MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MODEL TEST PAPER - 9

Section A

1. $n\{P(P(P(\varphi)))\} =$

A. 6

B. 8

C. 2^{3-1}

D. 2^{5-1}

Answer: C

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2. If $A = \{x, y, z\}$ and $B = \{1, 2\}$, then the number of relations from A to B is

A. 32

B. 16

C. 64

D. 128

Answer: C

3. If A,B,C,D are angles of a cyclic quadrilateral, then the value of $\cos A + \cos B + \cos C + \cos D$ is

A. -1

B. 1

C. 0

D. 2

Answer: C

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4. If x is a real number and $|5-(x-3)|+8<15$, then (i) $1 \leq x \leq 15$ (ii) $1<x<15$ (iii) $1<x \leq 15$ (iv) $1 \leq x \leq 15$

A. $l \leq x \leq 15$

B. $1<x<15$

C. $1<x \leq 15$

D. $1 \leq x \leq 15$

Answer: B

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5. If $r \geq 1$, then the sum of infinite G.P. tends to (i) 0 (ii) ∞ (iii) 1 (iv) none of these

A. 0

B. ∞

C. 1

D. none of these

Answer: B

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6. Number of 5-digit numbers can be formed using the digits 2,4,7,9,0 if no digit is repeated :

A. 69

B. 96

C. 169

D. 98

Answer: B

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7. Let $z_1 = 2 - i$ and $z_2 = 2 + i$, then $\text{Im}\left(\frac{1}{z_1 z_2}\right)$ is

A. 0

B. 6

C. 2

D. 8

Answer: A

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8. Distance between the lines $3x + 4y - 5 = 0$ and $6x + 8y - 45 = 0$ is

A. $\frac{1}{3}$

B. $\frac{7}{2}$

C. 1

D. $\frac{2}{7}$

Answer: B

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9. Find the length of the chord intercepted by the circle $x^2 + y^2 - 8x - 6y = 0$ on the line $x - 7y - 8 = 0$.

A. 5

B. $\sqrt{2}$

C. $5\sqrt{2}$

D. 6

Answer: C

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10. $\lim_{x \to 5^+} (x - [x])$ is equal to

A. 1

B. -1

C. 0

D. ± 1

Answer: C

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

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

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

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15. A card is drawn at random 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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16. In a group of 70 people, 48 speak Tamil, 36 speak English and all the people speak at least one

language. Find How many speak both the languages ?

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17. In a group of 70 people, 48 speak Tamil, 36 speak English and all the people speak at least one language.

Find :

How many speak only Tamil ?

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18. 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 $\tan\left(\frac{\alpha+\beta}{2}\right)$

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19. 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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20. 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 $A \times B$ of such that $n(A \times B)$ is least.

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21. 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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22. Find the 6^{th} term from the end in the expansion of $\left(2x - \frac{1}{x^2}\right)^{10}$.

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

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

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25. Solve :

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

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26. In any $\Delta ABC, \angle B = 90^\circ$, prove that $\tan\frac{A}{2} = \sqrt{\frac{b-c}{b+c}}$

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27. Using mathematical induction, to prove that

$1 \cdot 1! + 2 \cdot 2! + 3.3! + \ldots . + n \cdot n! = (n+1)! - 1$

, for all $n \in N$

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28. Using definition, differentiate w.r.t. 'x'

$f(x) = \cos^2 x$

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

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30. If sum of the roots of $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals then show that $2a^2c = ab^2 + bc^2$.

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31. if the equation $x^2 + qx + rp = 0$ and $x^2 + rx + pq = 0, (q \neq r)$ have only one root in common, then prove that $p + q + r = 0$.

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32. If a,b,c are in A.P., b,c,d are in G.P. and $\frac{1}{c}, \frac{1}{d}, \frac{1}{e}$ are in A.P, prove that a,c,e are in G.P.

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33. Find the equation 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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34. Show that the points (0,3),(-6,0),(-1,5) and (-4,-1) are concyclic.

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35. Calculate the variance and standard deviation of the observations : 11, 12, 13, ... 20.

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Section B

1. The equation of axis of the parabola having focus (2,3) and directrix $x - 4y + 3 = 0$ is

A. $x - 4y - 11 = 0$

B. $4x - y - 11 = 0$

C. $x + 4y + 11 = 0$

D. $4x + y - 11 = 0$

Answer: D

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2. The distance between the vertex and corresponding focus of the ellipse $25x^2 + 16y^2 = 400$ is

A. 5

B. 3

C. 2

D. 4

Answer: C

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3. Find the equation of locus of a point whose distance from z-axis is equal to its distance from xy-plane.

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4. Does the straight line $\frac{x}{a}+\frac{y}{b}=2$ touch the ellipse $\left(\frac{x}{a}\right)^2+\left(\frac{y}{b}\right)^2=2$? justify.

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

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

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7. Show that the statement "If x is real number such that $x^3 + 4x = 0$, then x=0" is true by the method of contrapositive.

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

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9. Reduce the following equation of parabola to a standard form, hence find the vertex focus and the equations of the directrix and equation of latus rectum : $4x - y^2 + 2y - 13 = 0$.

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10. The mid-points if the sides of a triangle are $\left(3, 2, \frac{3}{2}\right), \left(1, \frac{3}{2}, 3\right)$ and $\left(2, \frac{5}{2}, \frac{5}{2}\right)$. Find the coordinates of its centroid.

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Section C

1. Using simple average of price relatives method, the price index for 2010, taking 2001 as base year was found to be 127. If $\Sigma I = 612 + \frac{50x}{9}$ and

number of commondities = 6 then find the value of x .

A. 20

B. 27

C. 25

D. 29

Answer: B

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2. D_5 is always equal to

A. P_1

B. P_{10}

C. P_{25}

D. P_{50}

Answer: D

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3. In an asymmetrical distribution mean is 58 and median is 61. Find mode.

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4. Calculate sixty first percentile from the following data of the marks obtained by 10 students is an examination : 22,26,14,30,18,11,35,41,12,32

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5. A small industrial concern used three raw materials 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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6. Find the median and upper quartile for the following data : 9,5,7,11,13,17,15.

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7. The mean of two samples is 45. The mean of 1^{st} samples and 2^{nd} samples ware 30 and 50

respectively. Determine the ratio of the number of observations of the two samples.

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8. Calculate Separman' coefficient 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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9. 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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