Name:

Enrolment No:

UPES

End Semester Examination, May 2025

Course: Sports Exercise and Nutrition **Semester : VI**

Program: B.Sc. Food Nutrition and Dietetics **Duration : 3 Hours**

Course Code: HSND3003P **Max. Marks : 100**

Instructions: Read all the questions carefully.

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M = 30 Marks)	Marks	COs
Q1	The net energy production of ATP via glycolysis is _____. a) 1 ADP b) 2 ATP c) 4 FADH d) 2 GTP e) none of the above	1.5	CO1
Q2	Ketogenic amino acids are primarily converted into which of the following during metabolism? a) Glucose b) Pyruvate c) Ketone bodies or Acetyl-CoA d) Citric acid cycle intermediates	1.5	CO1
Q3	What is the primary function of the electron transport chain? a) Conversion of glucose into pyruvate b) Production of ATP by transferring electrons from NADH and $FADH_2$ c) Breakdown of fatty acids d) Conversion of pyruvate into lactate	1.5	CO1
Q4	List down three benefits of physical activity.	1.5	CO1
Q5	Which of the following activities is most likely to have a MET value of 12 or higher? a) Jogging at 5 mph b) Cycling at a leisurely pace c) Swimming laps at a fast pace d) Walking uphill at a moderate pace	1.5	CO2
Q6	Which plan best balances aerobic capacity, strength, and flexibility for Sarah's marathon training? a) Run 60 min (moderate), 4 days; resistance 30 min (high), 3 days; stretch 10 min before/after runs. b) Run 30 min (high), 5 days; resistance 45 min (moderate), 2 days; stretch 20 min after runs.	1.5	CO4

	c) Run 90 min (low), 3 days; resistance 60 min (moderate), 1 day; stretch 15 min, 1 day. d) Run 45 min (moderate), 5 days; resistance 30 min (moderate), 4 days; stretch 5 min before/after runs.		
Q7	Which of the following best describes the Cori cycle in energy metabolism? a) The process by which glucose is synthesized from fatty acids in the liver. b) The conversion of lactate produced in muscles during anaerobic exercise to glucose in the liver. c) The breakdown of glycogen into glucose in the liver for energy production. d) The process of converting amino acids into glucose in the liver.	1.5	CO2
Q8	During a 5-hour ultra-marathon in hot, humid weather, an athlete drinks large amounts of plain water but begins to feel dizzy, confused, and nauseous. What is the most likely cause of these symptoms? a) Dehydration due to inadequate fluid intake b) Hyponatremia caused by excessive water intake and sodium loss c) Heatstroke due to lack of cooling strategies d) Hypoglycemia caused by insufficient carbohydrate intake	1.5	CO2
Q9	What role do B vitamins play in energy metabolism?	1.5	CO2
Q10	Write down the primary role of ATP and PCr for muscle activity.	1.5	CO2
Q11	What is an ergogenic aid?	1.5	CO1
Q12	What term is used to describe the increase in muscle size and strength because of repeated work? a) Atrophy b) Hypertrophy c) Osteoporosis d) Muscular dystrophy	1.5	CO2
Q13	Which of the following is true regarding protein consumption and muscle mass development? a) Consuming excessive protein will automatically increase muscle mass. b) Protein supplements are the primary fuel source for weightlifting. c) Consuming high carbohydrate, moderate protein foods after a workout can enhance muscle protein synthesis. d) Strength training is not necessary for muscle growth if protein intake is increased.	1.5	CO3
Q14	To express exercise intensity relative to individual fitness, it is best to use: a) Absolute treadmill speed b) Percentage of body weight c) Percentage of VO_2 max d) Resting heart rate	1.5	CO3
Q15	Which of the following best describes "hitting the wall" during endurance exercise? a) Complete depletion of body fat stores b) Exhaustion of glycogen stores, leading to reduced exercise capacity c) Accumulation of lactic acid in the muscles d) Onset of dehydration during prolonged exercise	1.5	CO3

Q16	Under which of the following conditions would you recommend a sports drink over water? a) For hydration during short-duration exercise (less than 30 minutes) b) When exercising at low intensity in cool temperatures c) During prolonged exercise (over 60 minutes) in hot and humid conditions d) For hydration after a light workout	1.5	CO4
Q17	Match the definitions on the right with the terms on the left. a. beta-oxidation 1. breakdown of glucose to pyruvate b. ketosis 2. breakdown of fat to 2-carbon units called acetyl-CoA c. electron transport chain 3. synthesis of glucose from non-CHO sources d. gluconeogenesis 4. formation of excess ketone bodies e. glycolysis 5. electrons transferred back and forth to make ATP	1.5	CO4
Q18	Maria is hiking at a moderate intensity for half a day. What is the primary energy source her body will rely on during this session? a) Carbohydrates b) Fats c) Proteins d) A combination of carbohydrates and fats	1.5	CO4
Q19	What is progressive overload principle?	1.5	CO2
Q20	An endurance cyclist has an upcoming 100 km race expected to last over 4 hours. To optimize performance, which of the following strategies should she prioritize in the 3 days leading up to the event? a) Increase protein intake and perform high-intensity training b) Decrease carbohydrate intake to promote fat burning c) Maintain regular training and focus on hydration only d) Taper training while consuming a high-carbohydrate diet to maximize glycogen stores	1.5	CO4
Section B (4Qx5M=20 Marks)			
Q1	a) What is the difference between anaerobic and aerobic exercise? (2.5 marks) b) Discuss and provide examples of the exercise training principle of specificity and reversibility. (2.5 marks)	5	CO1
Q2	Explain how the functions and fuel sources of different muscle fiber types vary during exercise.	5	CO2
Q3	a) Consuming too much protein led to more muscle growth. Justify the statement. (2.5 marks) b) How does eating carbohydrates and protein after weight training help muscle recovery? (2.5 marks)	5	CO2
Q4	a) What is Relative Energy Deficiency in Sport (REDS)? b) How does iron deficiency anaemia affect athletic performance? (2.5 marks)	5	CO3
Section C			

(2Qx15M=30 Marks)			
Q1	a) State the predominant energy pathways that exist for different modes of physical activity. (3 marks) b) Discuss cardiac hypertrophy in trained athletes. (6 marks) c) Discuss the pulmonary adaptations that occur with aerobic training. (6 marks)	15	CO3
Q2	a) Discuss the relationship between exercise intensity and blood lactate levels in both untrained individuals and endurance athletes. (7.5 marks) b) How do aerobic training adaptations alter the lactate threshold, and what factors contribute to the improved lactate turnover in endurance athletes? (7.5 marks)	15	CO3
Section D **(2Qx10M=20 Marks)**			
Q1	Illustrate the metabolic pathways involved in ATP production from fatty acids and amino acids during the process of gluconeogenesis.	10	CO1
Q2	Melissa, a 45-year-old woman, has started a low carbohydrate, high-protein diet to lose weight. During the first 2 weeks of the diet, she is concerned about the effects of ketosis and wonders how fasting, might influence her metabolism. a) What are ketones, and how do ketosis support energy production during prolonged fasting? (5 marks) b) Explain the metabolic changes that occur in the body during the initial phase of fasting (first 24-48 hours) and how the body shifts from glucose to fat as its primary energy source. (5 marks)	10	CO4