

TET CUM TRT – 2018
PGT - MATHEMATICS

1. The first and the only lady ruler of Delhi sultanate
 1. Rudrama Devi
 2. Rani Mangamma
 3. Jhansi Lakshmi Bai
 4. Razia Sultana

2. The last British Viceroy of Independent India
 1. Lord Linlithgo
 2. Lord Mountbatten
 3. Lord Wavel
 4. Lord Irvin

3. The only bird that can fly backwards
 1. Crane
 2. Humming bird
 3. Turkey
 4. Parrot

4. The famous dance form of Andhra Pradesh
 1. Kathak
 2. Bharatanatyam
 3. Kuchipudi
 4. Dhandiya Rass

5. National school of Drama was set up in
 1. 1947
 2. 1959
 3. 1970
 4. 1975

6. The first element in the periodic table
 1. Oxygen
 2. Lithium
 3. Hydrogen
 4. Helium

7. The time taken by the light to reach Earth from Sun
 1. 10 minutes 10 seconds
 2. 8 minutes 20 seconds
 3. 12 minutes 10 seconds
 4. 4 minutes 45 seconds

8. The hottest planet in the solar system
 1. Venus
 2. Mercury
 3. Jupiter
 4. Uranus

9. Manabi Bandyopadhyay became the first transgender professor to complete a Ph.D in
 1. Tamil Literature
 2. Bengali Literature
 3. Malayalam Literature
 4. Telugu Literature

10. The three primary colours of light
 1. Red, Green, Blue
 2. Purple, Blue, Orange
 3. Red, Brown, Blue
 4. White, Green, Red

11. Centre for DNA finger printing and diagnostics is located at
 1. Hyderabad
 2. Mumbai
 3. Delhi
 4. Bengaluru

12. Expanded form of ASLV
 1. Aerospace Satellite Launch Vehicle
 2. Agrobased Satellite Launch Vehicle
 3. Augmented Satellite Launch Vehicle
 4. Aeronautical Satellite Launch Vehicle

13. 'Paradise Lost' was written by
1. Shakespeare
 2. John Milton
 3. W.B. Yeats
 4. Walt Whitman
14. Oncology focuses on this disease
1. Paralysis
 2. Cancer
 3. Heart attack
 4. Mental disorder
15. The largest internal organ of the human body
1. Gallbladder
 2. Lungs
 3. Heart
 4. Liver
16. The number of eyelids for duck
1. 2
 2. 4
 3. 1
 4. 3

17. National Science Day is observed on
1. November 14
 2. September 5
 3. February 28
 4. January 12
18. Benarus was renamed as
1. Myanmar
 2. Varanasi
 3. Yangon
 4. Nippon
19. The country that has largest land mass
1. England
 2. Russia
 3. India
 4. China
20. The first bank established in India is
1. Bank of Hindustan
 2. Imperial Bank
 3. Vijaya Bank
 4. Bank of Bharat

21. 'A first systematic level attempt at tackling the problem of education as a whole and unfolds that a national system of education would take 30 to 40 years to be evolved.' This is in accordance with _____
1. Hunter Commission-1882-83
 2. Wood's Despatch-1854
 3. Hartog Committee-1929
 4. Sargent Report- 1944
22. Post-Vedic education is also called
1. Dharmic Education
 2. Upanayanic Education
 3. Brahmanic Education
 4. Swadhyayic Education
23. What was the name given to primary schools attached to a mosque where elementary education was imparted in reading and writing Arabic and Persian in Medieval Period?
1. Khangahs
 2. Maktabas
 3. Madrasas
 4. Mahad
24. Which of these was the core subject of Post- Vedic Curriculum?
1. Brahma Vidya
 2. Bhuta Vidya
 3. Sarpa Vidya
 4. Deva-Jana Vidya

25. Teacher Education is offered in all the following ways except-
1. Regular course for 1 or 2 Academic years
 2. Evening or vacation courses for 2 Academic years
 3. Online course for 2 years plus one year internship at school
 4. Correspondence-cum-contact courses for 2 Academic years
26. Short term courses in teacher education of two or three months duration are called _____
1. Certificate courses
 2. Diploma courses
 3. Collegiate courses
 4. Correspondence courses
27. Which of these is a motivating agent for teachers in India?
1. Regular postings and transfers in Government jobs
 2. Demotion in case of unusual behaviour during the tenure
 3. Professional status, availability of proper resources
 4. Pay and allowances in private schools
28. Which of these is a function of professional organization of teachers?
1. Providing welfare services to all the children studying under the guidance of any teacher.
 2. Providing field services and field experiences
 3. Modifying the educational plans and implementing them as per the government orders
 4. Selling periodicals and research monographs

29. A convergent framework that aims at nurturing a spirit of inquiry and creativity, love for Science and Mathematics and effective use of technology amongst children.
1. Rashtriya Shodh Kshetra
 2. Inspire Programme
 3. Rashtriya Avishkar Abhiyan
 4. National Science Research Institute
30. Which of these has minimum role in bringing equalities in the educational opportunities?
1. Integrated child care services
 2. Comprehensive Access to Primary Education
 3. School Readiness
 4. Child Care schemes for parents
31. Which one is odd one out in case of Kasturba Gandhi Balika Vidyalayas?
1. Free Textbooks & Uniforms
 2. Day schooling
 3. Vocational Training & guidance
 4. Medical Facility
32. One of these is a measure suggested in National Population Policy 1976
1. Promotion of research activities in family planning methods
 2. Removal of population related issues from school curriculum
 3. Girls should be educated only up to secondary level
 4. Age of marriage for girls should be 16 years and for boys 18 years.

33. With respect to RTI Act 2005, which work is correctly matched with the fee charged for that?
1. To submit your request to receive information-Rs 10
 2. Diskette/ Floppy-Rs 20
 3. For each page created/ copied in A-4 or A-3 size paper- Rs 10
 4. For inspection of records (first hour)-Rs 20
34. What is the role of PIO if the superior officer orders him not to release information to the requester?
1. PIO is an independent authority under the law and no approval is required.
 2. PIO shall wait for the order of superior
 3. PIO reaches out to Chief Information Commissioner for the order
 4. PIO rejects request malafidely fully or partially
35. According to RTE Act 2009, part time instructors should be appointed for all except
1. Art Education
 2. Health and Physical Education
 3. Work Education
 4. ICT Education
36. As per RTE Act 2009, what is the student – teacher ratio in Class VI to VIII?
1. 1: 30
 2. 1:40
 3. 1:35
 4. 1:25

37. As per NCF 2005, which of these induces an inordinate level of anxiety and stress and promotes rote learning?
1. Literary activities
 2. Essay writing competitions
 3. Text-based and quiz-type questioning
 4. Multiple choice questions with negative marking
38. As per NCF 2005, in no case would children below the age of 16 years be eligible
1. for using mass media for education
 2. for admission to a VET programme
 3. for taking part in innovative and creative projects
 4. for choosing work and Art as a part of schooling
39. As per NCF 2005, mass media can be used to
1. support teacher training and facilitate classroom learning
 2. involve students in accumulating information from various sources
 3. protect children from self learning
 4. supply instructional materials to schools free of cost
40. As per NCF 2005, which of these is a form of learner engagement?
1. Discovering
 2. Recalling
 3. Imitating
 4. Translating

41. A method which is to know oneself and to study intrapersonal relationships
 1. Observation
 2. Experimentation
 3. Questionnaire
 4. Introspection

42. A child learns to control large muscles first and then finer movements with smaller muscles is
 1. Principle of Predictability
 2. Proximodistal Direction
 3. Principle of Integration
 4. Continuous Development

43. The number of stages in Jean Piaget's theory of Cognitive Development
 1. 5
 2. 6
 3. 4
 4. 8

44. The type of social play which 1 to 2 years of child involve in is
 1. Parallel Play
 2. Solitary Play
 3. Co-operative Play
 4. Competitive Play

45. A mental process that occurs when a child adjusts to new information
1. Schema
 2. Accommodation
 3. Assimilation
 4. Organization
46. The idea that some characteristics of an object stay the same even though the object might change
1. Centration
 2. Animism
 3. Conservation
 4. Seriation
47. Language and thought initially develop independently of each other and then merge was stated by
1. Piaget
 2. Noam Chomsky
 3. Vygotsky
 4. Skinner
48. Child obeys because adults have superior power. This is
1. Interpersonal expectations, relationships and conformity
 2. Social conscience orientation
 3. Individualism, instrumental purpose and exchange
 4. Punishment and obedience orientation

49. Teaching new behavior by reinforcing successive approximation to a specified target behavior
1. Prompt
 2. Shaping
 3. Time out
 4. Extinction
50. The “magical number seven, plus or minus two” is described by
1. George Miller
 2. Ebbinghaus
 3. Terman
 4. Binet
51. Ability to think in pictures, visualise a future result, imagine things in mind eye and use it on having a sense of direction is
1. Naturalist Intelligence
 2. Logico-Mathematical Intelligence
 3. Visual-Spatial Intelligence
 4. Bodily Kinesthetic Intelligence
52. Hitting in ball badminton interferes with hitting in shuttle badminton
1. Negative Transfer
 2. Positive Transfer
 3. Zero Transfer
 4. Bilateral Transfer

53. The strategy that involves creating a word from the first letters of the items to be remembered
1. Keyword Method
 2. Rhymes
 3. Method of Loci
 4. Acronyms / Mnemonics
54. A boy must learn to think of himself as a male if his behavior is to be appropriate
1. Self-Concept
 2. Sex-Identification
 3. Sex Constancy
 4. Self-Worth
55. The general mental adaptability to new problems and conditions of life is
1. Personality
 2. Intelligence
 3. Memory
 4. Learning
56. Children are able to remember without understanding
1. Episodic Memory
 2. Remote Memory
 3. Habit Memory
 4. Rote Memory

57. The principle that behavior followed by positive outcomes are strengthened and that behavior followed by negative outcomes are weakened
1. Law of Effect
 2. Law of Readiness
 3. Positive Reinforcer
 4. Negative Reinforcer
58. Applying previous experiences and knowledge to learning or problem solving in a new situation
1. Transfer
 2. Learning
 3. Memory
 4. Thinking
59. A systematic, organized strategy for planning lessons
1. Lesson Planning
 2. Unit Planning
 3. Term Planning
 4. Instructional Planning

60. A classroom arrangement style in which small number of students work in small, closely bunched group is

1. Auditorium Style
2. Offset Style
3. Seminar Style
4. Cluster Style

CONTENT

61. If $A = \{a, b, c, d, e\}$, $B = \{c, d, f, l, m\}$ and $C = \{a, l, m, o\}$ then $C \cap (A \cup B) =$
1. $\{a, d, l, m\}$
 2. $\{b, c, l, o\}$
 3. $\{a, l, m\}$
 4. $\{a, b, c, d, e, f\}$
62. The relation R defined on the set of natural numbers as $\{(a, b) / \text{'a' differs 'b' by 3}\}$, is given by
1. $\{(1, 4), (2, 5), (3, 6), \dots\}$
 2. $\{(4, 1), (5, 2), (6, 3), \dots\}$
 3. $\{(1, 3), (2, 6), (3, 9), \dots\}$
 4. $\{(3, 1), (6, 2), (9, 3), \dots\}$
63. If $n(A) = 12$, $n(B) = 16$, $n(C) = 21$, $n(A \cap B) = 5$, $n(A \cap C) = 8$, $n(B \cap C) = 12$, $n(A \cap B \cap C) = 3$ then $n(A \cup B \cup C) =$
1. 12
 2. 18
 3. 23
 4. 27

64. In a college of 300 students, every student reads 5 news papers and every news paper is read by 60 students. The number of news papers is

1. at least 30
2. utmost 20
3. exactly 25
4. none

65. If $y = f(x) = \frac{5x+3}{4x-5}$ then $f(y) =$

1. $-x$
2. x
3. $\frac{5x+3}{4x-5}$
4. none

66. The range of $5 \sin x + 12 \cos x - 13$ is

1. $(0, 13)$
2. $(-13, 0)$
3. $[-26, -13]$
4. $[-26, 0]$

67. If $f(x) = \frac{x}{\sqrt{1-x^2}}$, $g(x) = \frac{x}{\sqrt{1+x^2}}$ then $(f \circ g)(x) =$

1. $\frac{x}{\sqrt{1-x^2}}$

2. $\frac{x}{\sqrt{1+x^2}}$

3. $\frac{1-x^2}{\sqrt{1+x^2}}$

4. x

68. The function $y = f(x)$ satisfying the condition $f\left(x + \frac{1}{x}\right) = x^2 + \frac{1}{x^2}$ is

1. $x^2 + 2$

2. $2 - x^2$

3. $x^2 - 2$

4. None

69. For all $n \in \mathbb{N}$, $2 \cdot 4^{2n+1} + 3^{3n+1}$ is divisible by

1. 7

2. 5

3. 11

4. 209

70. If $nP_7 = 42 \cdot nP_5$ then $n =$
1. 10
 2. 11
 3. 13
 4. 12
71. If $nP_r = 840$, $nC_r = 35$ then $n =$
1. 7
 2. 35
 3. 21
 4. 42
72. There are 4 letters and 4 directed envelopes. The number of ways in which all the letters can be put in the wrong envelope is
1. 8
 2. 9
 3. 16
 4. 20
73. The total number of selections of fruit which can be made from 3 bananas, 4 apples and 2 oranges is
1. 39
 2. 315
 3. 51
 4. 415

74. $i^{18} - 3 \cdot i^7 + i^2(1 + i^4)(-i)^{26} =$

1. $1 + 3i$
2. $1 - 3i$
3. $-1 + 3i$
4. $-1 - 3i$

75. If $(x - iy)^{1/3} = a - ib$ then $\frac{x}{a} + \frac{y}{b} =$

1. $a^2 - b^2$
2. $4(a^2 + b^2)$
3. $4(a^2 - b^2)$
4. $a^2 + b^2$

76. If $(1 + i)(1 + 2i)(1 + 3i) \dots (1 + ni) = x + iy$ then $2 \cdot 5 \cdot 10 \dots (1 + n^2) =$

1. $x^2 - y^2$
2. $x^2 + y^2$
3. x
4. y

77. In the expansion of $\left(x^3 - \frac{1}{x^2}\right)^{15}$, the constant term is

1. $15C_9$
2. 0
3. $-15C_9$
4. 1

78. Let $(1+x)^n = \sum_{r=0}^n C_r x^r$ and $\frac{c_1}{c_0} + 2 \frac{c_2}{c_1} + 3 \frac{c_3}{c_2} + \dots + n \frac{c_n}{c_{n-1}} = \frac{1}{k} n(n+1)$

then the value of k is

1. $\frac{1}{2}$

2. 2

3. $\frac{1}{3}$

4. 3

79. The sum of the infinite series $\frac{3}{4} + \frac{3 \cdot 5}{4 \cdot 8} + \frac{3 \cdot 5 \cdot 7}{4 \cdot 8 \cdot 12} + \dots$

1. $2\sqrt{2} + 1$

2. $3\sqrt{3} + 1$

3. $2\sqrt{2} - 1$

4. $3\sqrt{3} - 1$

80. If a, b, c are in A.P. and b - a, c - b, a are in G.P, then a : b : c is

1. 1 : 2 : 3

2. 1 : 3 : 5

3. 2 : 3 : 4

4. 1 : 2 : 4

81. If $\frac{3 + 5 + 7 + \dots n \text{ terms}}{5 + 8 + 11 + \dots 10 \text{ terms}} = 7$ the value of n is

1. 35
2. 36
3. 37
4. 40

82. The n^{th} term of the series $3, \sqrt{3}, 1, \dots$ is $\frac{1}{243}$, then n is

1. 12
2. 13
3. 14
4. 15

83. If $b + c, c + a, a + b$ are in H.P then a^2, b^2, c^2 will be in

1. A.P
2. G.P
3. H.P
4. None

84. If $x = 2 + 2^{2/3} + 2^{1/3}$ then the value of $x^3 - 6x^2 + 6x =$

1. 1
2. 0
3. 2
4. 6

85. The number of real solutions of the equation $x^2 - 3|x| + 2 = 0$ is
1. 2
 2. 4
 3. 1
 4. 3
86. The quadratic equation for which the sum of the roots is 7 and the sum of the square of the roots is 25 is
1. $x^2 + 7x + 12 = 0$
 2. $x^2 - 7x + 25 = 0$
 3. $x^2 - 7x + 12 = 0$
 4. $x^2 - 7x - 12 = 0$
87. If the product of roots of equation $x^2 - 3kx + 2e^{2\log k} - 1 = 0$ is 7, then the value of k =
1. $\frac{1}{2}$
 2. 10
 3. 1
 4. 2

88. The value of determinant $\begin{vmatrix} x+1 & x+2 & x+4 \\ x+3 & x+5 & x+8 \\ x+7 & x+10 & x+14 \end{vmatrix}$ is

1. -2
2. $x^2 + 2$
3. 2
4. 5

89. If $\begin{vmatrix} x & x+y & x+y+z \\ 2x & 3x+2y & 4x+3y+2z \\ 3x & 6x+3y & 10x+6y+3z \end{vmatrix} = 64$ then real value of $x =$

1. 2
2. 4
3. 3
4. 5

90. If $A = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ then $A^{-1} =$

1. $2A$
2. A
3. $-A$
4. $2A$

91. The system of linear equations $x + y + z = 2$, $2x + y - z = 3$, $3x + 2y + kz = 4$ has a unique solution if
1. $k \neq 0$
 2. $-1 < k < 1$
 3. $-2 < k < 2$
 4. $k = 0$
92. The incentre of the triangle formed by $(0, 8)$ $(6, 0)$ $(10, 0)$ is
1. $(1, 1)$
 2. $(1, 2)$
 3. $(2, 1)$
 4. $(2, 2)$
93. If $(1, 2)$ $(4, 3)$ $(6, 4)$ are the midpoints of the sides \overline{BC} , \overline{CA} , \overline{AB} of ΔABC , then the equation of AB is
1. $2x - 3y - 13 = 0$
 2. $2x + 3y - 1 = 0$
 3. $x - 3y + 6 = 0$
 4. $x + 3y + 12 = 0$
94. The ratio in which the line $3x - 4y + 5 = 0$ divides the line segment joining the points $(2, -4)$, $(-3, 1)$ is
1. $26 : 9$
 2. $27 : 8$
 3. $24 : 7$
 4. $22 : 6$

95. The value of k such that the straight line $(2x + 3y + 5) + k(x - 7y + 6) = 0$ is parallel to x -axis is

1. $\frac{21}{5}$
2. $\frac{1}{3}$
3. $\frac{5}{3}$
4. -2

96. The angle between the pair of lines $xy + 3x + 3y + 9 = 0$ is

1. $\frac{\pi}{4}$
2. $\frac{\pi}{2}$
3. $\frac{\pi}{6}$
4. $\frac{\pi}{12}$

97. The equation of the normal to the circle $x^2 + y^2 + 6x + 4y - 3 = 0$ at $(1, -2)$ is

1. $y + 1 = 0$
2. $y + 2 = 0$
3. $y + 3 = 0$
4. $y - 2 = 0$

98. The point of contact of the line $3x - 4y - 25 = 0$ with the circle $x^2 + y^2 = 23$ is

1. $(1, -2)$
2. $(3, -4)$
3. $(1, 3)$
4. $(-1, 2)$

99. The condition that the line $lx + my + n = 0$ to be a normal to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

1. $\frac{a^2}{l^2} + \frac{b^2}{m^2} = \frac{(a^2 - b^2)^2}{n^2}$
2. $\frac{a}{l} + \frac{b}{m} = a^2 - b^2$
3. $\frac{a^2}{l^2} - \frac{b^2}{m^2} = \frac{(a^2 + b^2)^2}{n^2}$
4. $\frac{a^2}{l^2} - \frac{b^2}{m^2} = a^2 + b^2$

100. $\frac{\cos(360^\circ - A)}{\sin(270^\circ + A)} + \frac{\cot(90^\circ + A)}{\tan(180^\circ - A)} + \frac{\sin(90^\circ - A)}{\sin(90^\circ + A)} =$

1. 0
2. -1
3. 1
4. 2

101. If $A+B = \frac{\pi}{4}$ then $(1 + \tan A)(1 + \tan B) =$

1. 0
2. 2
3. -1
4. 1

102. $\frac{\sin A + \sin 5A + \sin 9A}{\cos A + \cos 5A + \cos 9A} =$

1. $\tan 2A$
2. $\tan 3A$
3. $\tan 4A$
4. $\tan 5A$

103. $\sin^{-1} \frac{4}{5} - \sin^{-1} \frac{5}{13} =$

1. $\sin^{-1} \left(\frac{56}{65} \right)$
2. $\sin^{-1} \left(\frac{33}{65} \right)$
3. $\sin^{-1} \left(\frac{77}{85} \right)$
4. $\sin^{-1} \left(\frac{3}{5} \right)$

104. The shadow of a tower standing on a level plane is found to be 60 mt longer when the sun's altitude is 30° than when it is 45° . The height of the tower is

1. 60 mt
2. 30 mt
3. $60\sqrt{3}$ mt
4. $30(\sqrt{3}+1)$ mt

105. $\lim_{n \rightarrow \infty} \frac{5 \cdot 2^{n+1} + 2 \cdot 3^{n+1}}{3 \cdot 2^n - 7 \cdot 3^n} =$

1. $\frac{6}{5}$
2. $\frac{2}{7}$
3. $\frac{-2}{7}$
4. $\frac{-6}{7}$

106. If $x = e^t (\cos t + \sin t)$, $y = e^t (\cos t - \sin t)$ then $\frac{dy}{dx} =$

1. Tant
2. $-\text{Tant}$
3. $\text{Tan} \frac{3t}{2}$
4. $-\text{cot} \frac{3t}{2}$

107. If $\sqrt{1-x^2} + \sqrt{1-y^2} = a(x-y)$ then $\frac{dy}{dx} =$

1. $\frac{\sqrt{1+y^2}}{\sqrt{1+x^2}}$

2. $\frac{\sqrt{1+x^2}}{\sqrt{1+y^2}}$

3. $\frac{\sqrt{1-y^2}}{\sqrt{1+x^2}}$

4. $\frac{\sqrt{1-y^2}}{\sqrt{1-x^2}}$

108. The value of 'c' of the mean value theorem If

$f(x) = x(x-1)(x-2)$; $a = 0$, $b = 1/2$ is

1. 1

2. $1 + \frac{\sqrt{21}}{6}$

3. $1 - \frac{\sqrt{21}}{6}$

4. None

109. The angle between the curves $y = x^2$ and $y = 4 - x^2$ is

1. $\text{Tan}^{-1}\left(\frac{6}{13}\right)$

2. $\text{Tan}^{-1}\left(\frac{3}{4}\right)$

3. $\text{Tan}^{-1}\left(\frac{5}{\sqrt{13}}\right)$

4. $\text{Tan}^{-1}\left(\frac{4\sqrt{2}}{7}\right)$

110. The height of the cylinder of maximum volume which can be inscribed in a sphere of radius ' r ' is

1. $\sqrt{3}r$

2. $\frac{r}{\sqrt{3}}$

3. $\frac{2r}{\sqrt{3}}$

4. $\frac{r}{2\sqrt{3}}$

111. $\int \frac{1}{e^x + e^{-x}} dx$

1. $\text{Tan}^{-1}(e^x) + c$

2. $\cot^{-1}(e^x) + c$

3. $\log |e^x + 1| + c$

4. none

112. $\int e^{2x} \left(\frac{1 + \sin 2x}{1 + \cos 2x} \right) dx =$

1. $e^{2x} \tan 2x + c$

2. $e^{2x} \tan x + c$

3. $\frac{1}{2} e^{2x} \tan x + c$

4. $\frac{1}{2} e^x \sin x + c$

113. $\int_0^{\pi/2} \frac{\sin^{5/2} x}{\sin^{5/2} x + \cos^{5/2} x} dx =$

1. $\frac{\pi}{2}$

2. 0

3. $\frac{\pi}{4}$

4. $\frac{\pi^2}{4}$

114. $\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{r=1}^n \sqrt{\frac{r}{n}} =$

1. $\frac{1}{2}$

2. $\frac{2}{3}$

3. 2

4. 0

115. Area of the region bounded by $y = 4 - x^2$ and $x = 0, x = 2$ is

1. $\frac{28}{3}$

2. $\frac{32}{3}$

3. $\frac{8}{3}$

4. $\frac{16}{3}$

116. The order and degree of $\left[\frac{d^2 y}{dx^2} + \left(\frac{dy}{dx} \right)^3 \right]^{6/5} = 6y$

1. 2, 5

2. 2, 6

3. 6, 2

4. 2, 1

117. The general solution of $(x+2)\frac{dy}{dx} = xy$ is

1. $y(x+2)^2 = ce^x$

2. $\log(y(x+2)) = x + c$

3. $y(x+2)^2 = x + c$

4. None

118. If \vec{a}, \vec{b} are non collinear vectors and

$$\vec{A} = (x+4y)\vec{a} + (2x+y+1)\vec{b} \quad \vec{B} = (y-2x+2)\vec{a} + (2x-3y-1)\vec{b} \quad \text{and}$$

$$3\vec{A} = 2\vec{B} \text{ then } (x, y) =$$

1. (2, 1)
2. (2, -1)
3. (-2, -1)
4. (-2, 1)

119. If ABCDEF is a regular hexagon and

$$\vec{AB} + \vec{AC} + \vec{AD} + \vec{EA} + \vec{FA} = \lambda \vec{AB} \text{ then } \lambda =$$

1. 1
2. 2
3. 4
4. 6

120. If $\vec{a} = \hat{i} + j + tk, \vec{b} = \hat{i} + 2j + 3k$, then the value of t for which $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ are perpendicular

1. ± 2
2. $\pm 2\sqrt{2}$
3. $\pm 2\sqrt{3}$
4. ± 3

121. If $\bar{a} + \bar{b} + \bar{c} = \bar{0}$ then

1. $\bar{a} \cdot \bar{b} = \bar{b} \cdot \bar{c} = \bar{c} \cdot \bar{a}$
2. $\bar{a} \times \bar{b} = \bar{b} \times \bar{c} = \bar{c} \times \bar{a}$
3. $\bar{a} \times \bar{b} = \bar{b} \cdot \bar{c}$
4. $\bar{a} + \bar{b} = \bar{a} \times \bar{c} + \bar{b} \times \bar{c}$

122. If $\bar{a} = 2\hat{i} + 2j + k$, $\bar{a} \cdot \bar{b} = 14$, $\bar{a} \times \bar{b} = 3i + j - 8k$ then $\bar{b} =$

1. $5\hat{i} + j + 2k$
2. $5\hat{i} - 5j + 2k$
3. $5\hat{i} + 5j - 2k$
4. $5\hat{i} - 5j - 2k$

123. The projection of the join of the two points (1, 4, 5), (6, 7, 2) on the line whose direction ratios are (4, 5, 6) is

1. $\frac{13}{\sqrt{77}}$
2. $\frac{7}{6}$
3. $\frac{17}{\sqrt{77}}$
4. $\frac{1}{\sqrt{77}}$

124. The equation of the plane passing through the points (2, 1, -1), (1, 1, 1) (3, 3, 0) is

1. $4x + y - 3z - 26 = 0$
2. $2x - 3y + 2z + 15 = 0$
3. $2x - 4y + 3z + 8 = 0$
4. $4x - 3y + 2z - 3 = 0$

125. The foot of the perpendicular of the point (1, 6, 3) to the line

$$\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3} \text{ is}$$

1. (1, 3, 5)
2. (2, 4, 7)
3. (1, 3, 7)
4. (2, 3, 5)

126. Equation of the plane containing the line $\frac{x+1}{-3} = \frac{y-3}{2} = \frac{z+2}{1}$ and the point (0, 7, -7) is

1. $2x + y + z = 1$
2. $x + 2y + z = 2$
3. $x + y + z = 0$
4. None

127. The equation to the sphere on the line segment joining A(x_1, y_1, z_1) and B (x_2, y_2, z_2) as ends of diameter is

1. $x^2 + y^2 + z^2 - x_1x_2x - y_1y_2y - z_1z_2z + d = 0$
2. $x^2 + y^2 + z^2 - (x_1 + x_2)x - (y_1 + y_2)y - (z_1 + z_2)z = 0$
3. $x^2 + y^2 + z^2 + (x_1 - x_2)x + (y_1 - y_2)y + (z_1 - z_2)z = 0$
4. $(x - x_1)(x - x_2) + (y - y_1)(y - y_2) + (z - z_1)(z - z_2) = 0$

128. The radius of the circle $x^2 + y^2 + z^2 = 25$, $2x + y + 2z - 9 = 0$ is

1. 2
2. 4
3. 8
4. 16

129. The enveloping cone of the sphere $S = x^2 + y^2 + z^2 + 2x - 2y - 2 = 0$ with its vertex at (1, 1, 1) is

1. $3x^2 - y^2 + 4zx - 10x + 2y - 4z + 6 = 0$
2. $3x^2 - y^2 + 4zx + 10x - 2y + 4z = 0$
3. $3x^2 - y^2 + 4z^2 + 6 = 0$
4. $3x^2 - y^2 + 4z^2 - 10x + 2y + 6 = 0$

130. The radius of the sphere $x^2 + y^2 + z^2 - ax - by - cz = 0$ is

1. $\sqrt{a^2 + b^2 + c^2}$
2. $\frac{\sqrt{a^2 + b^2 + c^2}}{2}$
3. abc
4. $2\sqrt{a^2 + b^2 + c^2}$

131. The mode of the distribution 25, 16, 24, 40, 27, 25, 23, 20, 25, 19

1. 40
2. 27
3. 25
4. 16

132. The G.M of the observations 3, 9, 12, 16, 48 is

1. $\frac{88}{3}$
2. 16
3. 9
4. 12

133. The variance of first n- natural numbers is

1. $\frac{n^2 + 1}{12}$
2. $\frac{n^2 - 1}{12}$
3. $\frac{(n+1)(2n+1)}{6}$
4. None

134. Mean deviation of 7, 10, 15, 10, 8, 8, 7, 3, 2, 10 through mean is

1. 2.6
2. 8
3. $\frac{4}{5}$
4. none

135. Two dice are rolled simultaneously. The probability that the number on them are different is

1. $\frac{5}{6}$

2. $\frac{1}{4}$

3. $\frac{1}{2}$

4. $\frac{9}{13}$

136. A bag contains 5 white, 7 black and 4 red balls. 3 balls are drawn at random. The probability that all the three balls are white is

1. $\frac{5}{8}$

2. $\frac{3}{5}$

3. $\frac{1}{2}$

4. $\frac{1}{56}$

137. A and B are events with $P(A) = 0.5$, $P(B) = 0.4$ $P(A \cap B) = 0.3$. Then the probability that neither A nor B occurs is

1. 0.6

2. 0.4

3. 0.3

4. 0.2

138. A problem in calculus is given to two students A and B whose chances of solving it is $\frac{1}{3}$ and $\frac{1}{4}$ respectively. Find the probability of the problem being solved if both of them try independently is

1. $\frac{7}{12}$

2. $\frac{5}{12}$

3. $\frac{1}{12}$

4. $\frac{1}{2}$

139. The probability that a person chosen at random is left handed is 0.1. What is the probability that in a group of 10 people, there is one who is left handed

1. $(0.9)^{10}$

2. 0.9

3. $(0.9)^9$

4. 0.1

140. The probability of getting exactly 2 heads when tossing 7 coins is

1. $\frac{21}{128}$

2. $\frac{15}{16}$

3. $\frac{30}{16}$

4. $\frac{14}{128}$

141. Z is the set of integers, $(Z, *)$ is a group with $a * b = a + b + 1$, $a, b \in Z$. The inverse of 'a' is

1. $-a$
2. $a + 1$
3. $-2 - a$
4. None

142. A subset H of a group G is a group iff

1. $a, b \in H \Rightarrow ab \in H$
2. $a \in H \Rightarrow a^{-1} \in H$
3. $a, b \in H \Rightarrow ab^{-1} \in H$
4. H contains the identity element

143. The additive group of integers is a cyclic group generated by

1. 1
2. 2
3. 3
4. none of these

144. The permutation $f = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\ 6 & 1 & 4 & 3 & 2 & 5 & 7 & 9 & 8 \end{pmatrix}$ is

1. odd
2. even
3. even and odd
4. none

145. The set $\{a + ib \mid a, b \in \mathbb{Z}, i^2 = -1\}$ of Gaussian integers is

1. Ring
2. Integral domain
3. Field
4. None

146. $M = \left\{ \begin{bmatrix} a & 0 \\ b & 0 \end{bmatrix} \mid a, b \in \mathbb{Z} \right\}$. For the ring R of 2×2 matrices over \mathbb{Z} . M is

1. Ideal
2. Left Ideal
3. Right Ideal
4. None

147. A finite integral domain is

1. Field
2. Ring
3. Group
4. None

148. If $f(x) = 3 + 4x^2$, $g(x) = 2 + x^3$ are in $\mathbb{Z}_7[x]$ then the degree of $f(x)g(x)$ in $\mathbb{Z}_7[x]$ is

1. 4
2. 5
3. 2
4. None

149. If f is bounded of $[a, b]$ and P be partition of $[a, b]$ then $L(P, f)$ is

1. $\leq m(b-a)$

2. $\geq (b-a)$

3. $\leq M(b-a)$

4. $\geq M(b-a)$

150. If $f(x) = x^2$ on $[0, 1]$ and $P = \left\{0, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, 1\right\}$ then $U(P, f) =$

1. $\frac{7}{32}$

2. $\frac{5}{32}$

3. $\frac{10}{31}$

4. $\frac{15}{32}$

151. $\sum_{n=2}^{\infty} \frac{1}{n(\log n)^p}$ is

1. converges for all values of p

2. diverges for all values of p

3. oscillating at $p > 1$

4. None

152. Maclaurin's expansion of e^x is valid for
1. $0 < x < 1$
 2. $-1 < x < 1$
 3. $-\infty < x < \infty$
 4. none
153. The function $f(x) = \frac{1}{x}$ in $(0, 1)$
1. Uniformly continuous
 2. Continuous and differentiable
 3. Not continuous
 4. None
154. If α, β are two vectors of an inner product space such that $|(\alpha, \beta)| = \|\alpha\| \|\beta\|$ then α, β are
1. L.D
 2. L.I
 3. Orthogonal
 4. Orthonormal
155. Vector of unit length orthogonal to $\alpha = (2, -1, 6)$ in $V_3(\mathbb{R})$ w.r.t standard inner product is
1. $\left(\frac{2}{3}, \frac{-2}{3}, \frac{-1}{3}\right)$
 2. $(2, -2, 1)$
 3. $(1, 1, 1)$
 4. $(0, 0, 0)$

156. The set $S = \{ (1, 0, 0, -1) (0, 1, 0, -1) (0, 0, 1, -1) (1, 0, 0, 1) \}$ are vectors of \mathbb{R}^4 then the set S is

1. Linearly independent
2. Linearly dependent
3. Linearly independent & dependent
4. None

157. If $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ is a linear transformation defined by

$$T(x, y, z) = (3x + z, -2x + y, -x + 2y + 4z)$$

Find the matrix of T in the basis $B = \{(1, 0, 0), (0, 1, 0), (0, 0, 1)\}$

1.
$$\begin{bmatrix} 3 & -2 & -1 \\ 0 & 1 & 2 \\ 1 & 0 & 4 \end{bmatrix}$$

2.
$$\begin{bmatrix} 3 & 0 & 1 \\ -2 & 1 & 0 \\ -1 & 2 & 4 \end{bmatrix}$$

3.
$$\begin{bmatrix} 3 & 0 & 1 \\ 2 & -1 & 0 \\ 1 & -2 & -4 \end{bmatrix}$$

4.
$$\begin{bmatrix} 3 & 0 & -1 \\ 2 & -1 & 0 \\ 1 & -2 & 4 \end{bmatrix}$$

158. $V = \mathbb{R}^2$, the linear operator T on V defined by $T(a, b) = (-2a + 3b, -10a + 9b)$ then the eigen values of T are
1. 2, 3
 2. 2, 4
 3. 3, 4
 4. None
159. The set of values of x for which the inequalities $x^2 - 3x - 10 < 0$, $10x - x^2 - 16 > 0$ hold simultaneously
1. $\{x \in \mathbb{R} / 3 < x < 4\}$
 2. $\{x \in \mathbb{R} / 2 < x < 5\}$
 3. $\{x \in \mathbb{R} / 5 < x < 7\}$
 4. None
160. The eccentricity of the hyperbola $9x^2 - 16y^2 + 72x - 32y - 16 = 0$ is
1. $\frac{2}{5}$
 2. $\frac{3}{4}$
 3. $\frac{5}{4}$
 4. $\frac{9}{2}$

Methodology

161. Now a days, in modern mathematics, the two words 'postulates and axioms' are used as
1. Homonyms
 2. Antonyms
 3. Syllogisms
 4. Synonyms
162. According to Pythagoras, the ancient Greek mathematician, any odd number can be expressed as the difference of
1. two squares
 2. square of two squares
 3. square of two even squares
 4. square of two odd squares
163. In the ninth book of 'Euclidean Elements', Euclid is reported to have proved that the numbers are
1. finite
 2. infinite
 3. continued proportions
 4. finite and arithmetic progression

164. The book, titled ‘the synopsis of elementary results in pure and applied mathematics’ which encouraged Ramanujan for self study, is believed to contain
1. theorems only
 2. formulae and principles
 3. principles and short proofs
 4. theorems, formulae and short proofs
165. “All relations could be reduced to number relations” – stated by
1. Aryabhatta
 2. Rene Decartes
 3. Euclid
 4. Pythagoras
166. The evaluation process that is taken up along with instruction, as an integral part of it, is known as
1. Progressive Evaluation
 2. Programme Evaluation
 3. Formative Evaluation
 4. Functional Evaluation
167. Recalling type of test item is
1. True or false type of test item
 2. Filling the blank type of test item
 3. Multiple choice type of test item
 4. Matching type of test item

168. According to Indian (National) Education Commission of 1964-66, the aim of Education is strengthening
1. Spiritual integration
 2. Political integration
 3. Social and National integration
 4. Cultural integration
169. In the affective domain of educational objectives, the 'receiving' is at the lower (bottom) level and forms the basis for all other higher objectives. The objective of top most position is
1. responding
 2. valuing
 3. organization
 4. characterization
170. Which of the following statements is the specification of general objective namely 'drawing skill'
1. The pupil does written calculations quickly and correctly
 2. The pupil reads the tables quickly and correctly
 3. The pupil does oral calculations quickly and correctly
 4. The pupil draws figures neatly and correctly
171. According to a research finding, what percentage of knowledge will be remembered if we see and listen?
1. 20% of what we learn
 2. 30% of what we learn
 3. 50% of what we learn
 4. 80% of what we learn

172. At present the teachers are not following steps suggested by Herbart. The term 'assignment' is now considered as
1. Introductory activity
 2. Completion activity
 3. Concluding activity
 4. Culminating activity
173. Activities taken up in mathematics clubs, fairs and exhibitions are called as
1. Co-educational activities
 2. Co-syllabi activities
 3. Co-curricular activities
 4. Co-operative activities
174. Assignment means giving something to a person. In mathematics, it means a set of problems given by the teacher to do
1. independently and individually
 2. copy down from the guide books
 3. copy down from the class works
 4. copy down from other's note books
175. If a statements is true for any particular value, and if it is true for the next value in the same serial order, then it is true for all such values. This is the line of thinking behind
1. Analytic reasoning
 2. Synthetic reasoning
 3. Inductive reasoning
 4. Deductive reasoning

176. The process by means of which a logical inference can be made from an established fact or assumptions made, is known as
1. Inductive reasoning
 2. Deductive reasoning
 3. Heuristic reasoning
 4. Dogmatic reasoning
177. The method of teaching which starts from ‘hypothesis’ and proceeds to ‘conclusion’ is known as
1. Method of induction
 2. Method of deduction
 3. Method of analysis
 4. Method of synthesis
178. Heuristic method of teaching was advocated by H.E. Armstrong which of the following disadvantage is associated with Heuristic method
1. Role memorization will be discouraged
 2. Facilitates meaningful learning
 3. Non-availability of suitable textbooks
 4. Development of self-confidence
179. The man does not live only for ‘bread and butter’. While selecting topics for study mathematics, utmost weightage should be given to
1. Economic values
 2. Cultural values
 3. Human values
 4. Religious values

180. One of the following, called “Mathematics” as the gateway and key to all sciences
1. Plato
 2. Pascal
 3. Kant
 4. Bacon
181. Besides ‘defined and undefined terms’, the following is/are also essential for carrying out the process of deductive reasoning
1. Information and Imagination
 2. Axioms or postulates
 3. Synonym and antonyms
 4. Syllogisms and Homonyms
182. Pythagoras, the ancient Greek mathematician, is believed to have proved that a circle contains greater area than any other plane figure with the
1. Same volume
 2. Same perimeter
 3. Similar shape
 4. Same measurements
183. The problems on Arithmetic and Geometric progressions are reported to have found in Bhaskaracharya’s
1. Siddhantha Koumudhi
 2. Lilavathi Ganitham
 3. Sheelavathi Ganitham
 4. Siddhantha Visharada

184. The Evaluation that will be taken up to explore learning difficulties, weaknesses, along with reasons is known as
1. Problem evaluation
 2. Summative evaluation
 3. Diagnostic evaluation
 4. Remedial evaluation
185. A test item is said to be an objective test item, if
1. it is framed on the basis of some objective
 2. it can be scored on the basis of a key
 3. it is independent of scope and style
 4. the scoring is consistent with all examiners
186. In schools and colleges, the achievement tests are used to estimate the attainment in
1. School subjects
 2. General intelligence
 3. Physical growth and development
 4. Appreciations, attitudes and interests
187. The probability of guessing the correct answer will be upto 50% with
1. Matching type of test items
 2. Fill in the blanks type of test items
 3. True or false type of test items
 4. Multiple choice type of test items

188. The courses offered for a study, the curricular and co-curricular activities and the learning experiences provided in the class, are all directed towards the realisation of
1. Aims of education system
 2. Purpose of society
 3. Aspiration of teachers
 4. Ambition of parents
189. An instructional objective should always be stated in terms of
1. teacher behaviour
 2. parental behaviour
 3. student behaviour and teacher's behaviour
 4. student behaviour observable after teaching
190. Identify the general instructional objective of mathematics, from the following statements
1. The pupil recalls the properties of rectangle
 2. The pupil acquires the knowledge of terms, concepts etc., of mathematics
 3. The pupil compares the rectangle with square for sides and angles
 4. The pupil formulates the hypothesis

191. In each domain of objectives, there exists a hierarchy of abilities. This is the higher level objective than “Articulation” of psychomotor domain
1. Imitation
 2. Manipulation
 3. Precision
 4. Naturalisation
192. In the cone of learning experiences; one of the following is in between direct purposeful experience and dramatization learning experiences,
1. Field experiences
 2. Film experiences
 3. Contrived experiences
 4. Audio experiences
193. Mathematically talented children should be encouraged to take project works independently or in groups, through
1. Community clubs
 2. Country clubs
 3. Cultural clubs
 4. Mathematics clubs
194. Every year, the Indian National Mathematics Olympiad will be held, at selected Regional Centers, on first Sunday of
1. January month
 2. February month
 3. March month
 4. April month

195. One of the following generalization can be made by Inductive method
1. Sum of the first 'n' natural numbers
 2. Sum of the given odd numbers
 3. Sum of the given even numbers
 4. Sum of the given natural numbers
196. In problem solving method, a problem may be solved in seven steps which of the following is not a step of problem solving method
1. Recognising the problem
 2. Defining the problem
 3. Restating the problem
 4. Organization of the data
197. The experiences which a pupil gets in libraries and play fields of a school, are called as
1. Extra sponsored experiences
 2. Additional curricular experiences
 3. Co-curricular experiences
 4. Co-sponsored experiences
198. If all concepts of 'symmetry' that are presented in 6th class, is completely exhausted in the same class it is known as
1. Concentric approach
 2. Spiral approach
 3. Topical approach
 4. Unitary approach

199. In the High school mathematics, the topics namely, 'sets, relations and functions' are placed in a sequential order because knowledge of set theory is necessary in learning other topics. This type of arrangement is known as

1. Concentric approach
2. Psychological approach
3. Logical approach
4. Topical approach

200. The percentages, simple and compound interest are selected and placed in 'School syllabus so as to meet the criterion of

1. Disciplinary principle
2. Utilitarian principle
3. Cultural principle
4. Vocational principle