ANSWER KEY TO EXPERIMENTAL TESTS

PRACTICAL TEST 1

PLANT ANATOMY AND PHYSIOLOGY

Task 1 (33 points)

Study of factors affecting the activity of stomata

Q. 1.1. (0.5 x 6 = 3 points)

	True	False
a.	√	
b.	√	
c.		√
d.		√
e.		√
f.		√

Q. 1. 2. (0.5 points)

a.	b.	c.	d.
√			

Q. 1.3. (2 points)

a.	b.	c.	
	√		X = 0.373 g
			Y = 0.5 ml

Q. 1. 4. (1 x 8 rows = 8 points):

Table 1.4.

Treatment	Total number of stomata counted	Number of open stomata	Number of closed stomata
1	20	20 **(3: 1 in the correct direction; less than 20 stomata counted – no marks)**	0 **(±5)**
2	20	0	20
3	20	0	20
4	20	0	20
5	20	20	0
6	20	20	0
7	20	20	0
8	20	0	20

Q. 1. 5. (2 x 5 = 10 points)

A. 4, 10

B. 5

C. 3, 9

D. 1, 2, 6, 7, 8

Q. 1. 6. (2.5 points)

a.	b.	c.	d.
	√		

Q. 1. 7. (2.5 points)

a.	b.	c.	d.	e.
			√	

Q. 1. 8. (2.5 points)

a.	b.	c.	d.	e.
		√		

Q. 1. 9. (0.5 x 4 = 2 points)

Step I: 1

Step II: 2

Step III: **8**

Step IV: 6

Step V: **4**

Step VI: **9**

Step VII: **11**

Task 2 (14 points)

Study of plant anatomy and its correlation with the habitat

Q. 2.1. (2 x 2 = 4 points)

I. Trichomes — E

II. Stomata — P

Q. 2.2. (0.5 x 8 = 4 points)

	Present	Absent
7. Cuticle	√	
8. Sclerenchyma	√	
9. Collenchyma	√	
10. Air spaces		√
11. Water storage tissue	√	
12. Glands:		
a. Oil gland		√
b. Salt gland	√	
c. Digestive gland		√

Q. 2.3. (0.5 x 7 = 3.5 points)

	Present	Absent
7. Cuticle	√	
8. Sclerenchyma	√	
9. Collenchyma	√	
10. Air spaces	√	
11. Water storage tissue		√
12. Vascular bundle:	Open	Closed
		√
	Collateral	Bicollateral
	√	

Q. 2.4. (2.5 points)

a.	b.	c.	d.	e.	f.	g.	h.
						√	

********** END OF PRACTICAL TEST 1 **********

PRACTICAL TEST 2

ANIMAL ANATOMY AND PHYSIOLOGY

Task 1 (54 points)

Study of animal skeletal systems

Q. 1.A.1. (2 points)

a.	
b.	√
c.	
d.	

Q. 1.A.2. (1 x 6 = 6 points)

Table 1.A.2.

Character		1	2	3
Type of skull	Anapsid		√	
	Diapsid	√		
	Synapsid			√
	Euryapsid			
Type of dentition	Homodont	√	√	
	Heterodont			√

Q. 1.A.3. (1 x 6 = 6 points)

Table 1.A.3.

Features		1	2	3
Vision	Predominantly stereoscopic vision			
	Predominantly non-stereoscopic vision	√	√	√
Feeding habit	Predominantly carnivorous	√	√	
	Predominantly herbivorous			√

Q. 1.B.1. (1 x 8 = 8 points)

Table 1.B.1.

Characters		4	5	6
Ribs	Present	√	√	
	Absent			√
Major type of ribs	True	√		
	False			
	Floating		√	
Tail	Present	√	√	
	Reduced /Absent			√

Q. 1.B.2. (1 x 3 = 3 points)

Table 1.B.2.

Feature		4	5	6
Neck movement	Restricted			√
	Free	√	√	

Q. 1.C.1. (1 x 12 = 12 points)

Table 1.C.1.

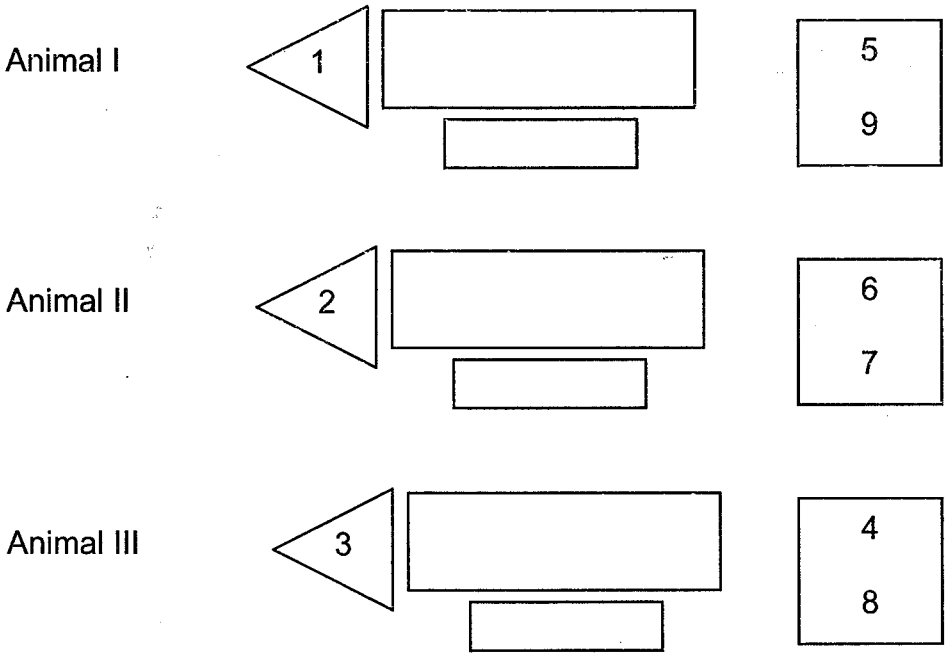
Characters		7	8	9
Position of limb with respect to body	Sprawled	√		√
	Underneath		√	
Length of fore- and hindlimbs	Similar			
	Fore limbs longer			
	Hind limbs longer	√	√	√
Claws	Present		√	√
	Absent	√		
Modifications	Tibia and fibula completely fused	√		
	Tibia and fibula partially separate		√	√

Q. 1.C.2. (1 x 8 = 8 points)

Table 1.C.2.

Features		7	8	9
Limb movement during locomotion	Swinging (rotational movement)	√		√
	Pendulum-like		√	
Habit of the animal	Saltatorial (jumping)	√		
	Cursorial (walking)		√	√
	Fossorial (digging)		√	√

Q. 1.D.1 (1 x 6 = 6 points)



Q. 1.D.2 (1 x 3 = 3 points):

Animal I: Class: B

Animal II: Class: D

Animal III: Class: A

Task 2 (12 points)

Semi-quantitative estimation of nitrogenous waste products

Q. 2.1.1. to 2.1.3. (1 x 9 = 9 points)

Table 2.1.

All three rows must be filled completely and the maximum weightage must be for the correct chemical

Samples	Uric acid test	Urea test	Ammonia test
S1	++/+	+++	+
S2	+	++/+	++++
S3	+++	++	+
Positive control	+++	+++	+++
Negative control	-	-	-

Q. 2. 2. (3 points):

Answer: ____d____

********** END OF PRACTICAL TEST 2 **********

PRACTICAL TEST 3

BIOCHEMISTRY AND CELL BIOLOGY

Task 1

Study of β-lactamase activity and its inhibition

PART A (35 points)

Q. 1.A.1. (3 x 6 = 18 points)

Table A.1.

Test tube	Absorbance
1	0.84 (0.756 – 0.924: 3 points) (0.672-0.755 – 0.925-1.008: 1.5 points)
2	0.84 (0.756 – 0.924: 3 points) (0.672-0.755 – 0.925-1.008: 1.5 points)
3	0.75 (0.675 – 0.825: 3 points) (0.600-0.674 – 0.826-0.900: 1.5 points)
4	0.57 (0.513 – 0.627: 3 points) (0.456-0.512 – 0.628-0.684: 1.5 points)
5	0.16 (0.144 – 0.176: 3 points) (0.128-0.143 – 0.177-0.190: 1.5 points)
6	0.00

Q. 1.A.2. (1 x 6 = 6 points)

Table 1.A.2.

Test tube	[I] (mM)	v_i/v_0
1	0	
2	0.8	
3	1.6	
4	2.4	
5	3.2	
6	4.0	

Q. 1.A.3. (5 points): Points will be transferred from the Graph Paper.

1 point each for the correct axes.

0.5 point for the correct plotting of each data point.

Q. 1.A.4. (3 points)

IC_{50} = 2.7 mM

2.0 – 3.4 (3 points)

1.4-1.9 – 3.5-4.1 (1.5 points)

Q. 1.A.5. (3 points)

K_i = 0.508 mM

0.375 – 0.625 (3 points)

0.250-0.374 – 0.626-0.750 (1.5 points)

PART B (4 points)

Q. 1.B.1. (1 x 4 = 4 points)

Table 1.B.1.

Plate	Organism
III	P or R or both
IV	P or R or both
V	S
VI	Q

PART C (4 points)

Q. 1.C.1. (1 x 4 = 4 points)

Table 1.C.1.

Region	R1	R2	R3	R4
Bacterium B grows		√	√	
Bacterium B does not grow	√			√

********** END OF PRACTICAL TEST 3 **********

PRACTICAL TEST 4

ANIMAL BEHAVIOR

Task 1 – Part A (7 points)

Study of the olfactory response of *Drosophila melanogaster* larvae

Experimental Design

Q. 1.A.1. (3 points)

Design I	
Design II	
Design III	√
Design IV	
Design V	

Q. 1.A.2. (4 points)

I.	II.	III.	IV.	V.	VI.	VII.	VIII.
F	T	F	F	T	F	T	T

**********END OF PART A**********

Task 1 – Parts B and C

Study of the olfactory response of *Drosophila melanogaster* larvae

Part B (18 points)

Larval Plate Test

Q.1.B.1 (0.5 x 20 = 10 points)

Table 1.B.1.

Experiment	Chemical in ZI	Number of larvae in ZI (N_{ZI})	Chemical in ZII	Number of larvae in ZII (N_{ZII})	$\frac{N_{ZI}}{N_{ZI}+N_{ZII}}$	$\frac{N_{ZII}}{N_{ZI}+N_{ZII}}$
1	B	2 / 3	C	20 / 21	0.08 / 0.09 / 0.1	0.8 / 0.9
2	A	4 / 5 / 6	B	11 / 12 / 13 / 14	0.2 / 0.3 / 0.4	0.6 / 0.7 / 0.8
3	A (in dark)	9 / 10 / 11 / 12	B	2 / 3	0.8	0.1 / 0.2
4	B	7	D	6	0.5	0.5
5	B (in dark)	2 / 3	C	16 – 29	0.1	0.9

Q.1.B.2. (1 x 3 = 3 points)

Chemical	Attractant	Repellant	Neutral chemical	Nature cannot be determined
A		√		
B			√	
C	√			

Q.1.B.3. (1 x 5 = 5 points)

	True	False
a.	√	
b.	√	
c.		√
d.		√
e.		√

Part C (11 points)

Study of olfactory adaptation in *Drosophila melanogaster* larvae

Q.1.C.1. (0.25 x 20 = 5 points)

Table 1.C.1.

Experiment	Pre-stimulation	Test odorant			
		Experiment A	Experiment B	Experiment C	Experiment D
		Ethyl acetate	Pentyl acetate	Hexyl acetate	Heptyl acetate
		RI	RI	RI	RI
1	None	75.0	56.5	7.6	- 23.8
2	Ethyl acetate	12.0	15.4	13.0	- 25.0
3	Pentyl acetate	3.2	4.34	35.7	- 21.7
4	Hexyl acetate	30.7	9.6	10.3	- 23.8
5	Heptyl acetate	20.0	44.4	- 23.8	- 13.0

Q. 1.C.2. (2 points)

Ethyl acetate	
Pentyl acetate	√
Hexyl acetate	
Heptyl acetate	

Q. 1.C.3. (2 points)

Ethyl acetate	
Pentyl acetate	
Hexyl acetate	√
Heptyl acetate	

Q. 1.C.4. (2 points)

Experiment	Experiment			
	A	B	C	D
1				
2				
3				
4				
5			√	

Task 2

Study of fish behavior

Q. 2.1. (1 x 11 = 11 points)

Table 2.1.

Number	Before the introduction of the mirror	After the introduction of the mirror
1.	+	+
2.	–	+
3.	–	–
4.	–	–
5.	–	–
6.	–	+
7.	–	–
8.	–	+
9.	–	–
10.	–	+
11.	+	+

Q. 2.2. (1 point)

a.	b.	c.	d.
		√	

Q. 2.3. (1 point)

a.	b.	c.	d.
	√		

**********END OF PRACTICAL TEST 4**********