



MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

SUPER MODEL QUESTION PAPER

Part C

1. Prove that :
$$\frac{\sin 5x - 2 \sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$$

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2. Solve the equation $z^2 = \bar{z}$ where $z = x + iy$

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3. Find h if the line through $(h, 3)$ and $(4, 1)$ intersects the line $7x - 9y - 19 = 0$ at right angles.

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4. The sum of first three terms of a G.P is $39/10$ and their product is 1. Find the common ratio and the terms.

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5. Find the co-ordinates of the foci, vertices and length of major axis of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$

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6. Find the derivative of $\frac{x^6 - \tan x}{x \cdot \sin x}$ wrt x



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7. By giving counter example, show that the following statement is false.

P : If n is an odd integer, then n is prime



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8. In a survey it was found that 21 people liked product A, 26 liked product B and 29 liked product C. If 14 people liked product A and B, 12 people like products C and A, 14 people liked products B and C and 8 liked all the three products. Find how many liked product C only.



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9. Define modulus function, draw the graph of it, write its domain and range.

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10. Prove that
$$\frac{\tan\left(\frac{\pi}{4} + x\right)}{\tan\left(\frac{\pi}{4} - x\right)} = \left(\frac{1 + \tan x}{1 - \tan x}\right)^2$$

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11. Show that : $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$

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12. Find the amplitude if $\sin. \frac{\pi}{5} + i\left(1 - \cos. \frac{\pi}{5}\right)$

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13. Find the equation of line cutting off intercepts on the axes whose sum is 1 and product is -6

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14. The portion of a line intercepted between the co-ordinate axes is divided by the point $(-4, 3)$ in the ratio $5:3$. Find the equation of the line.

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15. Find four numbers forming a geometric progression in which the third term is greater than the first term by 9 and the second terms is greater than the 4th by 18.



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16. Differentiate of $\sec x$ w.r.t. of from first principles



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17. Find the equation of the ellipse whose centre is at the origin and major axis along x-axis and passing through the points $(-3, 1)$ and $(2, -2)$.



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18. Evaluate $\lim_{x \rightarrow a} \frac{\cos x - \cos a}{\sqrt{x} - \sqrt{a}}$



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19. Given, P : 20 is a multiple of 4 and q : 25 is a multiple of 4 write the compound statement connecting these two statements with 'and' and 'or'. In both the cases the validity of the compound statement.

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20. A box contains 10 red marbles, 20 blue marbles and 30 green marbles. 5 marbles are drawn from the box. What is the probability that (i) all will be blue ? (ii) at least one will be green?

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21. Prove that $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$.

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1. Prove by mathematical induction that $1.4 + 4.7 + 7.10 + \dots$ up to n terms $= n(3n^2 + 3n - 2)$

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2. How many words with or without meaning, each of two vowels and 3 consonants can be formed from the letters of the word DAUGHTER?

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3. Prove that the Binomial theorem $(a + b)^n = {}^nC_0a^n + {}^nC_1a^{n-1}b + {}^nC_2a^{n-2}b^2 + \dots + {}^nC_nb^n$ for any positive integer 'n'.



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4. Derive the section formula for the internal division in three dimensions.

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5. If $A + B + C = \pi$, prove that $\sin 2A + \sin 2B + \sin 2C = 4 \sin A \sin B \sin C$.

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6. Find the equation of lines passing through the origin and making 45° with the line $3x - y + 5 = 0$.

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7. Find the sum to n terms of the series

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots$$

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8. (a) Define a parabola and derive its equation in the standard form

$$y^2 = 4ax$$

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9.

$$\frac{1}{1.4} + \frac{1}{4.7} + \frac{1}{7.10} + \dots + \frac{1}{(3n-2)(3n+1)} = \frac{n}{(3n+1)} \quad \forall n \in \mathbb{N}.$$

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10. A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of

(i) exactly 3 girls

(ii) atleast 3 girls?

(iii) atmost 3 girls?

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11. State and prove Binomial theorem for a positive integer index.

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12. Find the distance between two points in a three dimensional plane and hence find the distance between the points $P(-2,3,5)$ and $Q(1,2,3)$.

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13. Find the general solution of $(2 + \sqrt{3})\cos \theta + \sin \theta = 1$

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14. Find the image of the point $(3, 8)$ w.r.t the line $x + 3y = 7$, assuming the line to be a plane mirror.

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15. Verify by the method of contradiction that $\sqrt{7}$ is irrational number

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16. A box contains 10 red marbles, 20 blue marbles and 30 green marbles. 5 marbles are drawn from the box. What is the probability that (i) all will be blue ? (ii) atleast one will be green?

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17. Derive a formula for the angle between two lines with slopes m_1 and m_2 . Hence the slopes of the lines which make an angle $\frac{\pi}{4}$ with the line $x - 2y + 5 = 0$

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Part E

1. Prove that $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$.

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2. Prove by mathematical induction

$$1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}.$$

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3. Derive the equation of the ellipse in the form $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

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4. If $y = \frac{\sin x}{x^2}$ find dy/dx .

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5. Derive the equation of the ellipse in the form $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

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6. Find the sum of 'n' terms of $1.2 + 2.3 + 3.4 + 4.5 + \dots$

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7. Define hyperbola as a set of points derive its equation in the form

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

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8. Find the derivative of $\frac{x + \cos x}{\sin x}$ using rules of differentiation.

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1. Find $B - A$ if $A = \{2, 3, 4\}$ and $B = \{3, 4, 5, 6\}$

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2. Find the value of $\cos 390^\circ$

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3. From a committee of 8 persons, in how many ways can we choose a chairman and a vice chairman assuming one person can not hold more than one position ?

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4. Solve : $3(2 - x) \geq 2(1 - x)$

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5. Which term of the G.P 3,6 ,12 24..... Is 1536 ?

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6. Find the angle between the lines

$$\sqrt{3}x + y = 1 \text{ and } x + \sqrt{3}y = 1$$

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7. $\lim_{x \rightarrow 2} \frac{\sqrt{x} - \sqrt{2}}{x - 2}$

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8. An the following statement, identify the connecting word and break it in to components "All rational numbers are real and all real

numbers are not complex".

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9. Find the mean for the data 5, 7, 12, 8, 25, 27, 29

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10. Find the distance between the points $(-3, 7, 2)$ and $(2, 4, -1)$.

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Part B

1. If $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 2, 5, 6\}$, $B = \{6, 7\}$ verify that
 $A - B = B^c - A^c$



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2. If $A = \{1, 2, 3, \dots, 10\}$ define a relation R from A to A defined by,

$$R = \{(x, y) : 3x - y = 0, x, y \in A\}$$

Write down its domain.

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3. If in two circles arcs of the same length subtend angles 60° and 75° at the centre, find the ratio of their radii.

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4. Prove that $\tan(x + y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$

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5. Find the value of $\sin 15^\circ$



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6. How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if.

(i) 4 letters are used at a time,

(ii) all letters are used at a time

(iii) all letters are used but first letter is a vowel ?



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7. The first term of a GP is 1. The sum of 3rd and 5th term is 90. Find the common ratio of the G.P.



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8. Identify the type of 'or' used in the following statement and check whether the statement is true or false.

"To enter in to a public library children need an identity card from the school or a letter from the school authorities.

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9. Find the coefficient of x^{11} in $\left(x^3 - \frac{2}{x^2}\right)^{12}$

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10. A convex polygon has 44 diagonals. Find the number of sides.

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11. Find the conjugate of $\frac{(3 - 2i)(2 + 3i)}{(1 + 2i)(2 - i)}$.

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12. Solve each of the following equations.

1. Solve $x^2 + x + 1 = 0$

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13. Find all pairs of consecutive odd positive integers both of which are smaller than 10 such that their sum is more than 11.

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14. Find k if the following lines are concurrent

$3x + y = 2$, $kx + 2y = 3$ and $2x - y = 3$

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