



## MATHS

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

### MOCK QUESTION PAPER - 3

#### Part A

1. Write  $\{3, 6, 9, 12\}$  in the set-builder form ?



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2. If set A has three elements and set  $B = \{3, 4, 5\}$  find the number of elements of  $A \times B$



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

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4. Express  $i^9$  in the form of  $a+ib$ ?

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5. Find the value of  $\frac{8!}{6! \times 2!}$

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6. If  $a_n = \frac{n^2}{2^n}$ , then find  $a_7$ .

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7. Find the slope of the lines making inclination of  $60^\circ$  with the positive direction of x-axis ?

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8. Evaluate  $\lim_{x \rightarrow 3} [x(x + 1)]$  ?

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9. Write the negation of statement "every natural number is an integer"?

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10. If two coin are tossed once . Find a sample space ?

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1. If  $U = \{1, 2, 3, 4, 5, 5, 6\}$ ,  $A = \{2, 3\}$  and  $B = \{3, 4, 5\}$ . Find  $A \cap B$  ?

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2. Draw appropriate Venn diagram for  $(A \cup B)$  ?

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3. Let  $A = \{1, 2\}$  and  $B = \{3, 4\}$ . Find the number of relations from A to B.

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4. In a circle of diameter 40 cm, the length of a chord is 20 cm. Find the length of minor arc of the chord.

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5. Write the principal solution of  $\cot x = (-\sqrt{3})$  ?



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6. If  $x + iy = \frac{a + ib}{a}ib$ . Prove that  $x^2 + y^2 = 1$  ?



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7. Find all pairs of consecutive even positive integer both of which are larger than 5 such that sum is less than 23.



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8. Reduce the equation  $\sqrt{3}x + y - 8 = 0$  to normal form and find the length of the Perpendicular to the normal from origin and angle made by it with positive x axis.



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9. If the lines  $2x + y - 3 = 0$ ,  $5k + ky - 3 = 0$  and  $3x - y - 2 = 0$  are concurrent, find the value of  $K$ ?

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10. Show that the points  $P(-2, 3, 5)$ ,  $Q(1, 2, 3)$  and  $R(7, 0, -1)$  are collinear.

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

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12. Write the converse and contrapositive of the statement "If a triangle is equilateral, it is isosceles"?

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13. Find the mean for the following data

6, 7, 10, 12, 13, 4, 8, 12

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14. A bag contains of discs of which are red ,3 are blue and 2 are yellow .The discs are similar in shape and size .A disc is drawn at random from the bag .Calculate the probability that it will be (i) red (ii) not blue ?

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## Part C

1. In a group of 400 people , 250 can speak Hindi and 200 can speak English. How many people can speak both Hindi and English ?

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2. Determine the domain and range of the relation R defined by

$$R = \{(x, x+5) : x \in \{0, 1, 2, 3, 4, 5\}\}$$

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3. Prove that :  $\sin 3x = 3 \sin x - 4 \sin^3 x$

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4. Convert the complex number  $-1+i$  in the polar form ?

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5.  $x^2 + x + \frac{1}{\sqrt{2}} = 0$

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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. Find the middle terms in the expansion  $\left(3 - \frac{x^3}{6}\right)^6$

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8. If the sum of three numbers in A.P is 24 and their product is 440, find the numbers?

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9. If A.M and G.M of two positive numbers  $a$  and  $b$  10 and 8 respectively , find the numbers ?

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

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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  $\sqrt{7}$  is irrational number

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13. Two dice are thrown .The events A an and B as follows

A : getting an even number on the first dice.

B : getting an odd number on the first dice .

Describe the events (i) A (ii) not B ?



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14. If E and F are events such that

$$P(E) = \frac{1}{4}, P(F) = \frac{1}{2} \text{ and } P(E \text{ and } F) = \frac{1}{8}. \text{ Find}$$

$P(\text{not } E \text{ and not } F).$



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## Part D

1. Define greatest integer function .Draw its graph ,write its domain and range ?



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

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3.

$$1 \cdot 2 \cdot 3 + 2 \cdot 3 \cdot 4 + \dots + n(n+1)(n+2) = \frac{n(n+1)(n+2)(n+3)}{4} \forall n$$

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4. Solve the system inequalities  $(2x + y \geq 4, x + y \leq 3, 2x - 3y \leq 6)$  by graphically ?

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5. A group consists of 4 girls and 7 boys .In how ways can a team of 5 members be selected ,if the team has ?

(i) no girl

(ii) atleast one boy and one girl ?

(iii) at least three girls ?



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



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



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8. Derive the formula to find the co-ordinates of a point which divide the line joining the points  $A(x_1, y_1, z_1)$  and  $B(x_2, y_2, z_2)$  internally in the ratio  $m : n$ .

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9. Prove that  $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$  ?

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10. Find the mean deviation about the mean for the following data ?

$x_i$	5	7	9	10	12	15
$f_i$	8	6	2	2	2	6

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## Part E

1. Prove Geometrically  $\cos(x + y) = \cos x \cos y - \sin x \sin y$  and hence prove that  $\cos(x - y) = \cos x \cos y + \sin x \sin y$  using unit circle concept

?

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

$$1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + \dots$$

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3. Define ellipse and derive its equation in the form

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 (a > b).$$

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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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