



# MATHS

**BOOKS - JEEVITH PUBLICATIONS MATHS  
(KANNADA ENGLISH)**

**ANNUAL EXAMINATION QUESTION  
PAPER - 2019 (NORTH) (WITH ANSWERS)**

**Part A | Answer The Following Questions**

1. Write the following set in roster form  $A = \{ x \text{ is a natural number less than } 6 \}$



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2. If  $P = \{ a, b, c \}$  and  $Q = \{ r \}$ , find  $P \times Q$ .



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3. Convert  $\left( \frac{7\pi}{6} \right)^e$  into degrees.



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4. Express  $(-5i)\left(\frac{1}{8}i\right)$  in the form  $a + ib$ .



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5. Evaluate  $4! - 3!$ .



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6. Write the first three terms of the sequence defined by  $a_n = 2n + 5$ .



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7. Find the slope of the line passing through the points (3,-2) and (-1,2) .



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8. Evaluate :  $\lim_{x \rightarrow 4} \left( \frac{4x + 3}{x - 2} \right)$



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**9.** Write the negation of the statement 'Australia is a continent'



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**10.** A coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there ?



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**Part B | Answer Any Ten Questions**

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

$D = \{15, 17\}$ , find

$A \cap (B \cup C)$



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2. If  $X$  and  $Y$  are two sets such that  $n(X) = 17, n(Y) = 23$ , and  $n(X \cup Y) = 38$  find  $n(X \cap Y)$



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3. Let  $f = \{(1,1), (2,3), (0,-1), (-1, -3)\}$  be a function from  $Z$  to  $Z$  defined by  $f(x) = ax + b$ , for some integers  $a, b$ . Determine  $a, b$ .



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4. Find the radius of the circle in which a central angle of  $60^\circ$  intercepts an arc of length 37.4 cm  
(use  $\pi = \frac{22}{7}$ )



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5. Find the general solution of  $\cos x = \left(\frac{1}{2}\right)$ .



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6. Solve each of the following equations.

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



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7. The marks obtained by a student of class XI in the first and second terminal examination are 62



and 48 respectively. Find the minimum marks he should get in the annual examination to have an average of at least 60 marks .



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8. Find the equation of the line through the point  $(-2,3)$  and having the slope  $-4$



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9. Find the distance of the point (3,-5) from the line  $3x - 4y - 26 = 0$



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10. Find the co-ordinates of the point P which divides the line segment joining the points A ( 1, - 2, 3 ) and B ( 3 , 4 - 5 ) internally in the ratio 2 : 3



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11. Evaluate  $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x}$  .



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12. Write the component statement of the following compound statement and check whether they are true or false "All prime numbers are either even or odd"



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**13.** Two series A and B with equal means standard deviation 9 and 10 respectively . Which series is more consistent ?



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**14.** A committee of two persons is selected from two men and two women. What is the probability that the committee will have (i) no men (ii) two men



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## Part C Iii Answer Ten Questions

1. Let  $U = (1, 2, 3, 4, 5, 6)$ ,  $A = \{2, 3\}$  and  $B = \{3, 4, 5\}$ . Show that  $(A \cup B)' = A \cap B'$ .



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

(i)  $(f + g)(x)$  (ii)  $(f - g)(x)$  (iii)  $(fg)(x)$



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3. Prove that :  $\tan 3x = \frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x}$



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4. Represent the complex number  $Z = 1 + i\sqrt{3}$  in the polar form .



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5. (ii) If  $x + iy = \frac{a + ib}{a - ib}$  prove that  $x^2 + y^2 = 1$



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6. In how many of distinct permutations of the letters in the word MISSISSIPPI do the 4 I's not some together?



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7. Find the term independent of  $x$  in the expansion of  $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)$ .



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8. In an A.P if  $m^{\text{th}}$  term is  $n$  and  $n^{\text{th}}$  term is  $m$ , where  $m \neq n$ , find the  $p^{\text{th}}$  term .



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9. Find the sum of the sequence 8, 88, 888, 8888, .  
.. To  $n$  terms.



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10. Find the centre and radius of the circle

$$x^2 + y^2 + 8x + 10y - 8 = 0$$





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11. Differentiate of  $\cos x$  w.r.t.  $x$  from first principles



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



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13. If  $E$  and  $F$  are two events such that  $P(E) = \frac{1}{4}$ ,  $P(F) = \frac{1}{2}$  and  $P(E \text{ and } F) = \frac{1}{8}$ . Find  $P(\text{not } E \text{ and not } F)$



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14. One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be (a) a diamond (b) not a diamond (c) a black card.



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## Part D Iv Answer Any Six Questions

1. Define a modulus function . Draw its graph.  
Also write down its domain and range.



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2. Prove that

$$\cos^2 x + \cos^2 \left( x + \frac{\pi}{3} \right) + \cos^2 \left( x - \frac{\pi}{3} \right) = \frac{3}{2}$$



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3.

$$1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$$



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4. Solve the following system of inequalities graphically :

$$5x + 4y \leq 20, x \geq 1, y \geq 2$$



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5. A group consists of 7 boys and 5 girls . Find the number of ways in which a team of 5 members can be selected so as to have atleast one boy and girl.



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



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7. Derive the equation of a straight line having the intercepts 'a' & 'b' on the X and Y-axes respectively. Hence find the equation of the line intercepts -3 and 2 on the X and Y-axes respectively.



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



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10. Find the mean for the following data

Marks obtained	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No of students	2	3	8	14	8	3	2



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## Part E V Answer Any One Question

1. prove that

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$



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2. Find the sum of 'n' terms of 1.2

$$+2.3+3.4+4.5+\dots$$



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3. (a) Define a parabola and derive its equation in the standard form  $y^2 = 4ax$



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4. (b) Find the derivative of  $\frac{x^5 - \cos x}{\sin x}$  with respect to  $x$ .



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