Country:

Student Code:

27th International Biology Olympiad

17th-23rdJuly, 2016

Hanoi, Vietnam

Hanoi - Vietnam 2016
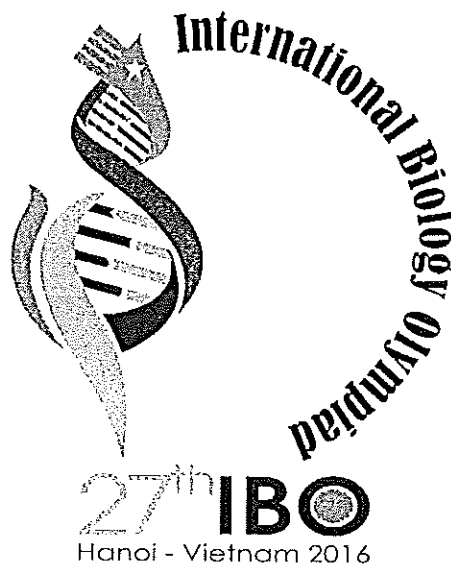
Practical Exam2

ANIMAL SYSTEMATICS AND ANATOMY

Answer Keys

Total points: 100

Experiment 1: Classification of Butterflies

1

ANSWER KEY 1 (8 × 2 points = 16 points)

Species	A	B	C	D	E	F	G	H
Papilio demolion								
Papilio machaon								
Papilio xuthus	√							
Papilio helenus		√						
Papilio noblei								
Hebomoia glaucippe			√					
Ixias pyrene								
Danaus genutia				√				
Danaus chrysippus								
Symbrenthia lilaea							√	
Junonia iphita					√			
Junonia orythia						√		
Athyma asura								
Polygonia c–aureum								√

ANSWER KEY 2 (128 × 0.20 point = 25.6 points)

	Characters	A	B	C	D	E	F	G	H
a	Hindwing with long tail	1	1	–	–	–	–	–	–
b	Hindwing with knob tail	–	–	–	–	–	–	1	1
c	No wing vein 1a on forewing	–	–	–	–	1	1	1	1
d	No wing vein 1a on the hindwing	1	1	–	–	–	–	–	–
e	Wing vein 8 and 9 in the forewing overlapped	–	–	1	–	–	–	–	
f	Wing vein 1a cuts the dorsum near the base of the forewing	1	1	–	–	–	–	–	–
g	Wing vein 1a and 1b in the forewing intersected	–	–	1	1	–	–	–	–
h	Open wing cells	–	–	–	–	1	1	1	1
j	Orange hindwings with brown wing veins	–	–	–	1	–	–	–	–
k	A big red-orange patch on half of the forewing	–	–	1	–	–	–	–	–
l	Upper side with orange bands on brown wings	–	–	–	–	–	–	1	–
m	A series of white spots on the marginal area of wings	–	–	–	1	–	–	–	–
n	White patch on hindwing	–	1	–	–	–	–	–	–
o	Upper side hindwing with an orange or a pale yellow tornal spot with a black dot inside	1	–	–	–	–	–	–	–
p	Ocelli on wings	–	–	–	–	1	1	–	–
q	Apex of forewing cut	–	–	–	–	1	1	–	1

ANSWER KEY 4 (10.75 points)

Iteration 1 (6 × 0.5 points= 3 points)

Specimens	A	B	C	D	EF	G	H
A	0.0						
B	4	0.0					
C	9	11	0.0				
D	12	12	9	0.0			
EF	13	13	12	9	0.0		
G	12	12	11	8	5	0.0	
H	13	13	12	9	4	3	0.0

Age of newly formed cluster

......1....

Iteration 2 (5 × 0.5 points = 2.5 points)

Specimens	A	B	C	D	EF	GH
A	0.0					
B	4	0.0				
C	9	11	0.0			
D	12	12	9	0.0		
EF	13	13	12	9	0.0	
GH	12.5	12.5	11.5	8.5	4.5	0.0

Age of newly formed cluster

......1.5......

Iteration 3 (4 × 0.5 points = 2 points)

Specimens	AB	C	D	EF	GH
AB	0.0				
C	10	0.0			
D	12	9	0.0		
EF	13	12	9	0.0	
GH	12.5	11.5	8.5	4.5	0.0

Age of newly formed cluster

......2......

Iteration 4 (3 × 0.5 points = 1.5 points)

Specimens	AB	C	D	EFGH
AB	0.0			
C	10	0.0		
D	12	9	0.0	
EFGH	12.75	11.75	8.75	0.0

Age of newly formed cluster

.....2.25......

Iteration 5 (2 × 0.5 points = 1 points)

Specimens	AB		
AB	**0.0**	C	
C	10	**0.0**	DEFGH
DEFGH	*12.6*	*11.2*	**0.0**

Age of newly formed cluster

.....**4.375**....

Iteration 6 (1 × 0.5 points = 0.5 points)

| Specimens	ABC	
ABC	**0.0**	DEFGH
DEFGH	*12.133*	**0.0**

Age of newly formed cluster

.....**5.6**....

Iteration 7 (0.25 points)

Age of newly formed cluster

.....**6.067**...

ANSWER KEY 5 (4.25 points)

ANSWER KEY 5 (4.25 points)
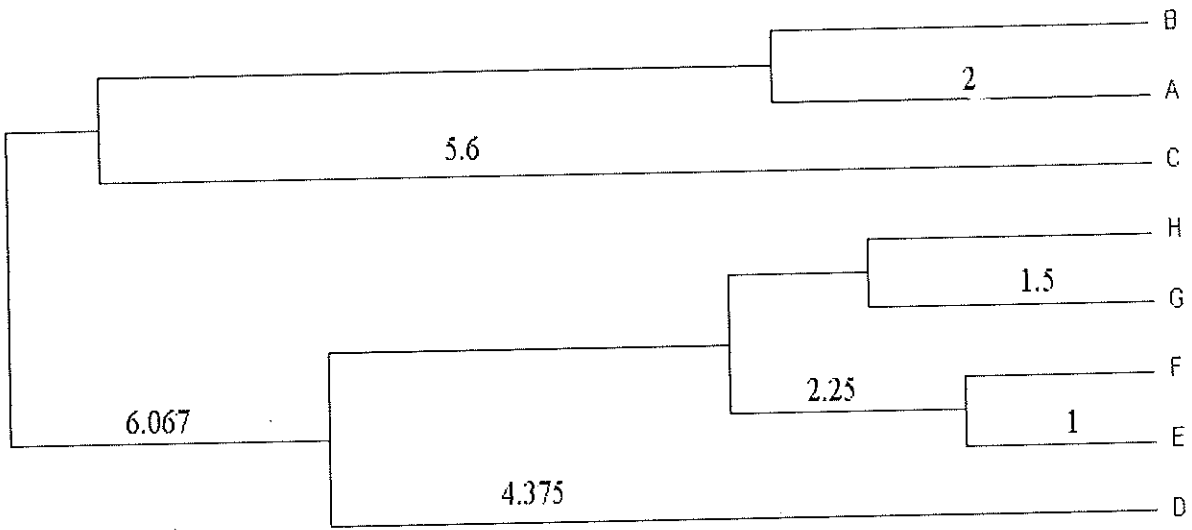
Experiment 2: Anatomy of earthworm

ANSWER KEY 6   (10 points)

Mark " ✓ " in the correct box.

Question	Statement			
	A	B	C	D
6.1 (3 points)		✓		
6.2 (3 points)				✓
6.3 (3 points)	✓			

7

ANSWER KEY 7 (25 points)

7.1. (3 points) Write the correct number of spermatheca pair in the box.

	Number
Spermatheca (Pairs)	2

7.2. (6 points = 4 × 1. 5 point) Mark " ✓ " in the correct box.

Septa	Presence	Absence
7/8	✓	
8/9		✓
9/10		✓
10/11	✓	

7.5. (3 points) Mark " ✓ " in the correct box.

A	B	C	D
		✓	

DISSECTING RERULT CONFIRMATION SHEET

COUNTRY:	....
STUDENT CODE:	....

7.3. (10 points = 5 × 2 points) Positioning the internal organ

Colour–headed pins	Organ	Mark "✓" in the appropriate box if correct; and "✗" if incorrect
Blue–headed pin	Stomach	....
White–headed pin	Caecum	....
Red–headed pin	Seminal vesicle	....
Yellow–headed pin	Prostate glands	....
Purple –headed pin	Nerve ganglion chain	....
Number of correct answers		

Q.7.4. (4 points)

	Good cross section (not broken)	The cross section is broken
Dissection quality	......	......

4 points if " ✓ " in the "Good cross section " box.

0 points if " ✓ " in the "The cross section is broken" box.

(Note: After confirming the student's results, teacher takes pictures of the dissecting results by using a camera)