



MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

ANNUAL EXAMINATION QUESTION PAPER - 2017 (NORTH) (WITH ANSWERS)

Part A | Answer All The Questions

1. Write the following sets in roster form:

$$D = \{x : x \text{ is a prime number which is divisor of } 60\}$$



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2. If $A \times B = \{(1, x)(2, x), (3, x), (1, y), (2, y), (3, y)\}$. Find $B \times A$.

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3. Convert $\left(\frac{5\pi}{3}\right)^e$ into degrees.

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4. Express $3(7 + i7) + i(7 + i7)$ in the form $a + ib$

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5. How many 3 digit even numbers can be formed from the digits 1, 2, 3, 4, 5, 6 if the digits can be repeated .

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6. If $a_n = \frac{n(n-2)}{n+3}$: find the term a_{20} °

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7. Find the equation of the line passing through the point (-4,3) with slope 1/2.

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8. Evaluate : $\lim_{x \rightarrow 1} (x^3 - x^2 + 1)$.

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9. Write the negation of the statement " The number 2 is greater than 7"



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10. A person is noting down the number of accidents along a busy highway during a year.



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Part B li Answer Any Ten Questions

1. Write down all the subsets of $\{1,2,3\}$



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2. If $A = \{3, 5, 7, 9, 11\}$, $B = \{7, 9, 11, ,1\}$ and $C = \{11, 13, 15\}$, and $D = \{15, 17\}$,

find $(A \cup D) \cap (B \cup C)$



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3. If $A = \{1, 2, 3, 5\}$ and $B = \{4, 6, 9\}$. Define a relation R from A to B by $R = \{(x, y) : \text{the difference between } x \text{ and } y \text{ is odd, } x \text{ in } A, y \text{ in } B\}$ Write R in roster form .

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4. Prove that $\sin^2(\pi/6) + \cos^2(\pi/3) - \tan^2(\pi/4) = \frac{-1}{2}$

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5. Find the values of trigonometric function $\tan(19\pi/3)$

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6. Find the multiplicative inverse of $1+i$.



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7. Solve $7x + 3 < 5x + 9$. Show the graph of the solution on number line.



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8. Without using distance formula, show that points $(-2,-1)$, $(4,0)$, $(3,3)$ and $(-3,2)$ are the vertices of a parallelogram.



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9. Find the equation of the passing through $(2, 3)$ and cutting off equal intercepts on co-ordinate axis.



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10. Verify that the points $(0, 7, 10)$, $(-1, 6, 6)$ and $(-4, 9, 6)$ are the vertices of an isosceles triangle

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11. Evaluate : $\lim_{x \rightarrow 0} \left[\frac{(x+1)^5 - 1}{x} \right]$.

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12. Write the contrapositive and converse of the following statement "x is an even number implies that x is divisible by 4"

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13. Find the mean of first n natural numbers .

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14. A coin is tossed twice. What is the probability that at least one tail occurs?

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Part C Iii Answer Any Ten Questions

1. In a survey of 600 students in a school, 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee?

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2. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real values functions, find

$$(f + g)(x)$$



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3. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real values functions,

find

$$(f - g)(x)$$



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4. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real values functions,

find

$$(fg)(x).$$



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5. $\cos 4x = \cos 2x$



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6. Write $-2 - 2i$ in polar form.



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7. Solve $\sqrt{2}x^2 + x + \sqrt{2} = 0$



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8. 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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9. Find the middle term in the expansion of $\left(\frac{x}{3} + 9y\right)^{10}$

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10. If the sum of a certain number of terms of the A.P. 25, 22, 19, is 116. Find the last term.

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11. The 4th term of a G.P is square of its second term, and the first term is -3. Determine its 6th term.

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12. Find the equation of the circle with radius 5 whose centre lies on the x -axis and passes through the point $(2,3)$.

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13. Differentiate $\sin x$ w.r.t. x from first principles

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14. Verify by the method of contradiction that $\sqrt{2}$ is irrational.

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15. Two dice are thrown, the events A, B and C are as follows

A: getting an even number on the first die

B: getting an odd number on the first die

C : getting the sum of the numbers on the dice ≤ 15

Describe the events

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16. A and B are events such that $P(A) = 0.42, P(B) = 0.48$ and $P(A \text{ and } B) = 0.16$ Determine (i) $P(\text{not } A)$,(ii) $P(\text{not } B)$,(iii) $P(A \text{ or } B)$

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Part D Iv Answer Any Six Questions

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

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2. Prove that $\frac{\cos 4x + \cos 3x + \cos 2x}{\sin 2x + \sin 3x + \sin 4x} = \cot 2x$.

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3.

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots + \frac{1}{n(n+1)} = \frac{n}{n+1} \quad \forall n \in \mathbb{N}.$$

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4. Solve graphically

$$2x + y \geq 4, x + y \leq 3, 2x - 3y \leq 6, x \geq 0, y \geq 0$$

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

exactly 3 girls ?

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6. State and prove Binomial theorem for any positive integer n .

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7. Derive the expression for the length of the perpendicular drawn from the point (x_1, y_1) to the line $ax + by + c = 0$

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8. Find the coordinates of the point which divides the line joining the points $A(5, 4, 2)$ and $B(-1, -2, 4)$ in the ratio (i) $2 : 3$ internally (ii) $2 : 3$ externally.

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9. Prove that $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$ (x being measured in radians)

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10. Find the M.D. about mean

| Height in cms | 95-105 | 105-115 | 115-125 | 125-135 | 135-145 | 145-155 |
|---------------|--------|---------|---------|---------|---------|---------|
| Number of boy | 9 | 13 | 26 | 30 | 12 | 10 |

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Part E V Answer Any One Question

1. (a) Derive geometrically that $\cos(x + y) = \cos x \cos y - \sin x \sin y$

.Hence deduce the value of $\cos 75^\circ$

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2. Find the sum to n terms of the series .

$$3 \times 1^2 + 5 \times 2^2 + 7 \times 3^2 + \dots$$

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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. Find the derivative of $\frac{x + \cos x}{\tan x}$ with respect to x

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