UNIVERSITY OF FORT HARE

HUS 511

DEGREE EXAMINATIONS

June 2023

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Time: 3 HOURS

Subject: Exercise physiology and science

Marks: 100

This paper consists of 3 pages including cover page

Internal Examiner

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External Examiner

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Instructions

Please answer all questions.

Question 1 **(25)**

Thabiso is 21 years old and has been playing for the Border Rugby team for the past two years. They have introduced new fitness standards and below are his results for the strength assessments and muscle endurance assessments.

Weight	86 kg
Stature	1.7 m
1RM bench	98 kg
1RM Leg press	150 kg
Push up test	38

Please are the norm tables that apply to `bench press and leg press.

Table 11.2 Age- and Sex-Based Norms for the 1RM Bench Press

Age (y)		20–29		30–39		40–49		50–59		≥60	
Descriptors	% rank	M	F	M	F	M	F	M	F	M	F
Well above average	90	1.48	0.54	1.24	0.49	1.10	0.46	0.97	0.40	0.89	0.41
	80	1.32	0.49	1.12	0.45	1.00	0.40	0.90	0.37	0.82	0.38
Above average	70	1.22	0.42	1.04	0.42	0.93	0.38	0.84	0.35	0.77	0.36
	60	1.14	0.41	0.98	0.41	0.88	0.37	0.79	0.33	0.72	0.32
Average	50	1.06	0.40	0.93	0.38	0.84	0.34	0.75	0.31	0.68	0.30
	40	0.99	0.37	0.88	0.37	0.80	0.32	0.71	0.28	0.66	0.29
Below average	30	0.93	0.35	0.83	0.34	0.76	0.30	0.68	0.26	0.63	0.28
	20	0.88	0.33	0.78	0.32	0.72	0.27	0.63	0.23	0.57	0.26
Well below average	10	0.80	0.30	0.71	0.27	0.65	0.23	0.57	0.19	0.53	0.25

Table 11.3 Age- and Sex-Based Norms for the 1RM Leg Press

Age (y)		20–29		30–39		40–49		50–59		≥60	
Descriptors	**% rank**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Well above average	90	2.27	2.05	2.07	1.73	1.92	1.63	1.80	1.51	1.73	1.40
	80	2.13	1.66	1.93	1.50	1.82	1.46	1.71	1.30	1.62	1.25
Above average	70	2.05	1.42	1.85	1.47	1.74	1.35	1.64	1.24	1.56	1.18
	60	1.97	1.36	1.77	1.32	1.68	1.26	1.58	1.18	1.49	1.15
Average	50	1.91	1.32	1.71	1.26	1.62	1.19	1.52	1.09	1.43	1.08
	40	1.83	1.25	1.65	1.21	1.57	1.12	1.46	1.03	138	1.04
Below average	30	1.74	1.23	1.59	1.16	1.51	1.03	1.39	0.95	1.30	0.98
	20	1.63	1.13	1.52	1.09	1.44	0.94	1.32	0.86	1.25	0.94
Well below average	10	1.51	1.02	1.43	0.94	1.35	0.76	1.22	0.75	1.16	0.84

Please apply the norms for push-up test.

Table 11.9 Age- and Sex-Based Norms for the Push-Up Test

Age (y)	15–19		20–29		30–39		40–49		50–59		60–69	
Classification	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Excellent	≥39	≥33	≥36	≥30	≥30	≥27	≥25	≥24	≥21	≥21	≥18	≥17
Very good	29–38	25–32	29–35	21–29	22–29	20–26	17–24	15–23	13–20	11–20	11–17	12–16
Good	23–28	18–24	22–28	15–20	17–21	13–19	13–16	11–14	10–12	7–10	8–10	5–11
Fair	18–22	12–17	17–21	10–14	12–16	8–12	10–12	5–10	7–9	2–6	5–7	2–4
Needs improvement	≤17	≤11	≤16	≤9	≤11	≤7	≤9	≤4	≤6	≤1	≤4	≤1

1. Please indicate clearly how you have interpreted Thabiso results in terms of descriptors and % rank for bench press and leg press according to the norms provided.

   2x3=6

2. Please interpret Thabiso's muscle endurance according to the norms provided.

   2

3. Compile a four day-split strength training program for Thabiso. Besides indicating the training intensity and volume of the chosen exercises, make sure to indicate the specific training weight for the bench press. 14
4. In a short paragraph please explain to Thabiso his results when it comes to strength and muscle endurance. 3

Question 2 **25**

Below are the results of three UFH basketball players. The strength and conditioning specialist used the vertical jump (countermovement vertical jump) to determine their power output. He requires your assistance to answer the questions below from the head coach.

Variables	Zotando	Nandipha	Avela
Body mass	56 kg	62 kg	83 kg
Stature	1.62 m	1.66 m	1.72 m
Vertical jump	Reach height .=1.78 Jump height =2.05	Reach height.= 1.86 Jump height= 2.12	Reach height.= 1.89 Jump height= 2.00

1. Please work out each of the players' displacement height results. Which player showed the highest displacement height 4
2. By making use of the following equation, please rank the players who had the highest peak power to the lowest. Please explain the relationship between displacement height and peak power 8

$$\text{Peak power (W)} = 60.7 \times \text{jump height (cm)} + 45.3 \times \text{body mass (kg)} - 2{,}055$$

3. One way of improving power is through plyometric training. However, before compiling such a program, a strength and speed assessment should be done to determine the players' readiness for plyometrics. Please explain one such assessment for upper body readiness and one for lower body plyometric readiness.

   2x2=4
4. Please compile a plyometric program specifically for basketball players of one week for the main competitive phase. Ensure to indicate all variables that would apply to a plyometric training program. 9

Question 3 **(25)**

Lindiwe is a 35 years old women and she will be competing in her first Half Ironman in January 2018. She is a very good swimmer and cyclist; however her running needs serious attention. She completed a bleep test and her level was and shuttle was 6.8

Level	Shuttle	VO2 Max
4	2	26.8
4	4	27.6
4	6	28.3
4	9	29.5

Level	Shuttle	VO2 Max
5	2	30.2
5	4	31
5	6	31.8
5	9	32.9

Level	Shuttle	VO2 Max
6	2	33.6
6	4	34.3
6	6	35
6	8	35.7
6	10	36.4

Level	Shuttle	VO2 Max
7	2	37.1
7	4	37.8
7	6	38.5
7	8	39.2
7	10	39.9

Level	Shuttle	VO2 Max
8	2	40.5
8	4	41.1
8	6	41.8
8	8	42.4
8	11	43.3

Level	Shuttle	VO2 Max
9	2	43.9
9	4	44.5
9	6	45.2
9	8	45.8
9	11	46.8

Level	Shuttle	VO2 Max
10	2	47.4
10	4	48
10	6	48.7
10	8	49.3
10	11	50.2

Level	Shuttle	VO2 Max
11	2	50.8
11	4	51.4
11	6	51.9
11	8	52.5
11	10	53.1
11	12	53.7

Level	Shuttle	VO2 Max
12	2	54.3
12	4	54.8
12	6	55.4

Level	Shuttle	VO2 Max
13	2	57.6
13	4	58.2
13	6	58.7

By making use of this information please answer the following questions:

a) Please describe lactate threshold and running economy and relate to how this affects her performance in aerobic events 4

b) What is her indirect VO2 max and explain the difference between a direct VO2 max test (provide an example of such test (2)) and indirect VO2 max interpretation. Make sure to highlight the advantages and disadvantages of each method (4) 6

c) Describe two different types of aerobic endurance training. Firstly name the activity (1) then prescribe intensity and duration (2) and provide an example (training session) for that aerobic endurance activity, ***specifically to Lindiwe*** (2) 2x5=10

d) Then compile a mico cycle indicating how Lindiwe should train in order for her to improve her aerobic endurance? 5

Question 4 **(25)**

The Eastern Cape Department of Sport has requested you to give a presentation about the importance of speed and agility training in sport. Your presentation should consist of the following information:

1. Indentify the difference between speed and agility (2)
2. Firstly, identify the series of subtasks and phases that make up sprinting performance and stride analyses (5)? Secondly, explain the fundamental movement involved in the last, and most important, subtask of sprinting (3)? (8)
3. Explain and describe to the coaches the coordinating abilities that are essential for agility?

   (3x2=6)
4. At the end of the presentation you are presented with the following question from the coaches:
   a. Thabo : "I have attended previous coaching clinics and was told that stairs and uphill running will assist in improving sprinting time, may you please explain what type of training method this is (1), to what aspect of sprinting does it contribute to (2) and training guidelines should be applied to sprint training (3)?"
   (6)
   b. Phil: "I have a very talented 100m sprinter- however he "jumps" out of the sprinting blocks and comes upright to quickly, what causes this and how can I correct that? (4)

END OF PAPER