



Tribhuvan University

Institute of Science and Technology

School of Mathematical Sciences

BALKHU, KATHMANDU, NEPAL

## **Model Question for Entrance Examination**

*(For New Admission of Master in Data Science (MDS)*

*Program -2078)*

## 1. Eligibility for MDS Admission- 2078

The following is the minimum requirements to be eligible to apply for the MDS program:

- a) A minimum of 15 years' formal education (12 years of schooling plus three years of graduation).
- b) Must have secured a minimum CGPA of 2.0 or second division or 45% in Bachelor's level with B Sc CSIT or equivalent, B Math Sc or equivalent, B Sc (Mathematics) or equivalent, B Sc (Statistics) or equivalent, B Sc/BA with Mathematics in the first 2 year, B Sc/BA with Statistics in the first 2 year, BE or equivalent, BIT or equivalent, BCA or equivalent, BIM (with one Mathematics and one Statistics) or equivalent, are eligible to appear in the entrance exam.

## 2. Entrance Exam – Selection Criteria

The selection of students will be based on the following three criteria:

- A. Written Test - 70 %
- B. Academic Qualifications - 15 %
- C. Individual Presentation and Interview- 15 %

### A. Written Test

The written test will cover 70% marks of the entrance examination. It has 100 multiple choice questions based on the *Bachelor Level Curriculum* to be completed within 2 hours. The test paper will have FIVE sections as follows:

Test Sections	Number of Questions	Total Marks
Section I: Mathematics	25 Questions	$25 \times 1 = 25$ Marks
Section II: Statistics	25 Questions	$25 \times 1 = 25$ Marks
Section III: Computer Science and Information Technology	25 Questions	$25 \times 1 = 25$ Marks
Section IV: English	10 Questions	$10 \times 1 = 10$ Marks
Section V: Logical Reasoning	15 Questions	$15 \times 1 = 15$ Marks
Total	100 Questions	100 Marks

The total marks obtained by the candidates in written test out of 100 marks will be converted into 70 marks in the result of written test.

## B. Academic Qualifications

The total 15 marks for the academic qualifications are distributed as follows:

### a) For 10+2 or Equivalent:

Marks with 80 % and above) or grade A <sup>+</sup>	Marks with (65 – 80) % or grade A, A <sup>-</sup> and B <sup>+</sup>	Marks with (50 –65) % or grade B and B <sup>-</sup>	Below 50 % or grade C
5	3.5	2.5	2

### b) For Bachelor Degree or Equivalent:

Marks with 80 % and above) or grade A <sup>+</sup> and A	Marks with (65 –80) % or grade A <sup>-</sup> and B <sup>+</sup>	Marks with (50 –65) % or grade B and B <sup>-</sup>	Below 50 % or grade C
10	7	5	3

## C. Individual Presentation and Interview

On the basis of the performance in written test, candidates will be short listed for presentation and interview. To qualify the students for the interview, the candidate must secure the cut-off marks ( 35 %).

### 1. Individual presentation : 5 Marks

Applicants should present their views and opinions on a given topic to the panel of judges for around 7 minutes.

### 2. Personal interview: 10 Marks

Personal interview measures applicants motivation, attitude and capability level to handle the pressure of the MDS program. The interview is conducted for around 10 minutes by a panel of experts by considering with the following points:

- i) Body language and Politeness – 1 mark
- ii) Dressing sense and Honesty – 1 marks
- iii) Basic knowledge on Current affairs – 2 marks
- iv) Knowledge about the Data Sciences and its tools – 3 marks
- v) Candidate's Vision/ Future Plan – 2 marks
- vi) Situational responses – 1 marks



# Model Question for Entrance Examination (For New Admission of MDS Program -2078)

Full Marks: 70

Time: 2:00 Hrs

Note: *The total marks obtained by the candidates in written test out of 100 marks will be converted into 70 marks in the result of written test.*

## General Instructions

Please read the following instructions carefully before you start answering the questions.

1. Write your **symbol No.** on your answer sheet only.
2. Do not write anything else on your question sheet.
3. Use the blank paper given with the answer sheet for rough work.
4. Mark your correct answers by **darkening option** on your answer sheet by using black ink.
5. There is no negative marking for wrong answer.
6. All sheets (**Question paper, answer sheet and rough papers**) must be submitted.

## How to Answer the Questions?

1. If a random variable  $X$  takes values 0, 1, 2, 3, 4 with respective probabilities 0.6, 0.1, 0.1, 0.1, 0.1, then the mean of  $X$  is  
(a) 0.1                      (b) 1.0                      (c) 0.5                      (d) 2

Indicate your correct answer on the Answer Sheet

(a)

(b)

(c)

(d)

## Solution

You should indicate your answer by darkening the correct answer choice (b) as shown below:

(a)



(c)

(d)

## Section-I: Mathematics (25 Marks)

Find the correct answer for the questions given below.

1. Divergence of gradient of a vector function is equivalent to  
(a) Laplacian operation                      (b) Curl operation  
(c) Double gradient operation              (d) Null vector
2. If  $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx = m\pi$ , then the value of  $m$  is  
(a) 0                                      (b)  $\frac{1}{2}$                                       (c) 1                                      (d) 2
3. Let  $a_n = \sum_{k=0}^n \frac{n}{n^2+k}$ , for  $n \in \mathbb{N}$ . Then the sequence  $\{a_n\}$  is  
(a) Convergent                                      (b) Bounded but not convergent  
(c) Diverges to  $\infty$                                       (d) Neither bounded nor diverges to  $\infty$

4. The integrating factor of the differential equation  $(x \ln x) \frac{dy}{dx} + y = 2 \ln x$  is  
 (a)  $\ln(\log x)$  (b)  $e^x$  (c)  $\ln x$  (d)  $x$
5. The slope of the normal at origin for the curve  $y = \cos x + 2e^x$  is  
 (a)  $-2$  (b)  $0$  (c) Infinity (d)  $3$
6. Complementary function of the differential equation  $(D^2 + 4)y = \tan x$  is  
 (a)  $A \cos 2x + B \sin 2x$  (b)  $A \cos 2x - B \sin 2x$   
 (c)  $A \cosh 2x + B \sinh 2x$  (d)  $A \cosh 2x - B \sinh 2x$
7. Bounded monotonic sequence will be increasing if it converges to its  
 (a) Infimum (b) Least bound (c) Supremum (d) Upper Bound
8. An infinite series  $\sum \frac{1}{n^p}$  is convergent if  
 (a)  $p \geq 1$  (b)  $p \leq 1$  (c)  $p > 1$  (d)  $p < 1$
9. The Value of Laplace Transform  $L(\cosh 10t)$  is  
 (a)  $\frac{s}{s^2-100}$  (b)  $\frac{s}{s^2+100}$  (c)  $\frac{1}{s^2-100}$  (d)  $\frac{1}{s^2+100}$
10. Given a non-empty subset  $S$  of the set of real numbers on the interval  $[0, 5]$ . Then, any numbers greater than 5 is an upper bounded of  $S$  since it is greater than all of the numbers contained in  $S$ . Therefore, we can say that 5.01, 5.1, 6 and 7 are all upper bounds of  $S$ . Among all these upper bounds, the one with the smallest value is known as the ..... of  $S$ .  
 (a) Supremum (b) Minimum (c) Infimum (d) Maximum
11. Which of the following statements is true?  
 (a) A number is rational if and only if its square is rational.  
 (b) An integer  $n$  is odd if and only if  $n^2 + 2n$  is odd.  
 (c) A number is irrational if and only if its square is irrational.  
 (d) A number  $n$  is odd if and only if  $n(n+1)$  is even.
12. Let  $A = \{x^2: 0 < x < 1\}$  and  $B = \{x^3: 1 < x < 2\}$ . Which of the following statement is true?  
 (a) There is one to one, onto function from  $A$  to  $B$ .  
 (b) There is no one to one and onto function from  $A$  to  $B$  taking rationals to rationals.  
 (c) There is no one to one from  $A$  to  $B$  which is onto.  
 (d) There is no onto function from  $A$  to  $B$  which is one to one.
13. The value of  $x$  from the equation  $\log_6(x+2) - \log_6 x = 2$  is  
 (a)  $\frac{2}{35}$  (b)  $\frac{35}{2}$  (c)  $-6$  (d)  $\frac{1}{18}$

14. Which of the following pairs of vectors is an orthogonal pair in  $\mathbb{R}^2$  with respect to the inner product defined by  $\langle u, v \rangle = 2x_1y_1 + x_2y_2$  where  $u = \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} \in \mathbb{R}^2$  and  $v = \begin{pmatrix} y_1 \\ y_2 \end{pmatrix} \in \mathbb{R}^2$
- (a)  $u = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, v = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$  (b)  $u = \begin{pmatrix} 1 \\ -1 \end{pmatrix}, v = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$   
(c)  $u = \begin{pmatrix} 1 \\ -1 \end{pmatrix}, v = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$  (d)  $u = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, v = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$
15. The rank of the matrix  $M = \begin{bmatrix} 5 & 10 & 10 \\ 1 & 0 & 2 \\ 3 & 6 & 6 \end{bmatrix}$  is
- (a) 0 (b) 1 (c) 2 (d) 3
16. The Eigen values of the matrix  $\begin{bmatrix} 4 & 1 \\ 1 & 4 \end{bmatrix}$  are
- (a) 3, -3 (b) 3, -5 (c) 3, 5 (d) 5, 0
17. Let  $f$  be the function defined by  $f(x) = \begin{cases} x^3 & \text{for } x \leq 0 \\ x & \text{for } x > 0 \end{cases}$ . Which of the following statement about  $f$  is true?
- (a)  $f$  is an odd function (b)  $f$  is discontinues at  $x = 0$   
(c)  $f$  has a relative maximum (d)  $f'(x) > 0$  for  $x \neq 0$ .
18. Let  $f$  be the function given by  $f(x) = |x|$ . Which of the following statements about  $f$  are true?
- I.  $f$  is continuous at  $x = 0$   
II.  $f$  is differentiable at  $x = 0$   
III.  $f$  has an absolute minimum at  $x = 0$
- (a) I only (b) II only (c) III only (d) I and III only
19. The number of bijective functions from set  $A$  to itself when  $A$  contains 10 elements is
- (a) 10 (b)  $(10)^2$  (c)  $(10)!$  (d)  $2^{10}$
20. The average value of the function  $f(x) = (x-1)^2$  on the interval from  $x = 1$  to  $x = 5$  is
- (a)  $-\frac{16}{3}$  (b)  $\frac{16}{3}$  (c)  $\frac{64}{3}$  (d)  $\frac{66}{3}$
21. The sum of the infinite series  $\sum_{n=10}^{\infty} \frac{3^{n+1}}{4^n}$  is
- (a)  $12\left(\frac{3}{4}\right)^{10}$  (b)  $4\left(\frac{3}{4}\right)^{10}$  (c)  $12\left(\frac{3}{4}\right)^{11}$  (d)  $4\left(\frac{3}{4}\right)^{11}$

22. If  $f(x, y, z) = x^2 + xyz + z$ , then the partial derivative of  $f$  w.r.t.  $x$  at point  $(1, 1, 1)$  is  
 (a) 0 (b) 1 (c) 3 (d) -1
23. The curve  $y = x^{1/5}$  at  $(0, 0)$  has  
 (a) A vertical tangent (parallel to  $y$ -axis) (b) A horizontal tangent (parallel to  $x$ -axis)  
 (c) An oblique tangent (d) No tangent
24. The locus of the equation  $xy + yz = 0$  is  
 (a) A pair of perpendicular planes (b) A pair of straight lines  
 (c) A pair of parallel planes (d) None of these
25. The projection of the vector  $2\hat{i} + 3\hat{j} - 6\hat{k}$  on the line joining the points  $(3, 4, 2)$  and  $(5, 6, 3)$  is  
 (a)  $\frac{2}{3}$  (b)  $\frac{4}{3}$  (c)  $-\frac{4}{3}$  (d)  $\frac{5}{3}$

## Section-II: Statistics (25 Marks)

26. The sum of deviations of data values is always zero when deviations are measured from the  
 (a) Arithmetic mean (b) Geometric mean (c) Median (d) Mode
27. In a binomial distribution, the probability of success ( $\pi$ ) and probability of failure ( $1 - \pi$ ) is same, then the  $\Pr(X = x)$  is given by  
 (a)  $n_{C_x} (\pi)^{n-x}$  (b)  $n_{C_n} (0.5)^n$  (c)  $n_{C_n} (\pi)^{n-x}$  (d)  $n_{C_x} (0.5)^n$
28. If the two observations are 20 and  $-20$ , then their harmonic mean is  
 (a) 10 (b)  $\infty$  (c) 5 (d) 0
29. In the usual notation if  $E(X) = 2$  and  $E(X^2) = 20$  then the standard deviation of  $X$  is  
 (a) 2 (b) 3 (c) 4 (d) 16
30. The coefficient of variation is computed by using the ..... formula  
 (a)  $\frac{\text{s.d.}}{\text{mean}} \times 100$  (b)  $\frac{\text{mean.}}{\text{s.d.}} \times 100$  (c)  $\frac{\text{mean} \times \text{s.d.}}{100}$  (d)  $\frac{100}{\text{mean} \times \text{s.d.}}$
31. The mean and variance of the exponential distribution with probability density function  $f(x) = \lambda e^{-\lambda x}$  for  $x \geq 0$ , respectively is  
 (a)  $\lambda$  and  $1/\lambda^2$  (b)  $1/\lambda$  and  $1/\lambda^3$  (c)  $1/\lambda^2$  and  $\lambda$  (d)  $1/\lambda$  and  $1/\lambda^2$
32. The sum of square of the deviations is always least when deviations are measured from the  
 (a) Arithmetic mean (b) Geometric mean (c) Median (d) Mode
33. In a distribution, the difference of two quartiles is 20 and their sum is 70 and the median is 36. The coefficient of skewness is  
 (a)  $-0.2$  (b)  $0.1$  (c)  $-0.1$  (d)  $0.2$

34. Which of the following is true for Binomial distribution  
 (a) Mean and variance are same (b) Mean is greater than variance  
 (c) Mean is less than variance (d) None of the above
35. How many all possible samples will be made for selecting 2 samples at a time out of 4 population size with replacement?  
 (a) 6 (b) 4 (c) 16 (d) 16
36. The statistical test generally used to test whether there is significant association between two independent categorical variables will be  
 (a) Independent  $t$ -test (b)  $F$ - test (c) Chi-squares test (d) None of the above
37. The probability of sure event is  
 (a) 0 (b) 1 (c) 0.2 (d) 0.5
38. If the decrease in  $X$  is accompanied by the decrease in  $Y$ , then the correlation coefficient between  $X$  and  $Y$  is always  
 (a) Positive (b) Negative (c) Zero (d) Unity
39. If a random variable  $X$  follows normal distribution with mean  $\mu$  and variance  $\sigma^2$ , then  $P(X \geq 2)$  will be computed through the following  $Z$  transformation  
 (a)  $Z = \frac{2 - \mu}{\sigma / \sqrt{n}}$  (b)  $Z = \frac{2 - \mu}{\sigma^2}$  (c)  $Z = \frac{2 - \mu}{\sigma^2 / \sqrt{n}}$  (d)  $Z = \frac{2 - \mu}{\sigma}$
40. Testing  $H_0: \mu = 100$  vs  $H_1: \mu \neq 100$  leads:  
 (a) One sided upper tailed test (b) One sided lower tailed test  
 (c) Two tailed test (d) One tailed test
41. Fisher's index number is the ..... of Laspeyre's index number and Paasche's index number.  
 (a) Arithmetic mean (b) Geometric mean  
 (c) Harmonic mean (d) None of the above
42. The appropriate statistical test for testing the significance of means across more than two independent groups in the population is  
 (a)  $F$ -test (b)  $t$ -test  
 (c)  $Z$ -test (d) Chi-square test
43. If  $X$  is a random variable with mean  $\mu$ , the  $E(X - \mu)^r$  represents the  
 (a) Variance of that variable (b)  $r^{th}$  raw moment of that variable  
 (c)  $r^{th}$  central moment of that variable (d) None of the above
44. If a random variable  $X$  follows hypergeometric distribution with its probability mass

$$\text{function } P(X = k) = \frac{\binom{K}{k} \binom{N-K}{n-k}}{\binom{N}{n}}, \text{ where the notations have the usual meanings, the mean}$$

of this distribution is

- (a)  $nKN$  (b)  $\frac{nk}{N^2}$  (c)  $\frac{nN}{K}$  (d)  $\frac{nK}{N}$



45. One can consider the best fitted trend line for which the sum of squares of errors is  
 (a) Maximum (b) Minimum (c) Negative (d) Zero
46. In time series analysis, the mostly used mathematical method for measuring the trend is:  
 (a) Semi average method (b) Moving average method  
 (c) Least squares method (d) Free hand curve method
47. The coefficient of determination  $R^2$  measures  
 (a) The proportion of variation of dependent variable explained by the independent variable  
 (b) The proportion of variation of independent variable explained by the dependent variable  
 (c) The proportion of unexplained variation in the model  
 (d) None of the above
48. The probability density function of normal random variate  $X$  with mean 6 and variance 1 is  
 (a)  $\frac{1}{6\sqrt{2\pi}} \exp\left\{-\frac{1}{2}\left(\frac{x-1}{6}\right)^2\right\}$  (b)  $\frac{1}{\sqrt{2\pi}} \exp\left\{-\frac{1}{2} \times 2\right\}$   
 (c)  $\frac{1}{\sqrt{2\pi}} \exp\left\{-\frac{1}{2}\left(\frac{x-1}{6}\right)^2\right\}$  (d)  $\frac{1}{\sqrt{2\pi}} \exp\left\{-\frac{1}{2}(x-6)^2\right\}$
49. Binomial distribution tends to Poisson distribution when  
 (a)  $n \rightarrow \infty, p \rightarrow 0$  and  $np = \lambda(\text{finite})$  (b)  $n \rightarrow \infty, p \rightarrow 1$  and  $np = \mu$   
 (c)  $n \rightarrow 0, p \rightarrow 0$  and  $np = 1$  (d)  $n \rightarrow 15, p \rightarrow 1/2$  and  $np = 0$
50. In testing of hypothesis, the type I error indicates  
 (a) Accept  $H_0$  when  $H_0$  is false (b) Reject  $H_0$  when  $H_0$  is true  
 (c) Reject  $H_1$  when  $H_1$  is true (d) None of the above

### Section-III:

### Computer Science and Information Technology (25 Marks)

51. Which of the following is not an operating system?  
 (a) Windows (b) Oracle (c) Dos (d) Linux
52. Which one of the following is primary memory of computer?  
 (a) RAM (b) ROM (c) DVD (d) Both (a) and (b)
53. Which one of the following software is most commonly used for statistical data analysis?  
 (a) SPSS (b) Word processor (c) Photoshop (d) Power Point
54. Which of the following is exit controlled loop?  
 (a) For (b) While (c) Do-while (d) Both (a) and (b)
55. The result of  $(10100001)_2 - (1100111)_2$  is  
 (a) 111010 (b) 100010 (c) 110000 (d) 101000

- 56.** Which of the following phase during software development is used to translate non-technical requirements to technical requirements?  
(a) Planning (b) Analysis (c) Feasibility study (d) Design
- 57.** The phenomenon of having a continuous glow of a beam on the screen even after it is removed is called as  
(a) Fluorescence (b) Persistence (c) Phosphorescence (d) Incandescence
- 58.** Which of the following subnet-mask is used if we divide a class C address into 8 subnets?  
(a) 255.255.255.0 (b) 255.255.255.192 (c) 255.255.255.224 (d) 255.255.255.240
- 59.** Which of the following system development approach is appropriate if in which user requirements are certain and precise?  
(a) Waterfall (b) Prototyping (c) Spiral (d) Agile
- 60.** Which of the following layer considers the functions that allows the data to move along different networks?  
(a) Network access layer (b) Internet layer (c) Transport layer (d) Physical layer
- 61.** Which of the following normal form is based on the concept multi-valued dependency?  
(a) 2NF (b) 3NF (c) 4NF (d) 5NF
- 62.** After successful completion, a transaction is in \_\_\_\_\_ state.  
(a) Active (b) Committed (c) Partially committed (d) Failed
- 63.** Which data structure is mainly used for implementing the recursive algorithm?  
(a) Queue (b) Binary tree (c) Linked list (d) Stack
- 64.** How many times will the following loop execute for (j = 0; j <= 10; j--)?  
(a) Forever (b) Never (c) 0 (d) 1
- 65.** Which of the following switching technique requires a dedicated path between sender and receiver?  
(a) Message switching (b) Packet switching  
(c) Circuit switching (d) None of the above
- 66.** Which of the following is an example of polymorphism?  
(a) Method overloading (b) Method overriding  
(c) Method definition (d) Both (a) and (b)
- 67.** Which of the following is the best way to measure algorithm's time complexity?  
(a) Counting algorithm steps (b) Measuring time in seconds  
(c) Counting significant operations (d) All of the above

68. Which of the following information is required to normalize a relation in BCNF?
- (a) Functional dependency
  - (b) Multivalued dependency
  - (c) Join dependency
  - (d) All of the above
69. Which of the following language is recognized by finite state automata?
- (a) Context free language
  - (b) Regular language
  - (c) Context sensitive language
  - (d) None of the above
70. Round-robin scheduling is the preemptive version of
- (a) Shortest-job first
  - (b) Shortest-remaining first
  - (c) FIFO
  - (d) Longest time first
71. Which of the following is executed by preprocessor?
- (a) `Void main (int argc, char **argv)`
  - (b) `#include <stdio.h>`
  - (c) `Return (0)`
  - (d) None of the above
72. DNS stands for
- (a) Domain name system
  - (b) Document name system
  - (c) Discrete name system
  - (d) Disk name system
73. Which one of the following diagram is used for process modelling in structured software development approach?
- (a) Use-case diagram
  - (b) Entity relationship diagram
  - (c) Data flow diagram
  - (d) Class diagram
74. Which of the following statement is true?
- (a) A relation can have only one primary key
  - (b) A relation can have only one foreign key
  - (c) A relation can have only one super key
  - (d) A relation can have only one candidate key
75. Which one of the following is the execution order of commands in SQL query?
- (a) SELECT, FROM, WHERE
  - (b) SELECT, WHERE, FROM
  - (c) FROM, SELECT, WHERE
  - (d) FROM, WHERE, SELECT

## Section-IV: English (10 Marks)

76. 'We have got too many applicants for the post. But, we are trying to separate the wheat from the chaff. In the second sentence **'separate the wheat from the chaff'** has .....meaning.
- (a) Literal
  - (b) Figurative
  - (c) Contextual
  - (d) Poetic

77. "When I was in Kathmandu, I had to work very hard." The part of speech of the underlined word is '.....'
- (a) Noun                      (b) Adjective                      (c) Adverb                      (d) Preposition
78. He enquired.....
- (a) That where I studied                      (b) Where I studied
- (c) Where I will study                      (d) That where I will study
79. A policeman shot him dead in the early morning. This means '.....'
- (a) He is shot dead by a policeman in the early morning
- (b) In the early morning was shot dead him
- (c) He in the early morning was shot dead
- (d) He was shot dead in the early morning
80. Neither the manager nor the assistants.....
- (a) knows how the office building caught fire
- (b) have known how the office building caught fire
- (c) know how the office building caught fire
- (d) were knowing how the office building caught fire

**Read the passage below and answer Q.No.81 to 85.**

The achievement of science in the twentieth century has been very great. Its influence can be felt in every sphere of life. From the small pins and needles to the huge iron sheets and joints, most of the things we require for our everyday use, come out of factories where scientific principles are utilized for practical ends. Science has enabled man to bring forces of nature under control and use them for his own advantage. It has brought the distant parts of the world closer together. Our knowledge of the universe has been much widened on account of the untiring efforts of the astronomers like Jeans and Eddington. Remarkable cures of human diseases have been possible owing to the discovery of some wonderful medicines.

81. The main idea of the passage is
- (a) The impact of science can be felt in every sphere of life.
- (b) Science is an anathema.
- (c) Nothing is beyond the purview of science.
- (d) Science can work miracles.
82. The mode of approach in the passage is
- (a) Anatomical                      (b) Descriptive                      (c) Logical                      (d) Narrative

83. What has enabled man to harness the forces of nature to the advantage of mankind?  
 (a) Arts (b) Oratory (c) Bravery (d) Science
84. Science has proved a great boon for  
 (a) Scientist (b) Mankind (c) Artists (d) Explorers
85. The most appropriate title for the passage will be  
 (a) Science is a curse (b) Achievements of Science  
 (c) Science, a great boon (d) None of these

## Section-V: Logical Reasoning (15 Marks)

86. Look carefully for the pattern, and then choose which *pair* of numbers comes next: 8 11 21 15 18 21 22.  
 (a) 25 18 (b) 25 29 (c) 25 21 (d) 24 21
87. Look at this series: 8, 43, 11, 41, \_\_, 39, 17, . . . What number should fill in the blank?  
 (a) 8 (b) 14 (c) 43 (d) 44
88. Fill the blank: QAR RAS SAT TAU \_\_\_\_  
 (a) UAV (b) UAT (c) TAS (d) TAT
89. Read the following information carefully and answer the questions below.  
**I.**  $J + K$  means  $J$  is the son of  $K$                       **II.**  $J - K$  means  $J$  is the wife of  $K$   
**III.**  $J \times K$  means  $J$  is the brother of  $K$                       **IV.**  $J \div K$  means  $J$  is the mother of  $K$   
**V.**  $J = K$  means  $J$  is the sister of  $K$   
 What does  $a + b - c$  mean?  
 (a)  $C$  is the uncle of  $A$  (b)  $C$  is the son of  $A$   
 (c)  $C$  is the brother of  $A$  (d)  $C$  is the father of  $A$
90. **Statement:** No new tax has been proposed in the budget of 2021–22. It is still a surplus budget.  
**Conclusion I:** The budget of 2021–22 may be considered a good budget.  
**Conclusion II:** 2021–22 budget is a surplus budget because no new tax has been proposed.  
 Which one is true?  
 (a) Only conclusion II follows. (b) Only conclusion I follows  
 (c) Both I and II follow (d) Neither I nor II follow.
91. **Statement:** Apart from the educational value of newspapers their recreational values should also be kept into account.

**Con. I:** People take newspapers to be a means of imparting education.

**Con. II:** The entertainment value of newspapers is also of paramount importance.

Which one is true?

- (a) Only conclusion I follows                      (b) Only conclusion II follows.  
(c) Both I and II follow                      (d) Neither I nor II follows

92. Fill in the blank



- (a) (b) (c) (d)

93. **Fact 1:** All chickens are birds.

**Fact 2:** Some chickens are hens.

**Fact 3:** Female birds lay eggs.

If the above statements are true, which of the following statements must also be true?

- I. All birds lay eggs.      II. Hens are birds.      III. Some chickens are not hens.  
(a) II only      (b) II and III only      (c) I, II, and III      (d) None of the statements is true.

94. What is the conclusion indicator term in this passage, if there is a conclusion? If it rains, then it's a bad time for a picnic. So, we shouldn't go there for a picnic since Svetlana knows it's raining there now. At least that's what she heard.

- (a) Then                      (b) At least                      (c) So                      (d) No conclusion

95. Which sentence below probably is *not* being used to make a claim (that is, a statement)?

- (a) I wonder if we should turn back.  
(b) Financial ruin from medical bills is almost exclusively an American disease.  
(c) I learned a long time ago that *minor* surgery is when they do the operation on someone else, not you.  
(d) My bumper sticker asks, —Do you believe in love at first sight, or should I drive by again?

96. If a headline were to say "New Pill Controls Birth Twice a Month," it would be unintentionally funny. Which one rewriting of it says only what was most probably intended?

- (a) New Pill Works Twice a Month to Control Pregnancy  
(b) New Birth Control Pill can be Taken Twice a Month  
(c) Taking New Pill Controls Pregnancy Two Times a Month  
(d) Taking New Pill Twice a Month Promotes Birth

**97.** Which of the following is not a useful principle for making scientific progress?

- (a) Similar effects are likely to have similar causes.
- (b) Look for confirming instances of the hypothesis, never disconfirming instances.
- (c) To find the cause, look for the key, relevant difference between situations where the effect occurs and situations where it does not.
- (d) Divide the problem into manageable components.

**98. Fact 1:** Most stuffed toys are stuffed with beans.

**Fact 2:** There are stuffed bears and stuffed tigers.

**Fact 3:** Some chairs are stuffed with beans.

If the first three statements are facts, which of the following statements must also be a fact?

**I.** Only children's chairs are stuffed with beans.

**II.** All stuffed tigers are stuffed with beans.

**III.** Stuffed monkeys are not stuffed with beans.

- (a) I only      (b) II only      (c) II and III only      (d) None of the statements is true.

**99.** Four people witnessed a mugging. Each gave a different description of the mugger.

Which description is probably right?

- (a) He was average height, thin, and middle-aged.
- (b) He was tall, thin, and middle-aged.
- (c) He was tall, thin, and young.
- (d) He was tall, of average weight, and middle-aged.

**100.** Here are some words translated from an artificial language.

*plekapaki* means fruitcake

*pakishillen* means cakewalk

*treftalan* means buttercup

Which word could mean "cupcake"?

- (a) alanpaki      (b) shillenalan      (c) treftpleka      (d) pakitreft



# Sample Answer Sheet

Symbol No. :.....

Symbol No. (In Words): .....

1.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	26.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	51.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	76.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
2.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	27.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	52.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	77.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
3.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	28.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	53.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	78.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
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14.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	39.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	64.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d	89.	<input type="radio"/> a	<input type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
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Marks Obtained: .....

Marks Obtained (In Words): .....