MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MODEL TEST PAPER -11

Sections A

1. If $A \subseteq B$, then the value of $A \cup B$ is

A. A

B. B

C. ϕ

D. None of these

Answer: B

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2. In a $\triangle ABC$, cos (A + B) + cos C =

A. 2 cos C

B. -1

C. 0

D. 1

Answer: C

3. Value of $\sin \dfrac{\pi}{18} \cdot \sin \dfrac{5\pi}{18} \cdot \sin \dfrac{7\pi}{18} =$

A. $\dfrac{1}{2^2}$

B. $\dfrac{1}{2^{4-1}}$

C. $\dfrac{1}{2^2 - 1}$

D. $\dfrac{1}{2^{3-1}}$

Answer: B

4. Find the 4th term from the end of the G.P. $\dfrac{2}{27}, \dfrac{2}{9}, \dfrac{2}{3}, , 162.$

A. 18

B. 27

C. 6

D. 3

Answer: C

5. If one root of the equation $ax^2 + bx + c = 0$ is the reciprocal of the other root, then

    A. a + b = 0

    B. a - b = 0

    C. a - c = 0

    D. b - c = 0

Answer: C

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6. The coefficient of 11th term from end in the expansion of $\left(2x - \dfrac{1}{x^2}\right)^{25}$ is

    A. $-^{25}C_{15}$

    B. $^{25}C_{15}$

    C. $-^{25}C_{16}$

D. $^{25}C_{16}$

Answer: A

7. The least positive value of n if $\left(\dfrac{1+i}{1-i}\right)^n = 1$, is (a)1 (b)5 (c)4 (d)6

A. 1

B. 5

C. 4

D. 6

Answer: C

8. A circle centre (1,2) touches y-axis. Radius of the circle is

A. 2

B. 3

C. 1

D. 4

Answer: C

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9. Sum of the intercepts cut off by the line 2x + 3y = 6 on the axes is

A. $\dfrac{5}{6}$

B. 6

C. 5

D. 1

Answer: C

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10. Find the coefficient of $x^6 y^3$ in the expansion of $(x + 2y)^9$.

A. 672

B. 627

C. 726

D. None of these

Answer: A

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11. Let P(n) be the statement $''(3)^n > n''$. If P(n) is true , prove that P(n + 1) is true.

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12. If $\left(\dfrac{x}{3} + 1, \, y - \dfrac{2}{3} \right) = \left(\dfrac{5}{3}, \dfrac{1}{3} \right)$, find the values of x and y.

13. Evaluate : $\displaystyle\lim_{x \to \frac{\pi}{2}} \dfrac{\tan 2x}{x - \dfrac{\pi}{2}}$

14. If $f(x) = \left(\dfrac{\sec x - 1}{\sec x + 1} \right)^{\frac{1}{2}}$, find $f'\left(\dfrac{4\pi}{3} \right)$

15. A die has two faces each with number 1, three faces each with number 2 and one face with number 3. If the die rolled once, determine $P(1)$ (b) $P(1 \text{ or } 3)$ (iii) $P(\neg 3)$

16. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real functions. Find $\left(\dfrac{f}{g}\right)(x)$. Also, state its domain

17. In a class of 35 students, 24 like to play cricket and 16 like to play football. Also, each student likes to play at least one of the two games. How many students like to play both cricket and football?

18. In $\triangle ABC$, if a = 3, b = 4 and sin B = 1, find sin A

19. The minute band of a watch is 1.5 cm long. How far does its tip move in 40 minutes ? (Use π = 3 . 14)

20. Prove that $\dfrac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan$ x

21. If $z_1 = 2 - i$, $z_2 = 1 + i$, find $\left| \dfrac{z_1 + z_2 + 1}{z_1 - z_2 + 1} \right|$

22. Find the quadratic equation whose roots are the reciprocals of the roots of the equation $x^2 - cx + b = 0$

23. Find the domain of the function $f(x) = \sqrt{4 - x} + \dfrac{1}{\sqrt{x^2 - 1}}$

24. Prove that: (sin 3 x +sin x) sin x + (cos 3x - cos x) cos x = 0

25. Prove that $\dfrac{\tan 3x. \cos 4x + \cos 3x. \tan 3x + \tan 3x. \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = 1$

26. Differentiate w.r.t. 'x' from first principles f (x) $= \sqrt{4 - x}$

27. Find the number of words with or without meaning which can be made using all the letters of the word AGAIN. If these words are written as in a dictionary , what will be the 50th word ?

28. In an examination, a question pater consists of 12 questions divided into two parts i.e., Part I and Part II, containing 5 and 7 questions, respectively. A student is required to attempt 8 questions in all, selecting at least 3 from each part. In how many ways can a students select the questions ?

29. Show that A.M. of the roots of $x^2 - 2ax + b^2 = 0$ is equal to the G.M. of the roots of the equation $x^2 - 2bx + a^2 = 0$ and vice- versa.

30. Solve for real x : $\dfrac{x + |x + 3|}{x + 2} < 1, x \neq -2$

31. Show that $\dfrac{1 \times 2^2 + 2 \times 3^2 + \ldots + n \times (n+1)^2}{1^2 \times 2 + 2^2 \times 3 + \ldots + n^2 \times (n+1)} = \dfrac{3n+5}{3n+1}$

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32. Find the distance of the line $4x$ $-y$ $=$ 0 from the point P(4, 1) measured along the line making an angle of $135o$ with the positive xaxis.

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33. Find the equation of circle passing through the point (2,3) and (-1,1) and whose centre is on the line x - 3y - 11 = 0

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34. The mean and standard deviation of a group of 100 observations were found to be 20 and 3 respectively. Later on it was found that three observations were incorrect , which were recorded as 21, 21 and 18 . Find

the mean and standard deviation if the incorrect observations are omitted.

Sections B

1. In the hyperbola $16x^2 - 9y^2 = 144$, the value of eccentricity is

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

B. $\dfrac{4}{3}$

C. $\dfrac{5}{3}$

D. $\dfrac{7}{3}$

Answer: C

2. The coordinates of a point are (1,-3,3), the point lies in

A. (a)II octant

B. (b)VIII octant

C. (c)I octant

D. (d)IV octant

Answer: D

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3. Find the equation of the ellipse of major axis is along x - axis, centre is at origin and it passes though the point (4,3) and (6,2)

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4. Find the value of k so that the line y = 3x + k is a tangent to the parabola $y^2 = -12x$

5. Write the negation of the following statement: There is a complex number which is not a real number.

6. Write the negation of the following statements :

Both diagonals of a rectangle have the same length

7. Write the negation of the following statement: all triangles are not equilateral triangles.

8. Check the validity of the following statement : If a, b are integers such that ab is odd, then both a and b are odd.

9. Find the equation of tangent to the ellipse $\dfrac{x^2}{4} + \dfrac{y^2}{2} = 1$ that perpendicular to the line $y = x + 1$. Also, find the point of contact .

10. In each of the following find the equations of the hyperbola satisfying he given condition: foci $(0, \pm 12)$ latus rectum $= 36$

11. Find the coordinates of a point equidistant from the four points O(0,0,0), A(p,0,0), B(0,q,0) and C(0,0,r)

1. If a machine cost Rs. 10000 in 2015 and Rs. 15000 in 2018, then find the price relative.

    A. 150

    B. 250

    C. 100

    D. None of these

Answer: A

2. The relation between Q_3 and P_{75} is

A. (a)$Q_3 < P_{75}$

B. (b)$Q_3 = P_{75}$

C. (c)$Q_3 = P_{25}$

D. (d)$Q_3 \neq P_{75}$

Answer: B

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3. If $\sum p_1 = 176$ and $\sum p_0 = 100$, find the price index number for current year relative to base year.

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4. For the data $14, 7, 13, 12, 13, 17, 8, 10, 6, 15, 18, 21, 20,$ compute P_{80}

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5. If upper quartile and inter-quartile range of a data are 55 and 5 respectively, then find the value of lower quartile

6. Given $n_1 = 50$, $n_2 = 40$, $\sigma_1 = 9$, $\sigma_2 = 6$, $d_1 = 4$, $d_2 = 5$

Find the combined standard deviation.

7. Find the first decile for the following data:

Size	0.10	$10 - 20$	$20 - 30$	$30 - 40$	$40 - 50$	$50 - 60$	$60 - 7$
Frequency	2	18	30	45	35	20	6

8. The coefficient of correlation for the variables x and y is 0.9926 from following data :

X	18	20	25	30	31	32
Y	21	22	28	32	35	36

Find the change in the correlation coefficient if each value of x in multiplied b 3 and subtracted by 4 and each value of y is multiplied by 2 and increased by 3.

9. First the rank correction coefficient of the following data :

Serles A	115	109	112	87	98	120	98	100	98	118
Series B	75	73	85	70	76	82	65	73	68	80

10. The table below gives details of the electricity generated in kilowatt hours in each quarter for the years 2012 to 2014

Year	Quarter			
	I	II	III	IV
2012	8	7	6	9
2013	10	7	7	10
2015	11	7	8	10

Calculate the four-quarterly moving averages and display these and the original figures on the same graph .