

PRACTICAL TEST 4

Answer Key










ECOLOGY

Total Points: 51

Duration: 90 minutes

TASK I. (16 points)

Q1. (4 points)

Species	Population size	Density (number of individuals/m ²)
Starfish 	15	0.31
Razor clam 	20	0.41
Sea slater 	15	0.31
Sea urchin 	13	0.27
Fiddler crab 	13	0.27
Octopus 	10	0.20
Oyster 	14	0.29
Mudskipper 	11	0.22
Sea anemone 	13	0.27

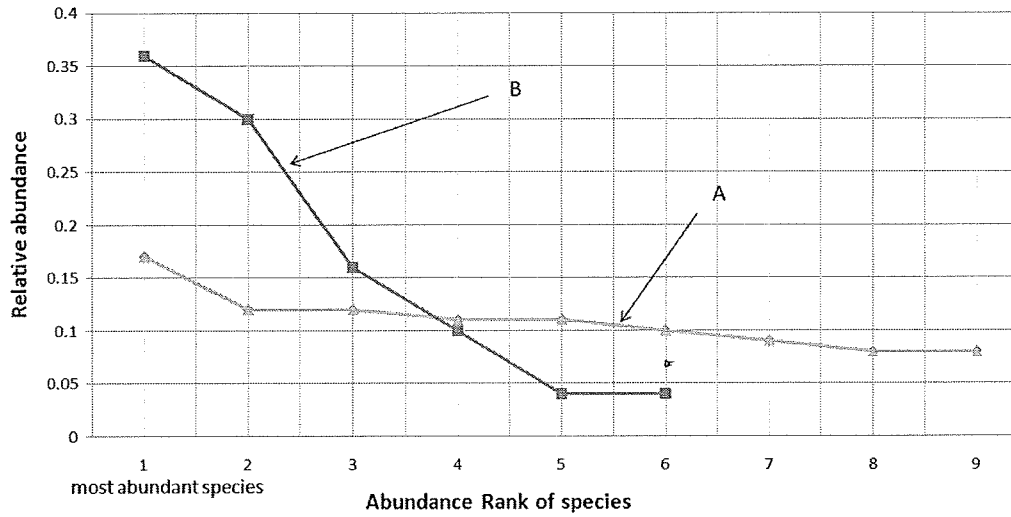
1. One point will be subtracted for any error in rounding value and error in decimal place.
2. In case of calculation error for any value, one point is subtracted for each error.
3. Only one point is subtracted for incorrect answers within each row of the table.

Q2. (2 points)

Community A			Community B		
Species	Population size	Proportion of relative abundance	Species	Population size	Proportion of relative abundance
Starfish	13	0.12	Fiddler crab	2	0.04
Razor clam	18	0.17	Barnacle	18	0.36
Sea slater	13	0.12	Sea anemone	15	0.30
Sea urchin	12	0.11	Sea cucumber	2	0.04
Fiddler crab	11	0.10	Hermit crab	5	0.10
Gastropod	8	0.08	Gastropod	8	0.16
Oyster	12	0.11			
Mudskipper	9	0.09			
Sea anemone	10	0.09			
Total	106		Total	50	

1. 0.5 point is subtracted for any error in rounding value and error in decimal place.
2. In case of calculation error for any value, 0.5 point is subtracted for each error.

Q3. (4 points)



1. Full points will be given for marks on the appropriate curve, and appropriate titles and scales for the Y-axis.
2. Full points are given if participant make appropriate graph using data in Q2.
3. For incorrect marks or no marks, 2 points are subtracted.
4. For no title or scales on Y-axis, 2 points are subtracted.

Q4. (4 points)

Species diversity index of community A (H'_A)	Species diversity index of community B (H'_B)
2.15	1.51

1. Full points will be given for values between 2.10 – 2.19 for community A and 1.50- 1.59 for community B.
2. 2 points for each value.
3. 1 point are subtracted for each error in rounding value and decimal place.
4. Full Points are given if participant make appropriate calculation using data in Q2.

Q5. (1 point)

A	B	C	D
√		√	

1. 1 point is given if participant make appropriate answer using the graph of Q3.
2. No point is given if participant mark only one out of both answers.

Q6. (1 point)

A	B	C	D
			√

TASK II. (8 points)

Q7. (4 points)

Number of individuals captured during the second sampling	Participant's Value
Number of marked individuals recaptured	Participant's Value
Estimate of the population size	Use of the Excel Table

1. 1 point will be given if the participant wrote the first and second answers.
2. 0.5 point is subtracted if the participant did not round off the numbers.
3. 0.5 point is subtracted if the participant did not record one decimal place or recorded more decimal places.



Q8. (4 points)

<i>t</i> -value	1.96
SE	Use of the Excel Table
Confidence interval of the estimated population size	Use of the Excel Table

1. Values found in Q.1 must be applied.
2. 0.5 point is subtracted if the participant did not round off the numbers.
3. 0.5 point is subtracted if the participant did not record one decimal place or recorded more decimal places.
4. It is OK if the confidence interval is written in the range $(\bar{X} - X')$ or in the form of $Y \pm Y'$ or Y' .
5. 1 point is subtracted when the participant wrote one wrong answer.
6. Confidence interval is accepted for the point within the range of the excel calculation ± 0.05

TASK III. (14 points)

Q9. (2 points)

Observed count		Spiral shellfish 	
		Present	Absent
Clam 	Present	15	12
	Absent	6	16

1. 1 point is subtracted if the participant wrote one wrong answer.

Q10. (2 points)

A	B	C	D	E
	√			

1. Plural choice is null.

Q11. (4 points)

Expected count		Spiral shellfish	
		Present	Absent
Clam	Present	11.6	15.4
	Absent	9.4	12.6

- 1 point is subtracted for each wrong answer.
- 0.5 point is subtracted if the participant did not round off the numbers.
- 0.5 point is subtracted if the participant did not record one decimal place or recorded more decimal places.
- Use the excel table for the evaluation when the observation counts are wrong (full point, in the case of exact calculation).

Q12. (2 points)

χ^2	3.96 or 3.89
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- Use the excel table for the evaluation when the answers of Q9 and Q11 are wrong (full point in the case of exact calculation).
- Full point is given if the value is within the range of ± 0.05

Q13. (1 point)

Degree of freedom (<i>df</i>)	1
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Q14. (2 points)

	Fail to reject	Reject
Null hypothesis		√

If $Q12 < 3.84$, “fail to reject” is a correct answer.

Q15. (1 point)

A	B	C	D	E
	√		√	

1. 1 point is obtained if the participant chose only B or D.
2. If answer of Q14 is “fail to reject”, correct answer is “A”.

TASK IV. (13 points)

Q16. (2 points)

Prey species	Density (number of individuals/m ²)	Ts (sec) when the prey density is 1	Ts (sec) at the Site I
Prey A	1.00	10	10
Prey B	0.75	15	20
Prey C	0.50	5	10

1. 0.5 point is subtracted if the participant did not round off the numbers.
2. 0.5 point is subtracted if the participant did not record one decimal place or recorded more decimal places.
3. 1 point is subtracted if the participant wrote one or two wrong answer within each row in the table.

Q17. (2 points)

	Height of drop (m)	Average number of drops required to break shell	Optimal height for handling
Prey A	2	60	
	3	40	
	5	20	
	10	8	√
	15	7	

	Height of drop (m)	Average number of drops required to break shell	Optimal height for handling
Prey B	2	60	
	3	20	
	5	7	√
	10	5	
	15	4	

	Height of drop (m)	Average number of drops required to break shell	Optimal height for handling
Prey C	2	30	
	3	10	√
	5	8	
	10	5	
	15	4	

Q18. (2 points)

Prey species	Handling time per prey (sec)
Prey A	80
Prey B	35
Prey C	30

- 1 point is subtracted if the participant wrote one wrong answer.

Q19. (3 points)

Prey species	Energy (KJ per prey)	Prey profitability
Prey A	7	0.08
Prey B	25	0.45
Prey C	5	0.13

- 1 point is subtracted if the participant wrote one wrong answer.
- 0.5 point is subtracted if the participant did not round off the numbers.
- 0.5 point is subtracted if the participant did not record one decimal place or recorded more decimal places.
- Use the excel table for the evaluation using answers of Q16 and Q18 (full point, in the case of exact calculation).

Q20. (2 points)

A	B	C	D	E
				√

Q21. (2 points)

A	B	C	D	E
		√		

Plural choice is null.