



PART – A

1. Arrange the given words in alphabetical order and choose the one that comes second.
A) Explosion B) Emergency C) Ecstasy D) Eager

Direction : A foreign expression and four English phrases are given. Identify the meaning of the foreign expression from the choices.

2. esprit de corps
A) Eternal truth B) Pertaining to the senses
C) Similar feeling shared by the group D) Linguistic group

Direction : Identify the meaning of underlined word as used in the sentence, from among four alternatives.

3. In Maharashtra the turmoil in the education system has percolated right down to the preprimary level.
A) State of confusion B) State of uproar
C) State of negligence D) State of change

Direction : An idiom and four possible meaning are given, identify the meaning of the idiom from among the answer choices.

4. A bird's- eye view
A) without care B) within the walls
C) an overall view D) out of place

Direction : Fill in the blanks in the given sentence to make it logically and grammatically correct

5. _____ about nine month ago, john was in excellent health.
A) Until B) In C) At D) As

Direction : A sentence is written in four different forms. Only one of them is grammatically correct. Choose the correct sentence as your answer.

6. A) Everyone of the students have produced his identity card.
B) Everyone of the students has produced his identity card.
C) Everyone of the student has produced his identity card.
D) Everyone of the students have produced their identity card.



Direction : Four alternative substitutes are given for the underline portion. Identify the choice that replace the underline part to form a logical and grammatically correct statement.

7. My friend asked me when had I completed my work.

- A) when I will have complete my work B) when had I completed my work
C) when I had completed my work D) I would have my work completed

Direction : A word and four jumbled choices are given. One of the choices, when properly arranged, give the meaning of the word. Identify the correct choice.

8. DAMAGE

- A) CLOCLET B) UNIJRY C) TEOTLRAE D) AEDMND

Direction : From the choices, select the most suitable synonym for the main word.

9. DETER

- A) distract B) suppress C) discourage D) contaminate

Direction : From the choices, select the most suitable antonym for the main word.

10. EXPEDIENT

- A) necessary B) harmful C) relevant D) imprudent

Direction : There is a certain relation between two given words on one side of :: and one word is given on another side of :: while another word is to be found from the given alternatives , having the same relation with this word as the given pair has. Select the best alternative.

11. Clock : Time :: Thermometer : ?

- A) Heat B) Radiation C) Energy D) Temperature

Direction : There is a certain relation between two given numbers on one side of :: and one number is given on another side of :: while another number is to be found from the given alternatives , having the same relation with this number as the given pair has. Select the best alternative.

12. 1 : 1 :: 25 : ?

- A) 26 B) 125 C) 240 D) 625

Direction : In the given question, four words have been given, out of which three are alike in some manner and the fourth one is different. Choose out the odd one.

13. A) Chair B) Bench C) Table D) Stool



Direction : In the given question, four numbers are given. Out of these, three are alike in a certain way but the rest one is different. Choose the one which is different from the rest three.

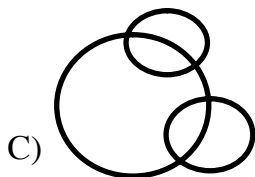
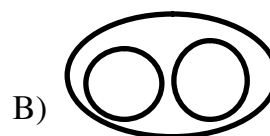
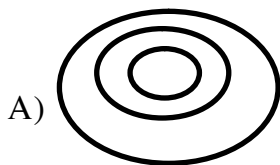
14. A) 10 B) 26 C) 24 D) 21

Direction : In the given question, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern.

15. 2, 3, 5, 7, 11, (...), 17
 A) 12 B) 13 C) 14 D) 15

16. If in a certain language, MONKEY is coded as XDJMNL, how is TIGER coded in that code ?
 A) QDFHS B) SDFHS C) SHFDQ D) UJHFS

17. Which of the following diagrams correctly represents Carrot, Food, Vegetable ?



18. If \times means \div , $-$ means \times , \div means $+$ and $+$ means $-$, then

$(3 - 15 \div 19) \times 8 + 6 = ?$

- A) 8 B) 4 C) 2 D) -1

19. If Mary was 32 years old 8 years ago, how old was she, x years ago ?

- A) $x-40$ B) $x-24$ C) $40-x$ D) $24-x$

20. If one third of one fourth of a number is 15, then three tenth of that number is:

- A) 35 B) 36 C) 45 D) 54



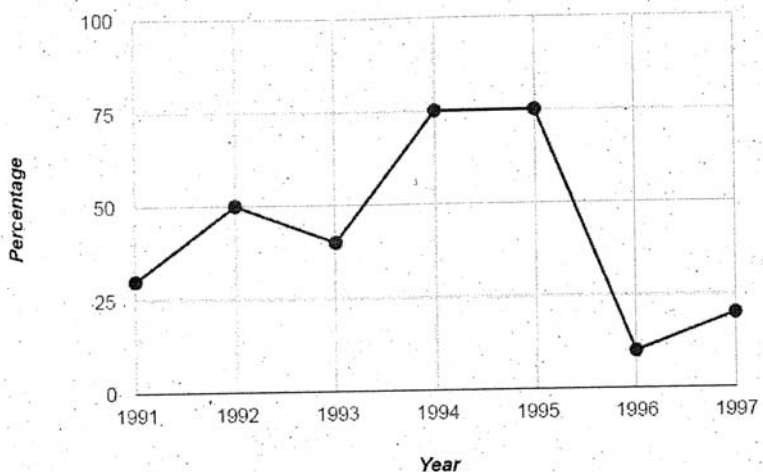
21. Choose the odd one
- A) Throw down the gauntlet: UN peace keeping
 - B) In the altogether: Bath tub
 - C) The halcyon days: Childhood
 - D) The real McCoy: Darjeeling Tea
22. If $A : B = 2 : 3$, $B : C = 4 : 5$ and $C : D = 6 : 7$, then $A : B : C : D$ is equal to
- A) 16 : 22 : 30 : 35
 - B) 16 : 24 : 15 : 35
 - C) 16 : 24 : 30 : 35
 - D) 18 : 24 : 30 : 35
23. A speed of 14 meters per second is the same as
- A) 28 km/hr
 - B) 46.6 km/hr
 - C) 50.4 km/hr
 - D) 70 km/hr
24. The Kane Wildlife Sanctuary is located in the State of
- A) Madhya Pradesh
 - B) Arunachal Pradesh
 - C) Uttrakhand
 - D) Bihar
25. Four States in India will jointly conduct elephant census using direct and indirect methods. These States are
- A) Uttar Pradesh, Uttrakhand, Jharkhand, Orissa
 - B) Uttar Pradesh, West Bengal, Orissa, Jharkhand
 - C) Jharkhand, Orissa, West Bengal, Chhattisgarh
 - D) Madhya Pradesh, Uttar Pradesh, Jharkhand, Orissa
26. What is self-plagiarism ?
- A) It's when authors claim other ideas as their own
 - B) Rephrasing the word of some other author without citing
 - C) Failing to cite the source of information that was used in a work
 - D) It's when authors present their previously published work as a new contribution
27. Which one of the following applications is best suited for plotting and analysis on computers ?
- A) Spreadsheet application
 - B) Word processor
 - C) Presentation application
 - D) Photo editing application
28. Which one of the following parts of a computer is a memory storage device ?
- A) RAM
 - B) CPU
 - C) Mother Board
 - D) Wifi Card
29. A researcher records the blood group from many patients. To which data type does this data collected fall under ?
- A) Binary
 - B) Categorical
 - C) Count
 - D) Ordinal



30. Which one of the following is not an operating system ?
A) Microsoft Windows B) Linux
C) Ubuntu D) Microsoft Word
31. Which one of the following is correct ?
A) C++ is an operating system B) C++ is a programming language
C) C++ is an internet protocol D) C++ is a machine language
32. Which one of the following journals is very likely to be the one with high standards of publishing ?
A) Journals with a large number of pages B) Journals with a high impact factor
C) Journals with online version D) Journals without peer review
33. Which one of the following parameters is widely used to judge the citation impact of a scholar ?
A) TRP rating
B) h-index
C) Number of articles he/she has published
D) Number of awards the scholar has won
34. An open access journal is one
A) in which one does not have to pay to read articles
B) in which one does not have to pay to submit articles
C) in which the articles can be modified and resubmitted by anyone
D) which does not require a login but one is required to pay to read articles
35. The outcome of an experiment is Boolean-valued. Which probability distribution will the observations very likely follow ?
A) Binary B) Poisson C) Binomial D) Gaussian
36. The probability distribution for a random error that is as likely to move the value in either direction is called
A) Poisson distribution B) Gaussian distribution
C) Levy distribution D) Hermite distribution
37. Random errors in experimental studies can be reduced by
A) Repeating experiments and carrying out statistical analysis
B) reducing mistakes made in calculations
C) ensuring proper calibration of instruments
D) by reducing the time to carry out the experiments
38. The length of an object is 5.0 cm. Researcher 'A' makes measurement of the length and reports a mean of 4.9 cm with an error of 0.2 cm. Researcher 'B' makes a similar measurement and reports a mean of 3.00 cm with an error of 0.02 cm. What conclusions about the measurements can you derive from these statements?
A) Measurements of both A and B are precise
B) Measurements of B is accurate but not as precise as A
C) Measurements of A is accurate but not as precise as B
D) Measurements of both A and B are accurate



39. An experimentalist reports the value of his measurements of the height of an object. Which one of the following is the correct way of quoting the results ?
- A) 15 : 00 – 1 : 23 cm B) 15: 00 – 1 : 23 cm
C) 15 : 0 – 1 : 23453 cm D) 15 : 000 – 1 : 23 cm
40. If a dependent variable x is related to a measured quantity m by the relation $x = m+a$, where a is a constant, then the relative error in x is given by
- A) $\frac{\sigma_m}{a}$ B) $\frac{\sigma_m}{m}$ C) $\frac{\sigma_m}{m + a}$ D) $\frac{\sigma_m}{ma}$
41. Approximately, what percentage of the measurements in a Gaussian distribution will fall within -1 standard deviation ?
- A) 90 % B) 68 % C) 99 % D) 50 %
42. The function $y = ax^k$, where a and k are constants, when plotted on a log-log graph will yield a
- A) Parabola B) Straight line
C) Exponential curve D) Logarithmic curve
43. The graph below shows the percentage of candidates qualifying an examination over a 7 year period. In which pair of years the number of qualified candidates was the same ?



- A) 1994 and 1995
B) 1996 and 1997
C) 1993 and 1994
D) The data in the graph is inadequate to conclude
44. In a histogram, if the bin width is set to a very large value,
- A) all small scale features and fluctuations will be lost
B) all small scale features and fluctuations will be prominent
C) No information is lost in all cases
D) The height of the histogram will become bigger



45. Consider the data points in the table below. Which fitting function would be most appropriate to describe this trend ?

x	y
0	0
10	102
20	398
30	899
40	1598

- A) Linear
B) Exponential
C) Second order polynomial
D) Gaussian
46. A hypothesis is
A) a proposition considered as a starting point based on the limited knowledge
B) a fact assumed to be true without proof
C) a logical conclusion based on evidences and can always be proved correct using experiments
D) a corollary to a theorem
47. A null hypothesis in statistical testing is
A) one which is not used for statistical testing
B) the hypothesis that there is no statistically significant differences between specified observations
C) an invalid hypothesis
D) the hypothesis that there is very large statistically significant differences between specified observations
48. Which one of the following methods is not used for statistical hypothesis testing
A) Unit test B) Z-test C) Chi-squared test D) F-test
49. Which one of the following should not be used in a journal article ?
A) Personally identifiable information of human subjects
B) Experimental setup or Theory
C) Results and discussion
D) References
50. The term multivariate analysis refers to
A) the statistical procedure of analyzing one variable multiple times
B) the statistical procedure of analyzing one variable by multiple experimentalists
C) the statistical procedure of analyzing one variable by multiple methods
D) the statistical procedure of analyzing more than one variable simultaneously



PART – B

51. Consider the sets $X = \{x + \sqrt{2} \mid x \in \mathbb{Q} \text{ and } x^2 \leq 2\}$ and $Y = [-\sqrt{2}, \sqrt{2}] \setminus X$. Then
A) X is countable, Y is finite
B) X is uncountable, Y is countable
C) X is countable, Y is countable
D) X is countable, Y is uncountable
52. The matrix $\begin{pmatrix} 1 & -1 & 0 \\ -1 & 2 & 1 \\ 0 & 1 & 0 \end{pmatrix}$ is
A) positive definite
B) negative semidefinite
C) indefinite
D) neither positive semidefinite nor negative definite
53. A function $f : \mathbb{R}^2 \rightarrow \mathbb{R}$ is defined by $f(x, y) = x^2y$. Let $d = (1, 2)$ and $a = (a_1, a_2)$ be two points of \mathbb{R}^2 . The directional derivative of f in the direction of d at a is
A) $a_1^2a_2$
B) $2(a_1^2 + a_1a_2)$
C) $a_1 + a_2$
D) $a_1a_2^2$
54. Let $A = \begin{pmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix}$ with $\theta = \frac{2\pi}{17}$. Then A^{2125} equals
A) A
B) I
C) A^{-1}
D) Null matrix
55. Which of the following subsets of functions from \mathbb{R} to itself is a vector space over \mathbb{R} ?
 $U = \{h \mid \lim_{x \rightarrow 0} h(x) \text{ exists}\}$, $V = \{f \mid \lim_{x \rightarrow 2} f(x) = 0\}$ and $W = \{g \mid \lim_{x \rightarrow 5} g(x) = 1\}$.
A) Both V and W
B) Only W
C) U but not V
D) Both U and V
56. Radius of convergence of the series $\sum z^n$ is
A) 0
B) 2
C) $\frac{1}{2}$
D) 1
57. Let C be a circle with $|z| = 2$ in the complex plane that is oriented in the counter clockwise direction. The value of a for which $\int_C \left(\frac{2z+3}{3(z-3)(z-2)} + \frac{a}{z-2} \right) dz = 0$
A) 0
B) $\frac{7}{3}$
C) 3
D) $-\frac{7}{3}$
58. Number of 2×2 invertible matrices over a finite field containing 3 elements is
A) 9
B) 12
C) 24
D) 48
59. The negation of the statement “ $\exists y \in \mathbb{Z}, \forall x \in \mathbb{R}$, such that $y^2 < x$.” is
A) $\forall x \in \mathbb{R}, \exists y \in \mathbb{Z}$, such that $y^2 > x$
B) $\forall y \in \mathbb{Z}, \exists x \in \mathbb{R}$, such that $y^2 \geq x$
C) $\exists x \in \mathbb{R}, \forall y \in \mathbb{Z}$, such that $x \leq \sqrt{y}$
D) $\exists x \in \mathbb{R}, \forall y \in \mathbb{Z}$, such that $\sqrt{x} < y$



60. The equation of the tangent to the curve $y = x^3$ at the point $x = 1$ is given by
 A) $3x - y = 2$ B) $3x + y = 2$ C) $y = 1$ D) $y = 2x$
61. The locus of a point with constant difference of distance from two different fixed points separated by a positive distance $2c$ is
 A) hyperbola B) circle C) ellipse D) parabola
62. Let $f(x) = 2x$ and $g(x) = 3x^2 - x$ be two functions on \mathbb{R} , then $g \circ f$ is given by
 A) $12x^2 - 2x$ B) $6x^2 - 2x$ C) $12x^2 - 2$ D) $12x^2 - 4$
63. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be defined as $f(x) = \cos x$. Which of the following is a closed set ?
 A) $f^{-1}(\{x \in \mathbb{R} \mid \sin x < 1\})$ B) $f^{-1}(\{x \in \mathbb{R} \mid \sin x = 1\})$
 C) $f^{-1}((0, \pi/2))$ D) $f^{-1}(\{\frac{1}{n} \mid n \in \mathbb{N}\})$
64. Which of the following collection of subsets of \mathbb{R}^n is open ?
 A) $\{x \in \mathbb{R}^n \mid 1 < |x| \leq 2\}$ B) A proper subspace
 C) $\{x \in \mathbb{R}^n \mid |x| > 2\}$ D) A compact set
65. In a metric space M , which of the following is correct ?
 A) Every bounded sequence converges B) Every convergent sequence is Cauchy
 C) Every Cauchy sequence converges D) Every bounded sequence is Cauchy
66. Let $f : [0, 1] \rightarrow \mathbb{R}$ be a continuous function. Then $\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=0}^n f\left(\frac{k}{n}\right)$ is
 A) always positive B) converges to 0
 C) converges to $\int_0^1 f(x) dx$ D) diverges to ∞
67. Let $f(x+iy) := 2 + iv(x, y)$ be analytic in a region D , then
 A) $f(x+iy) = 2 \quad \forall z \in D$ B) v is a constant
 C) $v(x, y) = x \quad \forall x+iy \in D$ D) $f \equiv 0$
68. $\lim_{z \rightarrow 2i} \frac{z^2 + 4}{z(z-2i)}$ is
 A) 0 B) ∞ C) $2i$ D) 2
69. Let C be the circle $|Z| = 1$ in the complex plane. Then $\int_C e^z z^{-3} dz$ is
 A) $2i$ B) $2\pi i$ C) 2π D) πi
70. The function $\sin z : \mathbb{C} \rightarrow \mathbb{C}$ is
 A) not entire B) unbounded C) bounded D) a constant



71. Which of the following statements are false ?
1) Every group has a cyclic subgroup
2) Every group of order 4 is Abelian
3) The permutation group is Abelian
4) There exists a non Abelian group of order 4
A) 1 and 2 B) Only 4 C) 1, 3 and 4 D) 3 and 4
72. Which of the following is not a basis of \mathbb{R}^4 ?
a) $B_1 = \{(1,0,0,0), (1,1,0,0), (1,1,1,0), (1,1,1,1)\}$
b) $B_2 = \{(4,0,0,0), (4,3,0,0), (4,3,2,0), (4,3,2,1)\}$
c) $B_3 = \{(1,1,0,0), (1,0,0,1), (1,2,0,0), (-1,1,0,0)\}$
A) Both a and b B) Only a C) Only b D) Only c
73. Which of the following matrices has the same column space as the matrix
$$\begin{pmatrix} 1 & 2 & 1 \\ 1 & -1 & -2 \\ 1 & -1 & -2 \end{pmatrix} ?$$

A) $\begin{pmatrix} 1 & 1 \\ -2 & 1 \\ -2 & 1 \end{pmatrix}$ B) $\begin{pmatrix} 0 & 0 \\ 0 & -5 \\ 1 & 1 \end{pmatrix}$ C) $\begin{pmatrix} -1 & 1 \\ 1 & -5 \\ 0 & 0 \end{pmatrix}$ D) $\begin{pmatrix} 1 & 1 \\ 2 & -1 \\ 1 & -2 \end{pmatrix}$
74. Number of groups of order 4 (upto isomorphism) is
A) 1 B) 16 C) 4 D) 2
75. Let G be a group such that $a^2 = e$ for all $a \in G$ then G is
A) abelian B) non-abelian C) cyclic D) of order 6
76. Let A and B be two normal subgroups of G . Which of the following is a normal subgroup of G ?
A) $A \cup B$ B) $A \cap B$ C) AB D) $(A \cup B)^c$
77. The number of 5-Sylow subgroups of a group of order 20 is
A) 5 B) 1 C) 4 D) 6
78. The remainder when a perfect square is divided by 5 is
A) 0 and 1 B) 0, 1 and 4 C) only 4 D) 3 and 4
79. The solutions of the differential equation $x + ydy/dx = 0$ are
A) circles
B) continuous curves passing through origin
C) ellipses
D) parabolas



80. The solution of the differential equation $y'' - 2y' - 3y = 0$ with initial conditions $y(0) = 0$ and $y'(0) = 1$ is
 A) $\frac{1}{4}e^{3x} - \frac{1}{4}e^x$ B) $\frac{1}{4}e^{3x} - \frac{1}{4}e^{-x}$ C) $\frac{1}{4}e^{3x} + \frac{1}{4}e^{-x}$ D) $\frac{1}{4}e^{3x} + \frac{1}{4}e^x$
81. Which of the partial differential equations has $u(x, y) = \pi x + y$ as a solution ?
 (1) $u_y - 1 = 0$ (2) $u_x - u_y = 0$ (3) $u - xu_x = y$
 A) Only 1 B) Only 2 C) 1 and 3 D) 2 and 3
82. The partial differential equation $2u_{xx} + 4u_{xy} + 3u_{yy} - 2 = 0$ is
 A) hyperbolic B) elliptic
 C) parabolic D) non-linear
83. Let A and B be two sets of events such that $A \subset B^c$ and $B \subset A^c$, then
 A) occurrence of A implies that of B
 B) occurrence of B implies that of A
 C) the events in A and B are mutually exclusive
 D) A and B has a common event
84. A coin is tossed twice. Let A_1 and A_2 be the events “head in first toss” and “head in the second toss” respectively. Then $P(A_1 \cup A_2)$ is
 A) $1/4$ B) $1/2$ C) $3/4$ D) 0.2
85. $\binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \dots + \binom{n}{n} = ?$
 A) n B) 2^n C) 2 D) 0
86. Two six-sided dice are rolled. What is the probability that the sum of the numbers is at least 10?
 A) $1/12$ B) $1/6$ C) $1/4$ D) $3/4$
87. There are two red pens, one green pen, and one blue pen. Two pens are chosen without replacement. Let A be the event that we choose exactly one red pen, and B be the event that we choose exactly one green pen. Then $P(A \cap B)$ is
 A) $1/3$ B) $4/6$ C) $1/2$ D) $3/4$
88. A random student is chosen among all those writing CUCET entrance exam today. The probability that the student is from Xavier’s College, Palayamkottai is $3/100$; the probability that the exam is for admission to Ph.D. in Mathematics is $1/5$; and the probability that the student is from Xavier’s College, Palayamkottai and appearing for the exam for admission to Ph.D. in Mathematics is $1/50$. What is the probability that the exam is for admission to Ph.D. in Mathematics given that the student is from Xavier’s College, Palayamkottai ?
 A) $1/3$ B) $3/5$ C) $2/3$ D) $3/4$



89. Consider the function $f(z) = \frac{1-z}{(1-2z)^2}$. The residue of $f(z)$ at its pole is
A) -1 B) $-1/4$ C) $1/4$ D) 1
90. Intersection of two convex sets
A) is open B) need not be convex
C) is convex D) is polyhedral
91. Correlation coefficient is a number in
A) $\{\pm 1\}$ B) $[-1,1]$ C) $[0,1]$ D) $[0,\infty)$
92. Number of edges in a complete graph on n vertices is
A) $\binom{n}{2}$ B) $\binom{n}{n-2}$ C) n D) n^2
93. Which of the following is a non-commutative ring ?
A) A field B) Ring of all 2×2 diagonal matrices
C) Ring of integers \mathbb{Z} D) Ring of all 2×2 matrices
94. The maximal ideal in the ring \mathbb{Z} of integers is
A) $4\mathbb{Z}$ B) $8\mathbb{Z}$ C) $3\mathbb{Z}$ D) $12\mathbb{Z}$
95. A connected planar graph with 4 vertices is drawn on a plane with out any intersection of its edges. It has 6 edges then the number of faces of this graph is
A) 10 B) 6 C) 2 D) 4
96. Which of the following has no zeros on the real line ?
(1) $f(x) = x^2 + 1$ (2) $g(x) = x^2$ (3) $h(x) = e^x$
A) Only 1 B) Only 2 C) Both 1 and 3 D) Only 3
97. The tangent of the curve $y = 3x^2 + 3$ at the point (1,6) is
A) parallel to x -axis B) has slope 1
C) passes through origin D) has slope -1
98. If A is a 5×6 matrix with rank 2, then the nullity of A is
A) 3 B) 2 C) 4 D) 1
99. There are 75 multiple choice questions with four choices of answer for each question. How many ways are there to complete this exam ?
A) 75 B) 75^4 C) 4^{75} D) 300
100. Let F be a field, $f(x) \in F[x]$ and $c \in F$. If $f(x+c)$ is irreducible over F then
A) f is reducible B) f is also irreducible
C) $f(x-c)$ is reducible D) None of the above
-



SPACE FOR ROUGH WORK