ALL ANSWERS MUST BE GIVEN ON THE COMPUTERIZED ANSWER SHEET
BY CROSSING THE CORRESPONDING LETTER

Mathematics M.C.Q's

No. of Questions: 50 (from 1 to 50)	Time: 80 Minutes
Questions on Page Numbers: 1 To 8	Negative markings: **Yes**

Q1 In the $xy-$coordinate plane, line L contains the points $(0, 0)$ and $(-1, 3)$. If line M is perpendicular to L and passes through the origin, then the equation of line M is

A) $y = 3x$
B) $x = 3y$
C) $x + y = 3$
D) $x = -3y$

Q2 If $x > 0$ satisfying $\dfrac{\sqrt[3]{x}}{x} = x^w$, then the value of w will be

A) $\dfrac{2}{3}$

B) $-\dfrac{2}{3}$

C) $-\dfrac{3}{2}$

D) $\dfrac{3}{2}$

Q3 If w percent of 80 is 60 percent of h, what is the value of h in terms of w?

A) $\dfrac{4w}{3}$

B) $\dfrac{3w}{4}$

C) $8w$

D) $6w$

Q4 If the modes of the set $\{1, 3, 6, 9, 12, 4x - y, y - x\}$ are 6 and 9, then $x + y$ is

      I.   16
     II.   19
   III.   21

A) I only
B) II only
C) Both I and III
D) Both I and II

Q5 The mode of a set of 4 positive integers is 7. What is the least possible value of the sum of these 4 integers?

A) 14
B) 16
C) 17
D) 18

Q6 Which has the largest area?

A) Rectangle of dimensions 10.4×9.5
B) Square of side 10
C) Triangle of base 20 and height 10
D) Right-angled triangle of perpendicular sides 20 and 11

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Q7 If $a^2b^3c^4d^5 > 0$ and $d < 0$, which of the following must be true?

A) $a < 0$

B) $b < 0$

C) $c < 0$

D) $ab < 0$

Q8 Aslam, Farid, and Majid are going to buy a shop that costs 54 million rupees. If Aslam pays 5 million rupees more than Farid and Farid pays twice as much as Majid, then how much does Farid pay?

A)   9.8 million rupees

B)   19.6 million rupees

C)   24.6 million rupees

D)   None of these

Q9 $\dfrac{1}{1+\sqrt{3}} - 1 + \sqrt{3} - \dfrac{1}{1-\sqrt{3}} =$

A) $1 + 2\sqrt{3}$

B) $1 - 3\sqrt{3}$

C) $-1 + 2\sqrt{3}$

D) $-1 - 3\sqrt{3}$

Q10 Let us consider a function $f(x) = x^3 - x^2 - x - 8$. If $f(u) = -8$, how many real values of u are there?

A) 0

B) 1

C) 2

D) 3

Q11 At the start of each academic year the University of Knowledge increases the tuition fee by 10%. And that increase is applicable to all students (new as well as old). If at the start of first year the annual tuition fee is Rs 100,000 (including recent 10% increase), how much will it be at the beginning of the third year?

A) Rs 110,000

B) Rs 120,000

C) Rs 121,000

D) Rs 130,000

Q12 Find h if $3^{(2h-1)} = 27^{(-h+2)}$.

A) $\dfrac{7}{5}$

B) $\dfrac{5}{7}$

C) 1

D) 0

Q13 A scientist found that the number of bacteria in a sample doubles every 3 hours. If there were 48 bacteria in the sample at the start of the experiment, how many bacteria were there after 15 hours?

A) 384

B) 768

C) 1536

D) 3072

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Q14 If G is divisible by 3, 6, and 10, which of the following is also divisible by these numbers?

A) $G + 36$

B) $G + 90$

C) $G + 70$

D) $G + 40$

Q15 If $\mu \, \Delta \, \lambda = \dfrac{\mu + \lambda}{\mu - \lambda}$, what is the value of $\dfrac{6}{7} \, \Delta \, \dfrac{7}{6}$?

A) $\dfrac{85}{13}$

B) $36 \, \Delta \, 49$

C) $\dfrac{-7}{6} \, \Delta \, \dfrac{6}{7}$

D) $\dfrac{-6}{7} \, \Delta \, \dfrac{7}{6}$

Q16 If $\alpha - \beta$ is a multiple of 11, which of the following must also be a multiple of 11?

A) Only $\alpha^2 - \beta^2$

B) Only $\alpha\beta$

C) Only $\beta - \alpha$

D) Both $\alpha^2 - \beta^2$ and $\beta - \alpha$

Q17 Let x, 3, and 6 be the lengths of three sides of a triangle. How many such triangles are possible with x being a positive integer?

A) 4

B) 5

C) 6

D) 7

Q18 The hypotenuse of my right triangle is 18 and one of the angles is 45 degrees. What's the length of the side adjacent to that angle?

A) $9\sqrt{2}$

B) $\dfrac{9}{\sqrt{2}}$

C) 9

D) $\dfrac{\sqrt{2}}{9}$

Q19 If the product of the two roots of the quadratic equation $x^2 + mx + m(m-1) = 0$ is 2, then the value of m is

A) Only 2

B) Only -1

C) Both 2 and -1

D) None of these

Q20 If the ages of players in a cricket team vary between 17 and 37 inclusive, which of the following describes all possible ages x in this cricket team?

A) $|x - 17| \leq 27$

B) $|x + 27| \leq 10$

C) $|x - 27| \leq 10$

D) $|x - 37| \leq 17$

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Q21 If $\dfrac{(x+3)}{10}$ is a positive integer, then the remainder, when x is divided by 5 is

A) 0
B) 1
C) 2
D) 3

Q22 Which of the following is equivalent to $3x^2 + 2x - 5$?

A) $(5 - 3x)(2 - x)$
B) $(3x - 5)(x + 1)$
C) $(x + 5)(3x - 1)$
D) $(3x + 5)(x - 1)$

Q23 WXYZ is a quadrilateral such that WZ = 2XW, ZY = XW, XY = XW + WZ, and XY + ZY = 16. What is the perimeter of WXYZ?

A) 48

B) 42

C) 36

D) 28

Q24 The sum of the first 20 terms in an arithmetic progression is 200 and the sum of the next 10 terms is 400. Find the fortieth term.

A) 49

B) 59

C) 69

D) 79

Q25 The first three terms of a sequence are 8, 15, 22. Each term after the first is obtained by adding 7 to the term immediately preceding it. Which term in the sequence is equal to $15 + 7(26 - 1)$?

A) The 6th

B) The 7th

C) The 27th

D) The 28th

Q26 A store is offering a 20% reduction of all regular prices such that the new price of a LED TV set is fifty thousand rupees. What was the price, in rupees, of the LED TV set before the reduction?

A) 62500

B) 57500

C) 55000

D) 52500

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Q27 An increasing geometric progression has positive terms. The sum of the first eight terms is seventeen times the sum of the first four terms. The seventh term is 960. The ninth term is

A) 30720

B) 7680

C) 3840

D) None of these

Q28 There are 50 boys and 60 girls in the cafeteria. After x boys and $x - 5$ girls have left the cafeteria, the probability of selecting a girl becomes $\dfrac{5}{7}$, what is the value of x?

A) 30   B) 35

C) 40   D) 45

Q29 Find the sum of the first 10 terms of the geometric series starting at 10 and decreasing by a factor of 2 each time

A) $5 - \dfrac{5}{2^8}$

B) $10 - \dfrac{5}{2^8}$

C) $15 - \dfrac{5}{2^8}$

D) $20 - \dfrac{5}{2^8}$

Q30 Given that u^2 is directly proportional the cube of w. Find the value of w when $u = 27$, if $u = 8$ when $w = 8$.

A) 14   B) 16

C) 18   D) 20

Q31 If M and N are negative integers and 5M – 4N = 20, which of the following CAN NOT be a value of M?

A) -4 B) -8

C) -10 D) -12

Q32 If $x = 2 - \sqrt{3}$, then the value of $x^2 - x^{-2}$ will be

A) 14

B) $-8\sqrt{3}$

C) $7 - 4\sqrt{3}$

D) $7 + 4\sqrt{3}$

Q33 Kamran ran from his house to the supermarket at an average speed of 6 KM per hour and returned along the same route at an average speed of 4 KM per hour. If the total time it took him to run to the supermarket and back was ninety minutes, how many minutes did it take him to run from the supermarket to her house?

A) 36

B) 54

C) 45

D) None of these

6

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Q34 How many 3 digit positive integers exist that when divided by 7 leave a remainder of 0?

A) 127
B) 128
C) 129
D) 142

Q35 If α is an integer chosen randomly from the set $\{6, 7, 8, 9\}$ and β is an integer chosen randomly from the set $\{36, 42, 56, 81\}$, what is the probability that $\dfrac{\beta}{\alpha}$ is an integer?

A) $\dfrac{3}{16}$

B) $\dfrac{5}{16}$

C) $\dfrac{7}{16}$

D) $\dfrac{9}{16}$

Q36 The set S consists of all multiples of 8. Which of the following sets are contained within S?

      I. The set of all multiples of 4

      II. The set of all multiples of 16

      III. The set of all multiples of 32

A) I only

B) II only

C) III only

D) II and III only

Q37 If n is a positive integer divisible by 3, 4 and 6, which of the following is true?

      I. n(n + 3) is divisible by 9

      II. n + 12 is divisible by 12

      III. n(n + 4) is divisible by 16

A) I and II only

B) I and III only

C) II and III only

D) I, II and III

Q38 The average of the first six data values of a data set is equal to 29. The average of the last four data values of the set is equal to 33. What is the average of the ten data values?

A) 26.2
B) 28.4
C) 30.6
D) 32.8

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Q39 Find the missing terms in the following arithmetic sequence: ?, 10, ?, 70, ?, 130

A)　0, 20, 80
B) −10, 30, 90
C) −20, 40, 100
D) None of these

Q40 If $x^2 + 72 = x^4$, then the value of x will be

A) Only ± 3

B) Only $\pm 2\sqrt{-2}$

C) Both ± 3 and $\pm 2\sqrt{-2}$

D) None of these

Q41 A geometric progression has a positive common ratio, and the sixth term is $\left(\dfrac{5}{4}\right)^4$. The sum of the first three terms and the sum of the third, fourth, and fifth terms are in the ratio 16 : 25. Find the sum of the first three terms.

A) 4.76

B) 3.05

C) 1.95

D) None of these

Q42 Jamil and Jalil together have 30 books. Both of them gifted 5 books each to a charity organization, and the product of the number of books they now have is 91. How many books did they have at the beginning?

A) 15, 15

B) 7, 13

C) 12, 18

D) None of these

Q43 A shopkeeper earns a profit of R70 for every 3 bags of wheat it sells. How many bags of wheat must the shopkeeper sell in order to make a R1400 profit?

A) 75

B) 60

C) 45

D) 30

Q44 Find the next 3 terms in the sequence: 256, − 64, 16, …

A)　8, − 4, 1
B) − 8, 　4, −1
C) 　4, −1, 0.25
D) − 4, 　1, −0.25

8

Q45 If $\dfrac{x(x-3)}{x^2-9} = 0$, what is the value of x?

A) Only 0

B) Only 3

C) Both 0 and 3

D) None of these


Q46 If A is the set of all integers greater than -2π, and B is the set of all integers less than $(-2\pi)^2$, how many integers are in both sets?

A) 40   B) 43

C) 46   D) 49

Q47 A special lottery is to be held to select the student who will live in the only deluxe room in a boys hostel. There are 150 seniors, 300 juniors, and 600 sophomores who applied. Each senior's name is placed in the lottery 4 times; each junior's name, 3 times; and each sophomore's name, 2 times. What is the probability that a junior's name will be chosen?

A) $\dfrac{1}{3}$ B) $\dfrac{2}{7}$

C) $\dfrac{3}{8}$ D) None of these

Q48 Which of the following is the graph (not drawn to scale) for the line $x - y = -1$?

A)
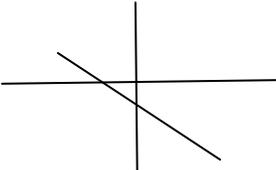
B)
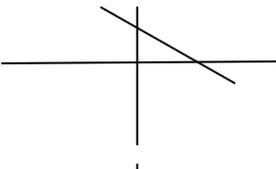
C)
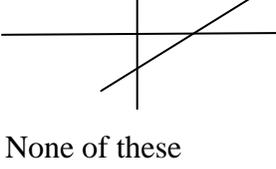
D)   None of these

Q49 A list contains 20 consecutive odd integers. The average of these integers is 24. What is the largest odd integer in the list?

A) 45   B) 43
C) 41   D) 39

Q50 How many numbers from -300 to 300 inclusive are equal to the cube of an integer?

A) 6

B) 7

C) 12

D) 13

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English M.C.Q's

No. of Questions: 40 (from 51 to 90)   Time: 45 Minutes

Questions on Page Numbers: 9 To 14   Negative markings: **Yes**

Grammar and Vocabulary Section

Qs 51-60 Choose the answer that is most appropriate to complete the sentence

51. The crew of the air balloon _____ the sand bags to help the balloon rise over the hill.
A. capsized
B. jettisoned
C. salvaged
D. augmented

52. We were not fooled by his _____ arguments; his plan was obviously _____ .
A. cogent - brilliant
B. hackneyed - banal
C. convoluted - labyrinthine
D. specious - untenable

53. Hawkins is _____ in his field; no other contemporary scientist commands the same respect.
A. disparaged
B. ignominious
C. preeminent
D. anachronistic

54. The model paraded in front of the celebrities with _____ ; it was impossible to tell that this was her first assignment.
A. panache
B. opprobrium
C. shame
D. trepidation

55. The term lead pencil is a _____ ; pencils are filled with graphite not lead.
A. misnomer
B. misdemeanor
C. peccadillo
D. euphemism

56. The _____ weather forced us to stay indoors.
A. enticing
B. glorious
C. restorative
D. inclement

57. It will be hard to _____ Leonid now that you have so _____ him.
A. pacify - soothed
B. mollify - incensed
C. antagonize - irritated
D. anger - ruffled

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58. The lectures on quantum physics were invariably ____ ; the lecturer ____ his ill-prepared material in a manner guaranteed to send even the most ardent student to sleep.
A. stimulating - delivered
B. pedestrian - enthused about
C. soporific - droned
D. scintillating - intoned

59. Edward was understandably upset that he had lost the position, but he was ____ by the conviction that he had done nothing to ____ the dismissal.
A. consoled - merit
B. warmed - avoid
C. comforted - mar
D. miffed - delay

60. Elinor ____ to counteract her negative feelings, but only succeeded in ____ them.
A. tried - allaying
B. hoped - mitigating
C. desired – ameliorating
D. endeavored - intensifying

Qs 61 to 70 Choose the correct sentence

61. A conjunction is used to connect <u>words and sentences together</u>.

A. words and sentences together.
B. words or sentences together.
C. words and sentences.
D. words or sentences.

62. Antony, coming alongside Cleopatra's ship, <u>climbed aboard without seeing or being seen by her.</u>
A. climbed aboard without seeing or being seen by her.
B. climbed aboard without seeing Cleopatra or being seen by her.
C. climbs aboard without Cleopatra seeing him
D. boarded without being seen by her.

63. Bombast <u>is when high sounding words for effect, not suitability, are used</u>.
A. is when high sounding words for effect, not suitability, are used.
B. is the use of high-sounding words for effect rather than for suitability
C. is where high-sounding words are used for effect not suitability.
D. is the using of high-sounding words for effect only.

64. <u>I would like to thank whoever it was that wrote that piece of music:</u> it has given me so much pleasure.
A. I would like to thank whoever it was that wrote that piece of music:
B. I would like to thank whomever it was that has written that piece of music:
C. I would like to thank whomever it might be that wrote that piece of music
D. Whoever it was that wrote that piece of music, I would like to thank because

65. <u>Your taking a loan to buy a car annoyed Father.</u>
A. Your taking a loan to buy a car annoyed Father.
B. Your taking a loan to buy a car aggravated Father.
C. You taking a loan to buy a car irritated Father.
D. You taking a loan to buy a car annoyed Father.

66. In the initial stages of learning a new language we learn more through listening <u>and attempting to copy speech patterns and not through reading grammar books.</u>
A. and attempting to copy speech patterns and not through reading grammar books.
B. and attempting to copy speech patterns than through reading grammar books.
C. and attempts to copy speech patterns than through reading grammar books.
D. and attempts at copying speech patterns than through reading grammar books.

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67. Between you <u>and I, I doubt that he will come</u>.
A. and I, I doubt that he will come.
B. and I, I doubt that he would come.
C. and me, I doubt that he will come.
D. and me, I doubt that he would come.

68. Work that is not finished is not work at <u>all, it is merely a botch, a failure</u>.
A. all, it is merely a botch, a failure.
B. all, it is a botch merely, and a failure.
C. all; it is merely a botch, a failure.
D. all; the work merely is a botch and a failure.

69. Pollution and degradation of the environment <u>is, according to the commission's report, a matter of universal concern.</u>
A. is, according to the commission's report, a matter of universal concern.
B. is, according to the report by the commission, a matter of universal concern.
C. is, according to the report of the commission, matters of universal concern.
D. are, according to the commission's report, a matter of universal concern.

70. <u>Denim jeans were originally worn not so much as a fashion statement as for their being practical work clothes.</u>
A. Denim jeans were originally worn not so much as a fashion statement as for their being practical work clothes.
B. Denim jeans were originally worn not so much as a fashion statement but for their being practical work clothes.
C. Denim jeans were originally worn not so much as a fashion statement but for being practical work clothes
D. Denim jeans were originally worn not as a fashion statement as for them being practical work clothes.

Qs 71-80 Find the word most SIMILAR in meaning to the given word.

71. Unprepossessing
A Ugly
B. Arrogant
C Personable
D. Didactic

22. Turbid
A. Shiny
B. Murky
C. Pellucid
D. Petrified

73. Potable
A. Bland
B. Unsavory
C. Drinkable
D. Fertile

74. Flagrant
A. Inauthentic
B. Unperturbed
C. Slanderous
D. Blatant

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75. Undermine
A. Impose
B. Apprehend
C. Glorify
D. Weaken

76. Tenuous
A. Dark
B. Playful
C. Weak
D. Unfathomable

77. Parochial
A. Cosmopolitan
B. Xenophobic
C. Parsimonious
D. Belligerent

78. Destitute
A. Impoverished
B. Desolate
C. Affluent
D. Meticulous

79. Tacit
A. Tenacious
B. Ostensible
C. Unspoken
D. Peaceful

80. Palliative
A. Tyrannical
B. Overt
C. Curative
D. Festive

Qs 81 to 90 Reading Comprehension

Passage 1
The pioneers of the teaching of science imagined that its introduction into education would remove the conventionality, artificiality, and backward-lookingness which were characteristic; of classical studies, but they were gravely disappointed. So, too, in their time had the humanists thought that the study of the classical authors in the original would banish at once the dull pedantry and superstition of mediaeval scholasticism. The **professional schoolmaster** was a match for both of them, and has almost managed to make the understanding of chemical reactions as dull and as dogmatic an affair as the reading of Virgil's Aeneid.

The chief claim for the use of science in education is that it teaches a child something about the actual universe in which he is living, in making him acquainted with the results of scientific discovery, and at the same time teaches him how to think logically and inductively by studying scientific method. A certain limited success has been reached in the first of these aims, but practically none at all in the second. Those privileged members of the community who have been through a secondary or public school education may be expected to know something about the elementary physics and chemistry of a hundred years ago, but the probably know hardly more than any bright boy can pick up from an interest in wireless or scientific hobbies out of school hours. As to the learning of scientific method, the whole thing is **palpably** a farce. Actually, for the convenience of teachers and the requirements of the examination system, it is necessary that the pupils not only do not learn scientific method but learn precisely the reverse, that is, to believe exactly what they are told and to reproduce it when asked, whether it seems nonsense to them or not. The way in which educated people respond to such

quackeries as spiritualism or **astrology**, not to say more dangerous ones such as racial theories or currency myths, shows that fifty years of education in the method of science in Britain or Germany has produced no visible effect whatever. The only way of learning the method of science is the long and bitter way of personal experience, and, until the educational or social systems are altered to make this possible, the best we can expect is the production of a minority of people who are able to acquire some of the techniques of science and a still smaller minority who are able to use and develop them.

81. The author implies that the 'professional schoolmaster' has
A. no interest in teaching science
B. thwarted attempts to enliven education
C. aided true learning
D. supported the humanists

82. The author's attitude to secondary and public school education in the sciences is
A. ambivalent
B. neutral
C. supportive
D. contemptuous

83. The word 'palpably' most nearly means
A. empirically
B. obviously
C. tentatively
D. markedly

84. The author blames all of the following for the failure to impart scientific method through the education system except
A. poor teaching
B. examination methods
C. lack of direct experience
D. lack of interest on the part of students

85. If the author were to study current education in science to see how things have changed since he wrote the piece, he would probably be most interested in the answer to which of the following questions?
A. Do students know more about the world about them?
B. Do students spend more time in laboratories?
C. Can students apply their knowledge logically?
D. Have textbooks improved?

86. Astrology is mentioned as an example of
A. a science that needs to be better understood
B. a belief which no educated people hold
C. something unsupportable to those who have absorbed the methods of science
D. the gravest danger to society

87. All of the following can be inferred from the text except
A. at the time of writing, not all children received a secondary school education
B. the author finds chemical reactions interesting
C. science teaching has imparted some knowledge of facts to some children
D. it is relatively easy to learn scientific method.

Passage 2
Erosion is regarded not merely as the physical removal of soil by water and wind, but rather as the deterioration of all the component parts of the habitat in which man and his crops and livestock have to exist. Since there is no conclusive evidence for any major climatic change in historic times to explain this deterioration, we must conclude that the eroding of the total environment has been due primarily to thoughtless destruction of the

vegetative cover. This has led to deterioration of the microclimate above and below the surface, generally in the direction of a general drying out of the soil which has exposed it to erosive action of wind and rainfall of high intensity or frequency, and to the loss of organic matter in the soil, thus reducing its capacity to resist erosion by conserving the water that falls on the surface. If everything possible is done within the total environment to conserve the naturally planted or cultivated vegetation, this will also ensure optimal conservation of soil and water.

88. It is argued in the passage that the impoverishment of the world's habitat ....
A. is first and foremost due to man's irresponsible abuse of the vegetable cover of the earth
B. is largely due to gradual changes in climate over long years
C. became inevitable as soon as agricultural and animal husbandry developed
D. cannot be remedied

89. The definition of erosion given in this passage ....

A. is a strictly regional one
B. disregards man's role in it
C. concentrates on flooding
D. is a broad one

90. It is pointed out in the passage that the loss of organic matter in the soil ....

A. led to the destruction of the world's vegetative cover
B. is a direct result of insufficient rain
C. is an irreversible process
D. has made the soil more susceptible to erosion

This is the END of part 2. Please wait for part 3 (writing two essays).

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<u>Essay Writing</u>

Each part 20 minutes

I. Present your perspective on the topic below in <u>three paragraphs</u>, using relevant reasons and/or examples to support your views based on your own readings, observations and experience. (400 words)

Is it true that acting quickly and instinctively is the best response to crisis? Or are there times when an urgent situation requires a more careful consideration and a slower response? Plan your response and then write an essay (400 words)

II. Discuss how well reasoned you find this argument. In your discussion be sure to analyze the line of reasoning and the use of evidence in the argument. (250 words)

It is known that in recent years, industrial pollution has caused the Earth's ozone layer to thin, allowing an increase in the amount of ultraviolet radiation that reaches the Earth's surface. At the same time, scientists have discovered, the population of a species of salamander that lays its eggs in mountain lakes has declined. Since ultraviolet radiation is known to be damaging to delicate tissues and since salamander eggs have no protective shells, it must be the case that the increase in ultraviolet radiation has damaged many salamander eggs and prevented them from hatching. This process will no doubt cause population declines in other species, just as it has in the salamander species

<u>Stop. Please, do not turn over this page until you are told to do so</u>.