MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MODEL TEST PAPER -2

Section A

1. A set B is given as B = {1,2}. Some elements of $A \times B$ are (3,1), (5,1) and (7,2) . Find the remaining elements of $A \times B$ such that $n(A \times B)$ is least

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2. An arc 15 ft long describes an angle of 5 radians at the centre of a circle. Find the radius of the circle

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3. If A, B, C, D are angles of a cyclic quadrilateral, then prove that cos A + cos B + cos + cos D = 0

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4. If $f(x) = 3\sqrt{\left(1+x^2\right)^4}$, find f'(1)

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5. Evaluate : $\sin^2 24^\circ - \sin^2 6^\circ$

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6. Find the condition for the equation $ax^2 + bx + c = 0$, so that one root is m times the other.

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7. How many 5-digit numbers can be formed using the digits 2, 4, 7, 9, 0 if no digit is repeated ?

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8. A card is drawn randomly from a pack of 52 playing cards. What is the probability that the card drawn is neither a spade nor a queen

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9. A real valued function is given by $f(x) = x^2 + 4$, find its domain and range .

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10. Let A = {1, 2, 3}, B = {4, 5, 6, 7} and let f = {(1, 4), (2,5), (3,6)} be a function from A to B . Show that f is one - one but not onto

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11. A polygon has 35 diagonals. Find the number of sides.

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12. Find the square root of $a^2 - 1 + 2ai$

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13. Solve : $\sin 2\theta + \sin 4\theta + \sin 6\theta = 0, (-180^\circ \leq \theta \leq 180^\circ)$

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14. Prove that, $\cos^\circ \frac{\pi}{12} + \cos^2 \frac{3\pi}{4} + \cos^2 \frac{5\pi}{12} = \frac{3}{2}$

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15. Given that $y = (3x-1)^2 + (2x-1)^3$ find $\frac{dy}{dx}$. Hence find the point (s) on the curve at which $\frac{dy}{dx} = 0$

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16. Evaluate : $\lim_{x \to 0} \frac{\tan x - \sin x}{x^3}$

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17. Find the image of the point (1,2) about the line x + y + 1 = 0

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18. Find the equations of straight lines through the point A (3, -2) and inclined at 60° to the line $\sqrt{3}x + y = 1$

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19. Find the 6^{th} term from the end in the expansion of $\left(2x - \frac{1}{x^2}\right)^n$ if $C_0 + C_1 + C_2 + \ldots + C_n = 1024$

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20. If $\tan \frac{\alpha}{2}$ and $\tan \frac{\beta}{2}$ are the roots of the equation $8x^2 - 26x + 15 = 0$ then find the value of $\cos(\alpha + \beta)$

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21. If $\frac{\cos x}{\cos(x - 2y)} = \lambda$ then show that tan (x - y) $= \left(\frac{1-\lambda}{1+\lambda}\right)$ cot y

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22. If a, b, c are in AP, b, c, d are in GP and $\frac{1}{c}, \frac{1}{d}, \frac{1}{e}$ are in AP , Prove that a, c, e are in Gp

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23. Find the terms are in GP such that their sum is $\frac{11}{2}$ and product is 32

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24. Find the values of f_1, f_2 and f_3 from the following data :

Class Interval	$0-10$	$10-20$	$20-30$	$30-40$	$40-50$	$50-60$	60
Frequency	4	16	f_1	f_2	40	f_3	

Given that median = 33.5 , mode = 34 and total frequency is 230

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Section B

1. Construct truth table for $\sim[pA(\sim q)]$ and find which implication has same truth value .

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2. Find the equation of ellipse with centre at origin, length of latus rectum is 5 and eccentricity is $\frac{2}{3}$

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3. Write the converse of the contrapositive of $p \Rightarrow q$

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4. Find the equation of hyperbola with foci at the points (-3,5) and (5,5) and length of latus rectum is $2\sqrt{8}$

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5. Reduce the following equation of parabola to a standard form hence find the vertex , focus and the equations of latus rectum

$4x - y^2 + 2y - 13 = 0$

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6. Using section formula, prove that three points A (-2, 3, 5), B (1, 2, 3) and (7, 0, -1) are collinear

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7. The midpoint of the sides of a triangle are $\left(3, 2, \frac{3}{2}\right), \left(1, \frac{3}{2}, 3\right)$ and $(2, (5), (2), (5), (2))$ Find the coordinates of centroid

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8. Does the straight line $\frac{x}{a} + \frac{y}{b} = 2$ touch the ellipse $\left(\frac{x}{a}\right)^2 + \left(\frac{y}{b}\right)^2 = 2$? If it touches, find the coordinates of the point of contact

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Section C

1. Calculate standard deviation of the number 11, 12, 13, . . . 20

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2. Find the Cov (X, Y) of the data given below :

(1,5), (2,7), (3,9), (4,11), (5,10), (6,9), (7,8), (8,7), (9,6), (10,5)

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3. A small industrial concern used raw material A, B and C in its manufacturing process . The prices of the materials are as shown below :

	2006	2016
A	.4	5
B	60	57
C	36	42

Using 2006 as the base year, calculate for 2016 a simple aggregate price index

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4. Calculate Spearman's coefficent of rank correlation from the following data and interpret the result.

X	16	19	22	28	25	31	37	40	43	49
Y	25	25	27	31	27	33	35	41	45	41

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5. The mathematical aptitude score of 10 computer programmers with their job performance is given below :

Mathematics score	7	5	1	4	3	0	2	6	8	9
Job performance rating	8	16	8	9	5	4	3	8	17	12

Calculate the Karl Pearson's correlation coefficient and interpret the result.

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6. From a frequency distribution consisting of 18 observations, the mean and standard deviation were found to be 7 and 4 respectively . But on comparison with original data, it was found that a figure 12 was miscopied as 21 in calculations. Calculate the correct mean and standard deviation.

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7. Find the inter-quartile range, semi inter-quartile range and coefficient of quartile deviation from the following frequency distribution

Marks	$10-20$	$20-30$	$30-40$	$40-50$	$50-60$	$60-70$
No. of students	60	45	120	25	90	80

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8. The following table gives the quarterly death rate per thousand of a city for the years 1953 to 1955

	Quarter Ending			
Year	*March*	*June*	*September*	*December*
1953	13.9	10.3	8.1	10.6
1954	13.8	9.8	7.8	10.8
1955	14.2	10.1	7.8	10.0

Plot these figures on a graph. Calculate the suitable moving averages and plot them on the same graph

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