

INDIAN NATIONAL BIOLOGY OLYMPIAD- 2019**SECTION A: ANSWER KEY**

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

	X	Y	Not attempted	
SECTION A				3X - Y =

SECTION B: ANSWER KEY**CELL BIOLOGY (19.5 points)**

27. (2 points)

Band I: _____d

Band II: _____e

Band III: _____b

Band IV: _____c

28. (2.5 points)

Statement	True	False
i.		✓
ii.	Deleted	
iii.		✓
iv.	✓	
v.		✓

29. (2 points)

a.	b.	c.	d.
			✓

30. (3 points)

Statement	True	False
i.	✓	
ii.		✓
iii.	✓	

31. (4 points)

Graph I: ____ a ____

Graph II: ____ e ____

Graph III: ____ f ____

Graph IV: ____ h ____

32. (2 points)

Answer: ____ 32 - 33.3 ____ %

33. (2 points)

Answer: ____ 16 or 17 ____

34. (2 points)

a.	b.	c.	d.
			✓

PLANT SCIENCES (14 points)

35. (2+2=4 points)

(A)

Table 1	
Ploidy level	Plant parts
Haploid (n)	B, D, E, F
Diploid (2n)	A, C

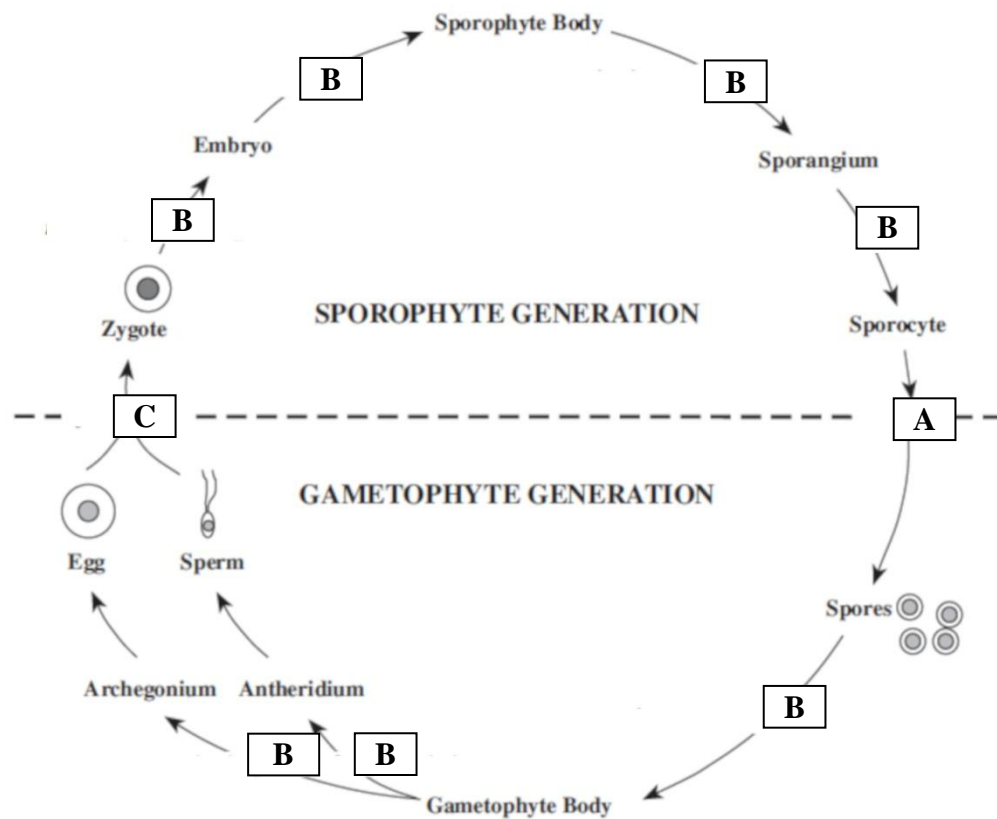
(B)

Table 2			
Statement		True	False
I.	Parts A and D are photosynthetic.	✓	
II.	Part F is unicellular and unbranched.		✓
III.	Part C shows the presence of stomata.		✓
IV.	Sexually reproducing structures are found in part A.		✓

36. (2 points)

Situations	Flowering will be observed	Flowering will not be observed
a.	✓	
b.		✓
c.		✓
d.	✓	

37. (3 points)



38. (3 points)

M: _____ II

N: _____ only I or I and II (1 point)

O: _____ only III or III and II (1 point)

39. (2 points)

Answer:

Set P: _____ iii

Set Q: _____ i

Set R: _____ iv

Set S: _____ ii

ANIMAL SCIENCES (9 points)

40. (2 points)

	pH	kPa pCO ₂	kPa pO ₂	mmol/L HCO ₃ ⁻
Normal	7.4	4.49	16.5	20.9
Hyperventilation	Increase	Decrease	Increase	Decrease
Holding breath	Decrease	Increase	Decrease	Increase

41. (2.5 points)

Traits	Likely to be observed	Not likely to be observed
i.	✓	
ii.		✓
iii.	✓	
iv.		✓
v.	✓	

42. (2.5 points)

Statement	True	False
a.	✓	
b.		✓
c.	✓	
d.	✓	
e.		✓

43. (2 points)

a.	b.	c.	d.	e.	f.
✓	✓				

GENETICS & EVOLUTION (15 points)

44. (2.5 points)

Sex chromosomes	Autosomes	Other Mutations	Sexual Phenotype			
			Fertile Female	Sterile Female	Fertile Male	Sterile Male
XX	AA	<i>tra</i> ⁻ / <i>tra</i> ⁻				✓
XY	AA	Over expression of NUM protein monomer	✓			
XO	AA	Over expression of DEM protein				✓
XY	AA	<i>tra</i> ⁻ / <i>tra</i> ⁻			✓	
XYY	AAA	Over expression of NUM protein monomer	✓			

45. (4 points)

Situation 1:

Answer: _____ b, d _____

Situation 2:

Answer: _____ a , c _____

Situation 3:

Answer: _____ b, d _____

Situation 4:

Answer: _____ a, c _____

46. (2+1.5+1=4.5 points)

(A)

Media	Strain 1	Strain 2	Strain 3
P	+	+	+
Q	-	-	+

a.	b.	c.	d.
✓			

(B)

a.	b.	c.	d.
		✓	

47. (2 points)

	Bar eyed	Wild type
Males	80	20
Females	200	0

48. (2 points)

Answer: Q < R < P

ECOLOGY (10.5 points)

49. (2 points)

Answer: _____ 0.25×10^{-6} or 1:4000003 (any other alternative representations of these answers have been given points) _____

50. (2 points)

Statement	Cause/Result	Not a cause/result
a.	✓	
b.	✓	
c.	✓	
d.		✓

51. (3 points)

I. Zone of competitive exclusion: _____C

II. Realised niche of *B. balanoides*: _____A, B, C

III. Zone of highest interspecific competition: _____C

IV. Dessication as a major controlling factor: _____D

V. Predation selection pressure on *B. balanoides*: _____AVI. Potential niche of *C. stellatus*: _____C, D

52. (1.5 points)

i. *Cryphonectria endothia* and chestnut tree native to China: _____a_____ii. *Cryphonectria endothia* and chestnut tree native to America: _____b_____iii. *Cryphonectria endothia* and virus: _____a_____

53. (2 points)

Statement	Correct	Incorrect
a.		✓
b.	✓	
c.	✓	
d.		✓

BIOSYSTEMATICS (6 points)

54. (2 points)

Statement	True	False
a.		✓
b.		✓
c.	✓	
d.		✓

55. (2 points)

Statement	True	False
a.		✓
b.	✓	
c.		✓
d.	✓	

56. (2 points)

Answer: Phyla/Class ___Annelida_____ and Phyla/Class
___Arthropoda_____

***** END OF SECTION B *****