PREVIOUS YEAR PAPER

UPPSC GIC Lecturer 2025 Prelims — Mathematics (TUKU-07)

UPPSC GIC Lecturer

35 of the paper's 120 questions · +2.5 for a correct answer, −0.83 for a wrong one · 120 minutes

Left out of the original paper: 85 (any question that needs a figure, a symbol or formatting we cannot show, or whose text did not read back cleanly from the booklet).

The official booklet is a scan with no text; ExamBharo typed this paper from it by hand. Report a typing slip through exambharo.com/contact/.

Questions from the Uttar Pradesh Public Service Commission's paper. Each question is followed by its answer, and the answer key is repeated on the last page.

Take it as a timed practice test: exambharo.com/uppsc-gic-lecturer/previous-year-papers/uppsc-gic-lecturer-2025-prelims-mathematics/

Mathematics

43. Two operations $\oplus$ and $\otimes$ on the set R of real numbers are defined as follows: $a \oplus b = a+b+1$, $a \otimes b = ab+a+b \ \forall \ a, b \in R$. The unit elements of the ring $(R, \oplus, \otimes)$ for $\oplus$ and $\otimes$ are respectively

(a) -1, 0

(b) 0, 1

(c) 1, 0

(d) 0, -1

Answer: (a)

44. If $(\sqrt{3}+i)^{100} = 298(a+ib)$, then a^2+b^2 is eq

(a) 4

(b) 8

(c) 16

(d) 2

Answer: (c)

45. In how many ways a student can choose 7 subjects out of 10 subjects, if 3 subjects are compulsory?

(a) 35

(b) 40

(c) 42

(d) 30

Answer: (a)

46. A body is thrown horizontally from the top of a tower with velocity 20 m/second. It falls on the ground at a distance of 40 m from the foot of the tower. The height of the tower is (Where g=9.8 m/sec²)

(a) 19.6 meter
(b) 24.6 meter
(c) 39.2 meter
(d) 1.20 meter

Answer: (a)

48. Value 'a', for which the equations $x^2+ax-1=0$ and $x^2+x+a=0$ have one root in common, is

(a) $i\sqrt{2}$
(b) $\sqrt{3}$
(c) $-i\sqrt{3}$
(d) $\sqrt{2}$

Answer: (c)

49. The generators of a group G={a, a^2, a^3, a4=e} with multiplication composition are

(a) a, a^3
(b) a^2, a^3
(c) a^2, a4
(d) a, a^2

Answer: (a)

53. Let A be the set of real numbers. Then the relati[illegible] $R=\{(x, y): xy+1>0\}$ on A is

(a) Reflexive and transitive but not sym[illegible]
(b) Symmetric and transitive but not reflexiv[illegible]
(c) An equivalence relation
(d) Reflexive and symmetric but not transitive

Answer: (d)

54. If the spheres $x^2+y^2+z^2-2x-5z+4y=20$ and $x^2+y^2+z^2+2\lambda y-4=0$, cut orthogonally, then the value of λ is

(a) -2
(b) 2
(c) -6
(d) -3

Answer: (c)

55. The cube roots of -8i are

(a) $-2i, -\sqrt{3}-i, \sqrt{3}-i$
(b) $2i, -\sqrt{3}+i, \sqrt{3}-i$
(c) $2i, -\sqrt{3}-i, \sqrt{3}-i$
(d) $-2i, \sqrt{3}+i, \sqrt{3}-i$

Answer: (c)

57. Which of the following is NOT a binary operation on the set of integers?

(a) -

(b) ×

(c) ÷

(d) +

Answer: (c)

58. If F be any field and T be a linear operator on F^2 defined by T(a, b)=(a+b, a) then T^{-1} is defined as

(a) T^{-1} (p, q)=(q, p-q)

(b) T^{-1} (p, q)=(p+q, p-q)

(c) T^{-1} (p, q)=(p, p-q)

(d) None of the above

Answer: (a)

63. Which of the following relations in the set of real numbers $\mathbb{R}$ is an equivalence relation?

(a) $a\mathbb{R}b$ if $|a| \geq |b|$

(b) $a\mathbb{R}b$ if $a-b \geq 0$

(c) $a\mathbb{R}b$ if $a-b \leq 0$

(d) $a\mathbb{R}b$ if $|a|=|b|$

Answer: (d)

64. If G is any group, then its improper subgroup is/a

(a) {e} only

(b) G only

(c) Both (a) and (b)

(d) φ

Answer: (c)

67. The set R={0, 1, 2, 3, 4, 5} under addition and multiplication modulo 6 is

(a) a ring with zero divisors

(b) a ring without zero divisors

(c) a division ring

(d) a field

Answer: (a)

69. How many triangles can be constructed by connecting the vertices of an octagon so that the triangle have at most one side common with octagon?

(a) 44

(b) 48

(c) More than 48

(d) 40

Answer: (b)

71. Let G be a cyclic group of order 6. Then, the number of elements $g \in G$, such that $G=<g>$ is

(a) 3

(b) 4

(c) 5

(d) 2

Answer: (d)

78. If α is the inclination of the plane to the horizon, λ the angle of friction and w the weight of the body, then the least force required to pull the body up the inclined rough plane is

(a) w sin (α - λ)

(b) w sin α

(c) w sin λ

(d) w sin (α + λ)

Answer: (d)

79. If α, β, γ are the roots of the equation $x^3 + x + 1 = 0$, then the value of $\alpha^3 + \beta^3 + \gamma^3 + 3\alpha\beta\gamma$ is

(a) -3

(b) 0

(c) -6

(d) 3

Answer: (c)

82. If a is any element of a group G and O(a) = 30, th the order of a^{18} will be

(a) 5

(b) 6

(c) 8

(d) 4

Answer: (a)

85. Which of the following set of vectors is a basis for vector space R^3?

(a) {(1, -1, 1), (1, 0, 2), (2, 1, 1)}

(b) {(1, -1, 1), (1, 0, 2), (0, 1, 1)}

(c) {(1, -1, 1), (1, 0, 2), (1, -2, 0)}

(d) {(1, -1, 1), (1, 0, 2), (2, -1, 3)}

Answer: (a)

88. Under what condition, lines x = ay + b, z = cy + d and x = a'y + b', z = c'y + d' will be perpendicular to each other?

(a) aa' + cc' = 0

(b) aa' + cc' = -2

(c) aa' + cc' = -1

(d) None of the above

Answer: (c)

95. Number of points at which $f(x) = |x^2 + x| + |x^2 - 1|$ is NOT differentiable, is

(a) 1

(b) 3

(c) more than 3

(d) 0

Answer: (b)

96. Let the following vectors
$\alpha1 = (1, 1, 0, 1, 0, 0)$, $\alpha2 = (1, 1, 0, 0, 1, 0)$, $\alpha3 = (1, 1, 0, 0, 0, 1)$, $\alpha4 = (1, 0, 1, 1, 0, 0)$, $\alpha5 = (1, 0, 1, 0, 1, 0)$, $\alpha6 = (1, 0, 1, 0, 0, 1)$
The dimension of the vector space spanned by these vectors is

(a) 5

(b) 4

(c) 3

(d) 6

Answer: (b)

98. If in a group G, $a5 = e$ and $aba^{-1} = b^2$ for all $a, b \in G$. Then for $b \neq e$, O(b) equals to

(a) 33

(b) 23

(c) 31

(d) None of the above

Answer: (c)

99. If $f''(x) < 0$ for all x in (a, b), then $f'(x) =$ is

(a) at least once in (a, b)

(b) exactly once in (a, b)

(c) at most once in (a, b)

(d) none of the above

Answer: (c)

100. Which one of the following are the equations of circles touches the x-axis at a distance 3 from the origin and intercept a distance of 6 on the y-axis?

(a) $x^2 + y^2 \pm 6x \pm 6\sqrt{2}\, y + 9 = 0$

(b) $x^2 + y^2 \pm 6x + 6\sqrt{2}\, y + 9 = 0$

(c) $x^2 + y^2 \pm 6\sqrt{2}\, x - 6y + 9 = 0$

(d) $x^2 + y^2 - 6x \pm 6\sqrt{2}\, y + 9 = 0$

Answer: (a)

101. If A and B are symmetric matrices of the same order, then the matrix (AB - BA) is

(a) Zero matrix

(b) A symmetric matrix

(c) A skew-symmetric matrix

(d) A unit matrix

Answer: (c)

106. Consider the following sets.
A = {(1, 1, 0), (0, 1, 1), (1, -1, -2)}
B = {(0, 1, 0), (1, 1, 0), (0, 1, 1)}
C = {(1, 1, 0), (2, 1, 0), (1, 1, 0)}
Which of the above sets are linearly dependent?

(a) A and C

(b) B and C

(c) A, B and C

(d) A and B

Answer: (a)

110. The sum of first n terms of two arithmetic series are in the ratio (7n + 1): (4n + 27), then the ratio of their 11th terms is

(a) 3 : 2

(b) 4 : 3

(c) 3 : 4

(d) 2 : 3

Answer: (b)

113. If AB is diameter of the circle $x^2 + y^2 + 2x + 4y - 3 = 0$. If co-ordinate of A is (1, 0), then co-ordinate of B is

(a) (-3, 2)

(b) (-3, 3)

(c) (-3, -4)

(d) (-3, 1)

Answer: (c)

115. If the equation $x^3 + px + q = 0$ has two equal roots, then

(a) $4p^3 - 27q^2 = 0$

(b) $27q^3 + 4p^2 = 0$

(c) $4p^2 - 27q^3 = 0$

(d) $27q^2 + 4p^3 = 0$

Answer: (d)

116. For a square matrix A, the value of $(\text{adj } A)^{-1}$ is

(a) adj (A^{-1})

(b) adj (A)

(c) A

(d) A^{-1}

Answer: (a)

118. If (G, *) be a group with $x^2 = e \ \forall \ x \in G$, then (G, *) is

(a) Finite group

(b) Not a finite group

(c) Abelian group

(d) Semi group

Answer: (c)

119. In the group {a, a^2, a^3, a4, a5, a6 = e}, the order of a5 is

(a) 6

(b) 2

(c) 3

(d) 5

Answer: (a)

120. An aeroplane is moving with speed 360 km/h. It drops a packet while flying at a height of 980 meters. What will be the horizontal range of the packet?
(g = 9.8 m second^{-2} and $\sqrt{2} = 1.414$)

(a) 2121 meters

(b) 707 meters

(c) 1414 meters

(d) None of the above

Answer: (c)

Answer key

Answer key from the Uttar Pradesh Public Service Commission's official answer key for this sitting. "—" means the key gave none.

Mathematics

43	**(a)**	44	**(c)**	45	**(a)**	46	**(a)**	48	**(c)**	49	**(a)**
53	**(d)**	54	**(c)**	55	**(c)**	57	**(c)**	58	**(a)**	63	**(d)**
64	**(c)**	67	**(a)**	69	**(b)**	71	**(d)**	78	**(d)**	79	**(c)**
82	**(a)**	85	**(a)**	88	**(c)**	95	**(b)**	96	**(b)**	98	**(c)**
99	**(c)**	100	**(a)**	101	**(c)**	106	**(a)**	110	**(b)**	113	**(c)**
115	**(d)**	116	**(a)**	118	**(c)**	119	**(a)**	120	**(c)**		