



MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MODEL TEST PAPER-15

Section A

1. $(3 + \omega + 3\omega^2)^4 = \lambda\omega$, then value of λ is :

A. 4

B. -4

C. 16

D. -8

Answer: c



Watch Video Solution

2. The number of ways can the letters of the word FORECAST taken 3 at a time and the word MILKY taken 2 at a time be arranged are:

A. 62700

B. 67700

C. 61200

D. 67200

Answer: d



Watch Video Solution

3. In a $\triangle ABC$, if $a = 3$, $b = 5$ and $c = 7$, find $\cos c$

A. $\frac{1}{2}$

B. $\frac{1}{\sqrt{2}}$

C. $-\frac{1}{2}$

D. 1

Answer: c



Watch Video Solution

4. If $\theta = -1440^\circ$, then $\tan \theta$ is

A. 1

B. 0

C. -1

D. $\sqrt{3}$

Answer: b



Watch Video Solution

5. The range of the function $f(x) = \frac{x + 1}{x - 2}$ is

A. A. $\{1\}$

B. B. \mathbb{R}

C. C. $\mathbb{R} - \{1\}$

$$D. D. R - \{2\}$$

Answer: c



Watch Video Solution

6. HCF of $3!$, $4!$ and $5!$ is $k!$, then $k =$

A. 3

B. 4

C. 6

D. 60

Answer: c



Watch Video Solution

7. If one root of $x^2 + x + 1 = 0$ is $\frac{-1 + \sqrt{3}i}{2}$

, then other root is :

A. A. $\frac{-1 - \sqrt{3}i}{2}$

B. B. $\frac{1 - \sqrt{3}i}{2}$

C. C. $\frac{1 - \sqrt{3}i^2}{2}$

D. D. $\frac{1 + \sqrt{3}i}{2}$

Answer: a



Watch Video Solution

8. In the binomial expansion of $(3\sqrt{3} + \sqrt{2})^5$, the term which does not contain irrational number is :

A. 1^{st}

B. 3^{rd}

C. 4^{th}

D. 5^{th}

Answer: b



Watch Video Solution

9. Evaluate : $\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4}$



Watch Video Solution

10. Find the probability of product of a perfect square when 2 dice are thrown together.



Watch Video Solution

11. If $y = \sqrt{3x + 2}$, Prove that $y \frac{dy}{dx} = \frac{3}{2}$



[Watch Video Solution](#)

12. Find the equation of the circle which touches both axes in 4th quadrant and whose radius is r.



[Watch Video Solution](#)

13. Find the area of the triangle formed by the lines $y - x = 0$, $x + y = 0$ and $x - k = 0$.



Watch Video Solution

14. If A and B are sets, then $A \cap (A \cup B) =$



Watch Video Solution

15. If p is a real number and if the middle term in the expansion of $\left(\frac{p}{2} + 2\right)^8$ is 1120, find p.



[Watch Video Solution](#)

16. if A and B are two sets, then prove that,

$$(A \cup B)' \cup (A' \cap B) = A'$$



[Watch Video Solution](#)

17. If $A = \{1, 2, 3, 4\}$ and $B = \{1, 2, 3, 4, 5, 6\}$ are two

sets and function $F: A \rightarrow B$ is defined by

$$f(x) = x + 2, \forall x \in A, \text{ then prove that the}$$

function is one-one and into.





Watch Video Solution

18. Prove that :

$$\sin^2 6x - \sin^2 4x = \sin 2x \cdot \sin 10x$$



Watch Video Solution

19. Find the value of

$$\cos^2 \left(\frac{\pi}{6} - \frac{\theta}{2} \right) - \sin^2 \left(\frac{\pi}{6} + \frac{\theta}{2} \right).$$



Watch Video Solution

20. Prove that $\frac{1 - \cos \theta + \sin \theta}{1 + \cos \theta + \sin \theta} = \tan \frac{\theta}{2}$.



Watch Video Solution

21. Locate the point representing the complex number z on the Argand diagram for which

$$|i - 1 - 2z| > 9.$$



Watch Video Solution

22. If α, β be the roots of $px^2 - qx + q = 0$,

then show that $\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} - \sqrt{\frac{q}{p}} = 0$.



[Watch Video Solution](#)

23. In a class of 30 pupils, 12 take Chemistry, 16 take Physics and 18 take History. If all the 30 students take at least one subject and no one takes all three, then find the number of pupils taking 2 subjects.



[Watch Video Solution](#)

24. If the two sides of a triangle and the included angle are given by $a = \sqrt{3} + 1$, $b = 2$ and $C = 60^\circ$, find the other two angles and the third side.



[Watch Video Solution](#)

25. If $\sec(\phi + \alpha) + \sec(\phi - \alpha) = 2 \sec \phi$,
prove that $\cos \phi = \pm \sqrt{2} \cos \frac{\alpha}{2}$, $\left(\phi \neq \frac{\pi}{2}\right)$.



[Watch Video Solution](#)

26. Prove by the method of mathematical induction that, $3^{2n+2} - 8n - 9, \forall n \in \mathbb{N}$ is divisible by 64.



Watch Video Solution

27. If $y \log x = x - y$, prove that

$$\frac{dy}{dx} = \frac{\log x}{(1 + \log x)^2}$$



Watch Video Solution

28. Differentiate $f(x) = \tan 2x$ by first principle of differentiation.



[Watch Video Solution](#)

29. The first term of an A.P. is the same as that of a G.P., the common difference of the A.P. and the common ratio of the G.P. are both 2. If the sum of the first five terms of each series be the same, find the 6th term of each series.



[Watch Video Solution](#)

30. Find sum to first n groups of :

$$(1 + 3 + 9 + 27) + \dots$$



[Watch Video Solution](#)

31. Draw the graphs of the following system of inequations and indicate the solution set.

$$2x + 3y \geq 6, 2x + y \geq 4, x \geq 4 \text{ and } y \leq 3.$$



[Watch Video Solution](#)

32. The straight line $2x + 3y = 24$ meets the x-axis at P and the y-axis at Q. The perpendicular bisector of PQ meets the line through $(-2,0)$ parallel to the y-axis at R. Find the area of the ΔPQR .



[Watch Video Solution](#)

33. Find the equation of the circle which has radius 5 units and which is tangent to the line $3x + 4y - 16 = 0$ at the point $(4, 1)$.



[Watch Video Solution](#)

34. Calculate the standard deviation of the following distribution :

Age	20 – 25	25 – 30	30 – 35	35 – 40	40 – 45	45 – 50
No. of persons	170	110	80	45	40	35



[Watch Video Solution](#)

Section B

1. The distance between x-axis and the point (3, 12, 5) is

A. A. 31 units

B. B. 13 units

C. C. 10 units

D. D. 9 units

Answer: b



Watch Video Solution

2. The point on the parabola $y^2 = 12x$ with focal distance equals to 12 units is

A. $(9, 8\sqrt{3})$

B. $(9, \sqrt{3})$

C. $(8\sqrt{3}, 9)$

D. $(9, 9)$

Answer: a



Watch Video Solution

3. The minor axis of the ellipse having eccentricity is $\frac{1}{2}$ and vertices $(4, 0)$ and $(10, 0)$ is $x = k$, then value of k is

A. 9

B. -7

C. 7

D. -9

Answer: c



Watch Video Solution

4. Find the z-coordinate of the point on XOZ plane divides the join of $(5, -3, -2)$ and $(1, 2, -2)$.

A. 2

B. -2

C. 0

D. $\frac{13}{5}$

Answer: b



Watch Video Solution

5. Write the negation of the following statements: 'For every real number x , $x^2 > x$.'



 [Watch Video Solution](#)

6. Using truth table, prove that : $\sim[(\sim p) \wedge q]$ is logically equivalent to $p \vee (\sim q)$.

 [Watch Video Solution](#)

7. Check the validity of the statement: 'Two lines in a plane either intersect at a point or they are parallel.'

 [Watch Video Solution](#)

8. Find the equation of ellipse having vertices at $(\pm 5, 0)$ and foci $(\pm 4, 0)$.



[Watch Video Solution](#)

9. A hyperbola passes through $(3, 3)$ and the length of its conjugate axis is 8. Find the length of the latus rectum.



[Watch Video Solution](#)

10. Find a point on X-axis which is equidistant from both the points (1, 2, 3) and (3, 5, -2) .



Watch Video Solution

Section C

1. D_3 for data: 16, 21, 27, 13, 19, 26, 25, 12, 17, 28
is

A. (a) 16

B. (b) 17

C. (c) 19

D. (d) 12

Answer: a



Watch Video Solution

2. D_9 is always equal to

A. P_9

B. a_3

C. P_{99}

D. P_{90}

Answer: d



Watch Video Solution

3. Q_2 for the data: 13, 16, 28, 17, 12, 25, 26, 19, 27,

21 is :

A. 21

B. 19

C. 20

D. 25

Answer: c



Watch Video Solution

4. The price index of a commodity in 2018 relative to 2015 is 125, If the price of the commodity is Rs. 20/kg in 2015, then price in 2018 is :

A. 20

B. 145

C. 25

D. 125

Answer: c



Watch Video Solution

5. Find the index number by using simple aggregate method.

Commodity	A	B	C	D	E
Base price (in ₹)	36	30	130	40	110
Current price (in ₹)	54	50	155	35	110



[Watch Video Solution](#)

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



[Watch Video Solution](#)

7. The following table gives the distribution of 100 families according to expenditure. If mode of the distribution is 124, find the missing frequencies.

Expenditure	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
No. of families	14	?	27	?	15



[Watch Video Solution](#)

8. Calculate Spearman's rank correlation coefficient between the marks in Mathematics

and Accountancy by 9 students.

Marks in Mathematics	35	23	47	17	10	43	9	6	28
Marks in Accountancy	30	33	45	23	8	49	12	4	31



[Watch Video Solution](#)