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## MATHS

# BOOKS - S CHAND MATHS (ENGLISH) 

## MODEL TEST PAPER-7

Section A

1. The greatest value of $\sin x \cos x$ is
A. 1
B. 2
C. $\sqrt{2}$
D. $\frac{1}{2}$
2. The value of $\frac{1-\tan ^{2} 15^{\circ}}{1+\tan ^{2} 15^{\circ}}$ is
A. 1
B. $\sqrt{3}$
C. 2
D. $\frac{\sqrt{3}}{2}$

Answer: D

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3. If $f(x)=p x+q$, where $p$ and $q$ are integers, $f(-1)=-5$ and $f(3)=3$, then $p$ and $q$ are equal
A. $p=-3 q=-1$
B. $p=2, q=-3$
C. $p=0, q=2$
D. $p=2, q=3$

Answer: B

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4. In a class of 60 students, 25 students play cricket and 20 students play tennis, and 10 students play both the games, Then, the number of students who play neither
A. 0
B. 25
C. 35
D. 45

## Answer: B

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5. Value of n so that $\frac{a^{n+1}+b^{n+1}}{a^{n}+b^{n}}$ is the geometric mean between a and $b$ is
A. 1
B. 2
C. $\frac{1}{2}$
D. $-\frac{1}{2}$

## Answer: D

6. Find the angle made by the line $x+\sqrt{3} y+7=0$ with negative direction of $x$-axis
A. $150^{\circ}$
B. $120^{\circ}$
C. $30^{\circ}$
D. $60^{\circ}$

Answer: C

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7. $\lim _{x \rightarrow 0}\left(x \sin \frac{1}{x}\right)$ is equal to
A. 1
B. 0
C. -1
D. not defined

## Answer: B

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8. If $\mathrm{x}+\mathrm{ky}=0$ is a diameter of the circle $x^{2}+y^{2}+6 x+2 y=0$ then vaue of $k$ is:
A. -3
B. 0
C. 4
D. 1

Answer: A
9. The roots of equation $\lambda x^{2}-2(\lambda+2) x+3 \lambda=0$ differ by 2 , values of $\lambda(>0)$ is
A. 2
B. 3
C. 4
D. 1

## Answer: A

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10. A polygon has 44 diagonals. The number of sides polygon has:
A. 10
B. 11
C. 13
D. 12

## Answer: B

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11. Express in polar form: $z=\frac{1}{i}$

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12. Find the value of $k$ so that the term independent of $x$ in the expansion of $\left(\sqrt{x}-\frac{k}{x^{2}}\right)^{10}$ is 405 .

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13. Find real values of $x$ and $y$ if( $x-i y$ ) $(3+5 i)$ is the conjugate of- $6-24 i$.
14. Three digit numbers are formed using the digits $0,2,4,6,8$. A number is chosen out of these numbers at random, What is the probability that this number has same digits?

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15. differentiate w.r.t 'x' $f(x)=e^{a \log x}+e^{x \log a}+e^{-a \log a}$

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16. Given $\mathrm{A}=\{2,4,6,8\}$ and $\mathrm{B}=\{4,6,27,54\}$, a in $A, b, \in B$, find the set of ordered pairs such that a is a factor of ab and $a<b$
17. Find the domain of the real valued function:
$f(x)=\left[\log _{10}\left(\frac{5 x-x^{2}}{4}\right)\right]^{\frac{1}{2}}$

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18. Find the number of ways in which a selection of 4 letters can be made of the letters of the word INFINITE.

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19. Let $f(x)=\sqrt{x}$ and $g(x)=x$ be two functions defined over the set of non-negative real numbers. Find I $(f-g) x(i i)\left(\frac{f}{g}\right)(x)$

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20. Differentiate by first principle: $f(x)=\sqrt{\cos x}$
21. Evaluate : $\lim _{x \rightarrow \pi} \frac{1-\sin \frac{x}{2}}{(\pi-x)^{2}}$

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22. Find the sum up to $n$ terms: $6+9+16+27+42+. . . .$.

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23. Find the sum to infinity: $1^{2}+3^{2} x+5^{2} x^{2}+7^{2} x^{3}+\ldots \ldots$.

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24. Find the equation of the bisector of $\angle O A B$ of $\triangle A B C$, given vertices $\mathrm{A}(4,3), \mathrm{B}(2,3)$.
25. Find the equation of circle that touches the line $2 x-3 y-7=0$ at
$(2,-1)$ and passes through

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26. Calculate the standard deviation from the following data. (Use step deviation method)

| Mid-point | 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Frequency | 5 | 8 | 7 | 12 | 28 | 20 | 10 | 10 |

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## Section B

1. The length of the latus rectum of the parabola having focus $(5,3)$ and the equation of directrix $3 x-4 y+1=$
A. $\frac{16}{5}$
B. $\frac{6}{5}$
C. $\frac{8}{5}$
D. None of these

## Answer: A

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2. The conditional statement of "You will get a sweet dish after the dinner" is
A. If you take the dinner, then you will get a sweet dish,
B. If you take the dinner, you will get a sweet dish
C. You will get a sweet dish if and only if you take the dinner.
D. None of these

## Answer: A

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3. Write the negation of the following statement:
"All mathehematticians are man"

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4. Find centricity of hyperbola whose vertices are $( \pm 2,0)$ and foci are $( \pm 3,0)$.

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5. If the origin is the centroid of the triangle PQR with vertices $\mathrm{P}(2 \mathrm{a}, 2$, $6)$, $Q 1-4,36,-10)$ and $R(8,14,2 c)$, then find the values of $c$.

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6. If p : It rains
q: I shall go to school.
Write $\sim(p \rightarrow q)$ is words.

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7. Write the contrapositive of $(p \vee q) \rightarrow r$
8. Find the equation the parabola whose vertex is at $(4,1)$ and focus (4, -3).

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9. The hyperbola $\frac{x^{2}}{a^{2}}-\frac{y^{2}}{b^{2}}=1$ passes through the point of intersection $7 x+13 y-87=0$ and its latus is of length $\frac{32 \sqrt{2}}{5}$ Find the lengths of its axes. Also find its eccentricity.

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10. Find the lengths of the medians of the triangle with vertices
$A(0,0,6), B(0,4,0)$ and (6,0,0).

## Section C

1. Given $\sum p_{1}=141, \sum p_{2}=167$ then the index number using simple aggregative method is:
A. 118.44
B. 181.44
C. 141.88
D. None of these

## Answer: A

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2. Semi-interquarlie range is:
A. Less than quartile deviation
B. Greater than quartile deviation
C. Is equal to quartile deviation
D. none of these

## Answer: C

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3. During a certain period, the cost of living index goes from 110 to 200 and salary of cworker is also raised from 325 to 500 . Find how amount the worker gains of loses in real term?

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4. The median of 7 items is 3 and the median of another 5 items is 7 ,
can you find the median of all 12 items taken together?
5. The mean weekly salary paid to all employees of a company is 8300 .

The mean monthly salary paid to male and female employees was 8000 and 9000 respectively. Determine the percentage males employed by the company.

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6. An analysis of daily wages of staffs in two firms $X$ and $Y$ given the following results:

| 豆 5 , 数 | Firm X | Firm $\mathbf{Y}$ |
| :---: | :---: | :---: |
| Number ofstafs | 586 | 648 |
| Square of mean deviation'about actual mean | 52.5 | 47.5 |
|  | 10 | 11 |

7. The following figures relate to the length of the time spent by cars in a particular car park during one day:

| Time parked (inlhours) | upto 1 | $1-2$ | $2-3$ | $3-4$ | $4-5$ | $5-6$ | $6-7$ |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Number of cars | 450 | 730 | 640 | 120 | 70 | 20 | 20 |

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8. A student while calculating correlation coefficient between two variables x and y for 25 pairs of observations obtained the following results:

$$
\sum x=100 \sum y,=125 \sum x y=508 \sum x^{2}=460 \text { and } \sum y^{2}=650
$$

. On rechecking it was found that he had miscopied two pairs as (14,
$6)$ and $(6,8)$ whereas the correct vales are $(12,8)$ and $(8,6)$. Find the correct correlation coefficient.
9. As an exercise, a company asked its purchase manager and store manager to independent rank its eight suppliers (A, B, C, D, E, F, G and H), taking into account such factors as reliability, quality, price, discount and punctuality. Two managers ranked the suppliers in order of preference as follows:

| Purchase Mangere | E | G | B | D | C | A | H | F |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Store Supervisor | E | C | G | H | B | D | A | F |

Find Spearman's rank correlation coefficient to determine the amount of agreement between the two.

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10. The number of letters in thousands received in Kolkata GPO on each day of fortnight is given below :

| Days of the week | Sun | Mon | Tue | Wed ${ }^{\text {\% }}$ | Thu | Fri | Sa |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Week 1 * tr | 35 | 70 | 36 | 59 | 62 | 60 | 71 |
| Week 2 嫁 | 39 | 72 | 38 | 56 | 63 | 71 | 75 |

Draw the graph of these figures. Calculate a set of moving averages
using the most number of observations. Give reason for you choice.
Plot these moving averages on the same graph.

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