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## MATHS

## BOOKS - JBD PUBLICATION

## MODEL PAPER (13)

## Exercise

1. If $A$ and $B$ are any two sets, then
$A \cup(A \cap B)$ is equal to
A. A

$$
\text { B. } A \cap B
$$

C. B
D. $\phi$

## Answer:

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2. If $x \neq 1$ and $f(x)=\frac{x+1}{x-1}$ is a real function, then $f(f(f)))$ is
A. 1
B. 2
C. 3
D. 4

## Answer:

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3. If $\theta$ and $\phi$ are acute angles such that $\cos \theta=\frac{13}{14}$ and $\cos \phi=\frac{1}{7}$, then value of $(\theta-\phi)$ is equal to:
A. $-\frac{\pi}{3}$
B. $\frac{\pi}{3}$
C. $\frac{\pi}{2}$
D. none of these

## Answer:

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4. If one root of the equation
$x^{2}+p x+12=0$ is 4 , while the equation
$x^{2}+p x+q=0$ has equal roots, then the value of $q$ is:

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5. How many words, with or without meaning
can be made from the letters of the word

MONDAY, assuming that no letter is repeated,
if, all letters are used but first letter is a vowel?
A. 120
B. 1
C. 720
D. 0

## Answer:

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6. Let the angles $\mathrm{A}, \mathrm{B}, \mathrm{C}$ of $\triangle A B C$ be in A.P.
and let $b: c=\sqrt{3}: \sqrt{2}$. Then angle $A$ is :
A. $75^{\circ}$
B. $60^{\circ}$
C. $45^{\circ}$
D. none of these

## Answer:

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7. If the lines $a x+12 y+1=0, b x+13 y+1=0$ and $c x+14 y+1=0$ are concurrent, then $a, b, c$ are in:
A. H.P
B. G.P.
C. A.P

## D. none of these

## Answer:

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8. The equation of a parabola whose focus is
$(-3,0)$ and dielectrix is $x+5=0$.

$$
\text { A. } y^{2}=-4(x+4)
$$

$$
\text { B. } x^{2}=-4(y+4)
$$

$$
\text { C. } y^{2}=4(x+4)
$$

## D. none of these

## Answer:

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9. Let $y=\frac{x}{x+5}$, then value of $\frac{d y}{d x}$ is:
A. $\frac{1+y}{y}$
B. $\mathrm{y}(1-\mathrm{y})$
C. $1+y^{2}$

## D. none of these

Answer:

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10. 

If
$P(A)=P(B)=x$
and
$P(A \cap B)=P(\bar{A} \cap \bar{B})=\frac{1}{3}$, then the value of $x$ is:
A. $\frac{1}{2}$
B. $\frac{1}{3}$
C. $\frac{1}{4}$
D. none of these

## Answer:

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11. 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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# 12. Prove the following: <br> $\cos ^{2} 2 x-\cos ^{2} 6 x=\sin 4 x \sin 8 x$ 

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13. Simplify: $\frac{(1-i)^{2}}{(1+i)^{2}}$

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14. Show that the middle term in the expansion
of $(1+x)^{2 n}$ is $\frac{1.3 .5 \ldots(2 n-1)}{n!} 2^{n} x^{n}$, where
$n$ is a positive integer.

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15. Write the general term in the expansion of $\left(x^{2}-y\right)^{6}$.

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16. Using section formula, prove that the three
points $(-4,6,10),(2,4,6)$ and $(14,0,-20)$ are collinear.

Also find the ratio in which point $B$ divides the join of $A$ and $C$.

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17. Find the component statement of the
following and check whether they are true or not.

All prime numbers are either even or odd.

- 

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18. In a group of 65 people, 40 like cricket, 10
like both cricket and tennis. How many like tennis only and not cricket? How many like tennis?

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19. If $f(x)=x^{3}-\frac{1}{x^{3}}$, find the value of $f(x)+f\left(\frac{1}{x}\right)$.
$\tan ^{2} 20-\tan ^{2} \theta$
$=\tan 30 \tan \theta$

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21. Prove, by Mathematical Induction, that for
all $n \in N$,
$2.7^{n}+3.5^{n}-5$ is divisible by 24.

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22. How many different numbers between 100 and 1000 can be formed from the digits $0,1,2,3,4,5$ and 6 assuming that in a number the digit can not be repeated? How many of these will be divisible by 5 ?

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23. The ratio of the.A.M. and G.M. of two positive numbers $a$ and $b$ is $m$ : $n$. Show that $a: b=\left(m+\sqrt{m^{2}-n^{2}}\right):\left(m-\sqrt{m^{2}-n^{2}}\right)$
24. If the sum to infinity of the series
$3+5 r+7 r^{2}+\ldots \ldots \ldots i s \frac{44}{9}$. Find r .

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25. The line $2 x-3 y=4$ is perpendicular bisector of
the line $A B$. If the coordinates of $A$ are $(-3,1)$.

Fiind the coordinates of $B$.
26. Find the equation of ellipse whose vertices
are $( \pm 13,0)$ and foci are $( \pm 5,0)$

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27. Find $\lim _{x \rightarrow 1} f(x)$, where
$f(x)= \begin{cases}x^{2}-1 & x \leq 1 \\ -x^{2}-1 & x>1\end{cases}$

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28. Find the derivative of $x^{4}-5$ at $\mathrm{x}=10$.

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29. In a single throw of two dice, find the probability of total of 9 or 10.

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30. A bag contains 5 black and 3 white balls.

Two balls are drawn at random. Find the probability of drawing two black balls.
31. A bag contains 5 black and 3 white balls.

Two balls are drawn at random. Find the probability of drawing two white balls.

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32. Convert $z=\frac{i-1}{\cos \frac{\pi}{3}+i \sin \frac{\pi}{3}}$ in polar form.

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33. Find the modulus and argument of the
complex number $\frac{1+2 i}{1-3 i}$

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34. Solve the following system of inequalities
graphically:
$x+2 y \leq 10, x+y \geq 1, x-y \leq 0, x>0, y \geq 0$

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35. In an experiment, a solution of a hydrochloric acid is to be kept between $30^{\circ}$ and $35^{\circ} \mathrm{C}$. what is the range of the temperature in degree fahrenheit, if conversion formula is given by
$C=\frac{5}{9}(F-32)$
Where C and F represent temperature in degree celsius and degree fahrenheit respectively.
36. Evaluate: lim

$$
\cos x-\sin x
$$

$$
\lim _{x \rightarrow \frac{\pi}{4}} \quad x-\frac{\pi}{4}
$$

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37. Find the derivative of $\sin (x+1)$ w.r.t. $x$

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38. Find the variance and S.D of the following set of numbers:
$25,50,45,30,70,42,36,48,34,60$

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39. Find the mean deviation about the mean of
the following data:
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