INDIAN NATIONAL BIOLOGY OLYMPIAD- 2009

ANSWER SHEET

1st February, 2009 **Roll No.** | |

Time: 2 hrs

Centre : _____

- Please write your INBO roll number on the top of this page in the space provided.
- Please fill the top half of the Performance Card attached to this answer sheet. **Do not detach the Performance Card.**
- Please fill in all the data below correctly. The contact details provided here would be used for all further correspondence.

Full Name (Block Letters) : _____

Male / Female Date of Birth(dd/mm/yyyy):_____

Residential address (include city and PIN code): _____

_____

_____

Residential Phone No. with STD Code: _____

Mobile number (if any): _____

E-mail address (if any): _____

Class: XI / XII Board: ICSE / CBSE / State Board / Other

I have read the Procedural Rules of INBO and agree to abide by them.

Roll No. Signature:
Place: Date:

HOMI BHABHA CENTRE FOR SCIENCE EDUCATION
Tata Institute of Fundamental Research
V. N. Purav Marg, Mankhurd, Mumbai 400 088.

Instructions regarding INBO Theory Test Paper:

The question paper is divided into Section A and Section B.

Section A

- Section A consists of 28 questions carrying 1 point each.
- All 28 questions are of multiple choice type, with only one correct answer for each question.
- Mark the correct answer with 'X' on the answer sheet provided. The correct way of marking a cross is shown below. Use a dark pencil / pen to mark your answer.

Q.No.	a	b	c	d
		X		

- Each wrong answer will have negative marking as indicated in the scoring key.

Section B

- Section B consists of a total of 28 questions.
- The marks for the questions in Part B vary depending on the number of answers and the complexity of the question. These marks have been indicated along with the question.
- Fill your answers in the **Answer Sheet** for Part B.
- Contradictory answers will not be considered for marking.

SCORING KEY

NO. OF CORRECT ANSWERS: X

NO. OF INCORRECT ANSWERS: Y

SCORE INBO (THEORY): SECTION A: 3X – Y

SECTION B: 3 x POINTS OBTAINED

INBO - 2009 **ROLL NO.** _____

ANSWER SHEET: SECTION A

Q. No.	a	b	c	d	Q. No.	a	b	c	d
1		■			15	■			
2		■			16	■			
3	■				17	■			
4	■				18	■			
5			■		19		■		
6				■	20		■		
7			■		21				■
8	■				22				■
9		■			23				■
10			■		24			■	
11				■	25			■	
12		■			26				■
13				■	27				■
14			■		28				■

Signature of Invigilator: _____

	X	Y	Not attempted	
SECTION A				3X – Y =
SECTION B				3X =
				Total score =

ANSWER SHEET: SECTION B

CELL BIOLOGY (28)

29. (0.25 x 24 = 6 points)

(A) **Table 29.A**

Cell types	[^{3}H] Thymidine	[^{14}C] Uridine	[^{35}S] Methionine
Intestinal mucosal cells	+	+	+
Reticulocytes	+	+	+
Neurons	-	+	+
RBC	-	-	+

(B) **Table 29.B**

Cell types	[^{3}H] Thymidine	[^{14}C] Uridine	[^{35}S] Methionine
Intestinal mucosal cells	+	+	+
Reticulocytes	+	+	+
Neurons	+	+	+
RBC	-	-	+

30. (1 x 3 = 3 points)

1. IV
2. I
3. I

31. (0.5 x 4 = 2 points)

Statement	True	False
A	√	
B		√
C		√
D		√

32. (0.5 x 6 = 3 points)

No.	Effects	True	False
1.	Increased glycogen and fat biosynthesis		√
2.	Decreased rate of metabolism		√
3.	Increased sweating	√	
4.	Decreased mean body temperature		√
5.	Increase in heat production	√	
6.	Decreased cardiac output		√

33. (2 points)

a.	
b.	√
c.	
d.	

34. (0.5 x 6 = 3 points)

3 > 2 > 1> 6 > 4 > 5

35. (2 points)

a.	
b.	
c.	
d.	√

36. (0.5 x 4 = 2 points)

Population	Stage
P	a
Q	b
R	d
S	c

37. (1 x 5 = 5 points)

A. 1:257000 **or** (3.89x10^{-6} to 4x10^{-6}) **or** $10^{-5.41}$ **or** 99% **or** 1/$10^{5.41}$

B. 1:25 or 1:26 **or** (3.84x10^{-2} to 4x10^{-2}) **or** $10^{-1.41}$ **or** 96% **or** 1/$10^{1.41}$

C. 1: 1.02 **or** 0.97 to 1.00 **or** 9.7x10^{-1} **or** 97x10^{-2} **or** $10^{-0.01}$ **or** 45% **or** 1/$10^{0.01}$

D. pH 2 **or** A or stomach

E.

a.	
b.	√
c.	
d.	

PLANT SCIENCES (6)

38. (0.5 x 4 = 2 points)

Characteristic	Type of plant	>/</=/X	Type of plant
Light compensation point	C_3 plants	>	C_4 plants
Photorespiration rate	C_3 plants	>	C_4 plants
Optimum temperature for photosynthesis	C_3 plants	<	C_4 plants
Productivity	C_3 plants	<	C_4 plants

39. (0.5 x 4 = 2 points)

1: mucilage duct

2: cambium

3: spring wood

4: autumn wood

40. (0.5 x 4 = 2 points)

Statements	True	False
I.		√
II.		√
III.	√	
IV.	√	

ANIMAL SCIENCES (10)

41. (0.5 x 4 = 2 points)

Activity	Will increase	Will not increase
A.		√
B.	√	
C.		√
D.	√	

42. (2 points)

a.	
b.	√
c.	
d.	

43. (0.5 x 4 = 2 points)

Statements	True	False
A.	√	
B.	√	
C.		√
D.		√

44. (0.5 x 8 = 4 points)

Animal group	**Body pattern (A/B/C/D/E)**
Sea urchin	A
Sea anemone	C
Nematodes	B
Star fish	A
Corals	C
Snakes	A
Rotifers	B
Tape worm	D

GENETICS & EVOLUTION (9.5)

45. (1.5 points)

Answer: 1/8 **or** 0.125 **or** 12.5%

46. (1 point)

Answer: II x III

47. (0.5 x 5 = 2.5 points)

Description	Whether description suggests	
	Pre-zygotic barrier	Post-zygotic barrier
A.	√	
B.	√	√
C.	√	
D.		√

48. (0.5 x 5 = 2.5 points)

Statements	True	False
A.	√	
B.	√	
C.	√	
D.		√
E.	√	

49. (2 points)

a.	
b.	
c.	√
d.	

ETHOLOGY (5)

50. (0.5 x 6 = 3 points)

Social condition	Response
A.	4
B.	5
C.	1 or 6
D.	2
E.	6 or 1 or 4
F.	3

51. (0.5 x 4 = 2 points)

A.

a.	
b.	√
c.	
d.	

B.

a.	√
b.	

C.

a.	
b.	
c.	√
d.	

D.

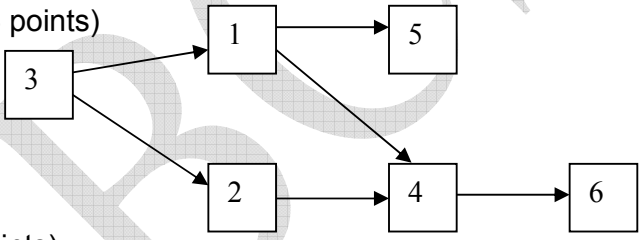
a.	
b.	√
c.	

ECOLOGY (11.5)

52. (0.5 x 5 = 2.5 points)

Condition	Mode
A.	I
B.	III
C.	II or III
D.	I
E.	III

53. (0.5 x 6 = 3 points)



54. (2 x 2 = 4 points)

(A)

a.	
b.	
c.	√
d.	

(B)

a.	
b.	
c.	
d.	√

55. (0.5 x 4 = 2 points)

Adaptation	Advantage
Dichotomous branching of thallus	b
Presence of fucoxanthin	g
Mucilaginous secretions	c
Lower solute potential than the surroundings	d

BIOSYSTEMATICS (2)

56. (2 points)

a.	√
b.	
c.	
d.	

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