly distance by 10 percent each week. Find the distance in week four. [4]

16. State three signs of overtraining and explain the purpose of tapering before competition. [4]

Part E: Sports Psychology and Skill Learning (17 marks)

Show working for calculation questions.

17. A player records eight reaction times in seconds: 0.34, 0.31, 0.29, 0.33, 0.30, 0.32, 0.35, 0.28. Find the mean reaction time. [4]

18. Using the SMART principle, write one training goal for a player with a low free-throw percentage and explain the S and M parts. [4]

19. Explain the inverted-U theory, describing how low, moderate and high anxiety affect performance, and give one example. [4]

20. Player A scores 21 of 30 shots and player B scores 25 of 40. Find both success rates and explain why comparing only the number of successful shots is misleading. [5]

Part F: Sport in Society and Health Promotion (16 marks)

Include units in your answers.

21. A 60 kg student runs for 30 minutes at an intensity of 8.3 METs. Using calories = MET x body mass in kg x hours, calculate the energy expenditure. [4]

22. The WHO recommends 150 minutes of moderate activity per week for adolescents. A student exercises 40 minutes a day for 5 days a week. Find the weekly total and the percentage of the recommendation. [4]

23. Explain the four steps of the RICE protocol for acute sports injury and the purpose of each. [4]

24. In a school sports day 420 of 1,200 students competed. Find the participation rate and the number of additional students needed to reach a 50 percent target. [4]
