MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MODEL TEST PAPER -5

Section A

1. Let n(A) = 6 and n(B) = p . Then , the total number of non - empty relations that can be defined from A to B is

A. 6^P

B. n^{P+1}

C. $6p - 1$

D. 2^{6p-1}

Answer: A

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2. Let A = $\{x : x^2 - 5x + 6 = 0\}, B = \{2, 4\} = \{4, 5\}$ then $A \times (B \cap C)$ is

A. $\{(2, 4), (3, 4)\}$

B. $\{(4, 2), (4, 3)\}$

C. $\{(2, 4), (3, 4), (4, 4)\}$

D. $\{(2, 2), (3, 3), (4, 4), (5, 2)\}$

Answer: A

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3. In A ΔABC , if a = 2 , b = 3 and $\sin A = \frac{2}{3}$ then $\angle B$ is (a) 90° (b)80° (c)110° (d)140°

A. 90°

B. 80°

C. 110°

D. 140°

Answer: A

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4. The value of $\cos(35^\circ + A)\cos(35^\circ - B) + \sin(35^\circ + A)\sin(35^\circ - B)$ is equal to (i) $\sin(A + B)$ (ii) $\sin(A - B)$ (iii) $\cos(A + B)$ (iv) $\cos(A - B)$

A. $\sin(A + B)$

B. $\sin(A - B)$

C. $\cos(A + B)$

D. $\cos(A - B)$

Answer: C

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5. The argument of the complex number $\left(\frac{i}{2}-\frac{2}{i}\right)$ is equal to (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{12}$ (d) $\frac{3\pi}{4}$

A. $\frac{\pi}{2}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{12}$

D. $\frac{3\pi}{4}$

Answer: A

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6. If $1-I$ is a root of the equation $x^2+ax+b=0$ where $ab \in R$ then value of a is

A. -2

B. 2

C. 0

D. none of these

Answer: A

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7. In how many ways a committee consisting of 3 men and 2 women can be chosen from 7 men and 5 women?

A. 45

B. 350

C. 4200

D. 230

Answer: B

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8. Seven different letters are given. Then the number of ways in which , words of 5 letters can be formed such that atleast one of the letters is repeated is

A. P(7,5)

B. 14287

C. 7^5

D. 5^7

Answer: B

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9. Find the equation of the line , which is perpendicular to x - axis and a distance of 3 units from left of the origin is

A. $x = 3$

B. $y = -3$

C. $x = -3$

D. $y = 3$

Answer: C

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10. Let f(x) = $x - [x], x \in R$ then $f\left(\frac{1}{2}\right)$ is

A. 1

B. 0

C. -1

D. none of these

Answer: A

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11. Find the length of intercept on the straight line $2x - y = 5$ by the circle $x^2 + y^2 - 6x + 8y - 5 = 0$

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12. If three geometric means inserted between 1 and 256 , then find the common ratio

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13. Evaluate : $\lim_{x \to -1} \frac{x}{[x]}$

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14. A bag contains tickets numbered 1 to 20 . Two tickets are drawn at random , Find the probability that sum of the two numbers on the tickets is even .

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15. In the binomial expansion of $(a-b)^n, n \geq 5$ the sum of the 5th and 6th term is zero , then find $\frac{a}{b}$

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16. For any sets X and Y prove that $P(X) \cup P(Y) \subset P(X \cup Y)$

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17. Find the domain and the range of the relation R given by R = { (x,y) : $y = x + \frac{6}{x}$, where x $y \in N$ and $x < 6$}

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18. Evaluate : $\sin^2\left(\frac{\pi}{8}+\frac{x}{2}\right)-\sin^2\left(\frac{\pi}{8}-\frac{x}{2}\right)$

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19. Find the length of an arc of a circle of radius 75 cm that spans a central angle of measure 126°

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20. If $\theta = -400^\circ$, determine then the sign of $\sin\theta+\cos\theta$

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21. For a positive integer n , find the value of $(1-i)^n\left(1-\frac{1}{i}\right)^n$

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22. If $\sin\alpha$ and $\cos\alpha$ are the roots of $ax^2+bx+c=0$, then find the relation satisfied by a, b and c .

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23. A real valued function is given by $f(x)=\frac{x^2+x+2}{x^2+x+1}$, find its domain and range .

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24. Solve : $\tan x + \sec x = 1(-180^\circ \leq x \leq 180^\circ)$

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25. Prove that $\cos\left(\frac{2\pi}{7}\right) + \cos\left(\frac{4\pi}{7}\right) + \cos\left(\frac{6\pi}{7}\right) = -\frac{1}{2}$

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26. 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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27. Differentiate by 1^{st} principal $f(x) = \tan(1 - 2x)$

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28. Evaluate $\lim_{x \to \frac{\pi}{6}} \frac{2 - \sqrt{3}\cos x - \sin x}{(6x - \pi)^2}$.

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29. If a^2, b^2, c^2 are in A.P , pove that $\frac{a}{a+c}, \frac{b}{c+a}, \frac{c}{a+b}$ are in A.P .

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30. In an infinite geometric progression , the sum of first two terms is 6 and every term is four times the sum of all the terms that follow it . Find (i) the geometric progression and (ii) its sum of infinity .

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31. If one root of the quadratic equation $ax^2 + bx + c = 0$ is equal to the n^{th} power of the other root , then show that $(ac^n)^{\frac{1}{n+1}} + (a^n c)^{\frac{1}{n+1}} + b = 0$

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32. Sketch roughly the lines satisfying the given consition and write its equation angle of inclination = 150° and

distance from the origin = 3 units .

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33. Show that the circles $x^2 + y^2 - 2x - 4y - 20 = 0$ and $x^2 + y^2 + 6x + 2y - 90 = 0$ touch each other . Find the coordinates of the point of contact and the equation of the common tangent .

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34. The weights of a coffee in 70 jars are shown in the following table .

Weight (in grams)	200–201	201–202	202–203	203–204	204–205	205–206
Frequency	13	27	18	10	1	1

.Determine variance and standard deviation of the above distribution.

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Section B

1. The sum of the distance of the any point on the ellripse $3x^2 + 4y^2 = 24$ from its foxi is

A. 4

B. $4\sqrt{2}$

C. $8\sqrt{2}$

D. $2\sqrt{2}$

Answer: B

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2. The eccentricity of the conics $-\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

A. $\sqrt{\frac{a^2+b^2}{b^2}}$

B. $\sqrt{\frac{a^2-b^2}{b^2}}$

C. $\sqrt{\frac{a^2-b^2}{a^2}}$

D. $\sqrt{\frac{a^2-b^2}{a^2}}$

Answer: A

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3. Find the equation of the tangent of the parabola $y^2=8x$ which is perpendicular to the line $2x+y+1=0$

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4. What loci do the equation represent in space?

$z = 0$

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5. Check the validity of the following statement " Square of an integer is positive or negative " .

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6. Construct truth table for $\sim[p \vee (\sim q)]$

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7. Use p : I like my school

q : I like my class teacher .

Express follwing statements

(i)$\sim[(\sim p) \wedge q]$ (ii) $(\sim p) \wedge \sim q$

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8. Find the coordinates of the point equidistant from the four points A(0,0,0) , B (a,0,0) , C(0,b,0) and D(0,0,c) .

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9. Find the ratio in which the line joint of A (2,1,5) and B(3,4,3) is divided by the plane $2x + 2y - 2z = 1$. Also , find the coordinates of the point of division .

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10. Find the equation of the hyperbola whose foci are (8, 3) and (0, 3) and eccentricity is 4/3.

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Section C

1. Price relative means the ratio of price of a certain item in current year to the price of that item in base year , expressed as a.....

A. percentage

B. multiple of 10

C. Σ pw

D. none of these

Answer: A

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2. In Spearman's rank correlation if m item have common rank then th correction that is to be added with Σd^2 is

A. $\frac{1}{12}\left(m^3+m\right)$

B. $\frac{1}{12}\left(m^3+1\right)$

C. $\frac{1}{12}\left(m^2-m\right)$

D. $\frac{1}{12}\left(m^3-m\right)$

Answer: D

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3. Find the covariance between X and Y when n = 10 , $\Sigma X = 60, \Sigma Y = 60$ and $\Sigma XY = 305.$

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4. The price relative to base 100 of a set of commodities are as given in the following tabe :

Commodities	A	B	C	D
Price relative	125	120	127	119

Find the index number using simple average of price relatives .

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5. If Cov(x,y) = -2, $\Sigma y = 30, \Sigma x = 25$ and $\Sigma xy = 140$, find the number of observations .

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6. The Spearman's rank correlation coefficient $= \frac{9}{11}$, given $\sum d^2 = 30$. Find the number of observation.

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7. Find Cov (X,Y) for the following data :

X	5	4	3	2	1
Y	4	2	10	8	6

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8. An examination is taken at three centres each of the of which has 100 candidates .

The mean marks and standard devaition for the each centre are given below :

Centre	Mean	Standard Deviation
1st centre	45	9.6
2nd centre	50	10.8
3rd centre	43	9.0

Calculate the mean and standard deviation of all 300 candidates .

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9. Find the median for the following data

Height (in cm)	Number of plants
More than 0	55
More than 10	50
More than 20	40
More than 30	20
More than 40	5

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10. Daily absence from a school during three weeks is recorded as follows :

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	23	28	21	33	40
Week 2	38	52	43	58	63
Week 3	52	54	61	51	51

Draw a graph , illustrating the above data . Calculate the 5 - days moving average and plot them on the same graph .

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