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India's Number 1 Education App

## MATHS

## BOOKS - JBD PUBLICATION

## MODEL PAPER (6)

## Exercise

1. The $\operatorname{set} A=\{x: x$ is a prime number and divisor of 6$\}$ is equal to:
2. Let $A$ be a set containing 10 distinct elements.

Then the total number of distinct functions from $A$ to $A$ is:
A. 10
B. $10^{10}$
C. $2^{10}$
D. $10^{2}-1$

## Answer:

3. The value of $\sin ^{2} 75^{\circ}-\sin ^{2} 15^{\circ}$ is equal to:
A. $\frac{\sqrt{3}}{2}$
B. 0
C. $\frac{1}{2}$
D. 1

## Answer:

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4. If $\alpha, \beta$ are the roots of the equation $x^{2}-2 x+2=0$, then the value of $\alpha^{2}+\beta^{2}$ is
A. -1
B. 1
C. 0
D. $\pm 1$

Answer:

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5. The value of ${ }^{n} P_{r}$, and ${ }^{n} C_{r}$ will be equal when
A. $n=2 r$
B. $r=0$ or 1
C. $n=r$
D. $n=3 r$

## Answer:

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6. Three numbers $a, b$ and $c$ are in A.P if:
A. $2 a-b-c=0$
B. $a-b-c=0$
C. $2 b-a-c=0$
D. none of these

## Answer:

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7. Slope of the line which cuts off intecepts of equal length on the axis is?

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8. The foci of the ellipse $9 x^{2}+4 y^{2}=36$ are
A. $( \pm 5,0)$
B. $(0,-5)$
C. $(-5,0)$
D. $(0, \pm 5)$

## Answer:

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9. $\lim _{x \rightarrow 2}\left(x^{3}-x^{2}+1\right)$ is equal to:
A. -11
B. 12
C. -12
D. none of these

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10. The number of elements in a sample space, when a die rolled twice are
A. 36
B. 63
C. 33
D. 66

Answer:
11. Prove that: $\sin 18^{\circ}=\frac{\sqrt{5}-1}{4}$

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12. Prove the following: $\frac{\sin 5 x+\sin 3 x}{\cos 5 x+\cos 3 x}=\tan 4 x$

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13. Find the multiplicative inverse of 7-2i.
14. Find the middle terms in the expansion of $\left(\frac{x}{3}+a y\right)^{10}$

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15. Find the term independent of $x$ in the expansion
of $\left(x^{2}+\frac{1}{x}\right)^{9}$.

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16. Find the co-ordinates of the centroid of the triangle whose vertices are

## $\left(x_{1}, y_{1}, z_{1}\right),\left(x_{2}, y_{1}, z_{2}\right)$ and $\left(x_{3}, y_{3}, z_{3}\right)$.

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17. Find out which of the following sentences are statements and which are not. Justify your answer.

Asia is a continent.

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18. Find out which of the following sentences are
statements and which are not. Justify your answer.
$\sqrt{2}$ is a rational number.
19. Write the converse of the following statements.

If a number x is even, then $x^{2}$ is also even.

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20. Write the converse of the following statements.

If you do all the exercises in the book, you get $A$ grade in the class.

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21. Find the (a) union (b) intersection of the following pair of sets :
$A=\{x: x$ is a natural number and multiple of 3$\}, B=$ $\{x: x$ is a natural number less than 6$\}$.

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22. Find the domain and range of $\sqrt{9-x^{2}}$.

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23. Find the general solution of $\sin x+\sin 5 x=\sin 2 x+\sin 4 x$.
24. Prove by the principle of mathematical induction $10^{2 n-1}+1$ is divisible by 11 .

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25. If $.{ }^{n+1} C_{r+1}:{ }^{n} C_{r}:{ }^{n-1} C_{r-1}=11: 6: 3$, find the
values of $n$ and $r$.

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26. In how many ways can the letters of the word PERMUTATIONS be arranged if the words start with $P$ and end with S ?

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27. In how many ways can the letters of the word PERMUTATIONS be arranged if the vowels are all together?

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28. Insert five numbers between 8 and 26 such that the resulting sequence is an A.P.

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29. If A and G be A.M. and G.M., respectively between two positive numbers, prove that the numbers are $A \pm \sqrt{(A+G)(A-G)}$.

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30. Find the equations of the lines passing through
the point $(2,2)$ such that the sum of their intercepts
on the axes is 9.

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31. Find the coordinates of the foci and the vertices,
the ecentricity and the length of the latus rectum of
the hyperbolas :
$16 x^{2}-9 y^{2}=576$

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32. Prove that: $\lim _{x \rightarrow 2} \frac{|x-2|}{x-2}$ does not exist.
33. Find the derivative of $\frac{x}{\sin ^{n} x}$

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34. In a single throw of two dice, find the probability of getting a total of 9 or 2 .

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35. If $\left[\frac{1}{1-4 i}-\frac{2}{1+i}\right]\left[\frac{3-4 i}{5+i}\right]=a+i b$ then find the values of $a$ and $b$.
36. Find the multiplicative inverse of $Z=1+\cos \theta+i \sin \theta$.

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37. Solve the following systems of linear inequalities graphically
$3 x+4 y \leq 60, x+3 y \leq 30, x \geq 0, y \geq 0$.

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38. Solve the system of inequalities:
$2(2 x+3)-10<6(x-2),\left(\frac{x-2}{2}\right)+13 \geq 2+\frac{4 x}{3}$

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39. Evaluate $\lim _{x \rightarrow 0} \frac{\sin a x+b x}{a x+\sin b x}$

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40. Find the derivative of
$x^{-3}(5+3 x)$
41. Find the derivative of
$x^{5}\left(3-6 x^{-9}\right)$.

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42. Find the mean and variance of the first $n$ natural numbers.
43. Find the mean of the following data:

| Class-interval | Frequency |
| :---: | :---: |
| $0-50$ | 4 |
| $50-100$ | 10 |
| $100-150$ | 12 |
| $150-200$ | 10 |
| $200-250$ | 8 |
| $250-300$ | 6 |
| Total | 50 |

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