MATHS

BOOKS - S CHAND MATHS (ENGLISH)

SAMPLE QUESTION PAPER 02

Section A

1. Find the range of the function $y = \frac{x^2 - 1}{x - 1}, x \neq 1.$

A. $f(x) = R + \{1\}$

B. $f(x) = R - \{1\}$

C. $f(x) = \{1\} - R$

D. $f(x) = \{1\} + R$

Answer: B

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2. In $\triangle$ ABC, a = 2, b = 3,c = 4 , then the value of cos A is

A. $\frac{21}{24}$

B. $\frac{21}{12}$

C. $\frac{24}{21}$

D. $\frac{24}{12}$

Answer: A

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3. The value of $\sin(\pi + x).\ \sin(\pi - x).\ \text{cosec}^2 x$ is

A. 0

B. 1

C. -1

D. Not defined

Answer: C

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4. The conjugate of $\frac{1}{3-4i}$ is

A. $\frac{3}{25}-\frac{4}{25}i$

B. $\frac{3}{25}+\frac{4}{25}i$

C. $\frac{4}{25}-\frac{3}{25}i$

D. $\frac{4}{25}+\frac{3}{25}i$

Answer: C

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5. If α and β are the roots of the quadratic equation $px^2 + qx + 1$, Then the value of $\alpha\beta + \alpha^2\beta^2$ is

A. $\frac{q}{p^2}$

B. $\frac{-q}{p^2}$

C. $\frac{-q}{p^3}$

D. $\frac{q}{p^3}$

Answer: C

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6. Find the number of terms in the expansion of $\left(1 + 6x + 9x^2\right)^{23}$

A. 44

B. 45

C. 46

D. 47

Answer: D

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7. The values of x for which the numbers $\frac{-2}{7}, x, \frac{7}{2}$ are in G.P is

A. 0

B. ± 1

C. $+1$

D. -1

Answer: B

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8. If the origin is a shifted to (2,3), then the new co-ordinates of (-1,2) will be

A. $(-1, -3)$

B. $(-3, -1)$

C. $(-1, -1)$

D. $(-3, -3)$

Answer: B

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9. The equation of the circles (0,2) and radius 2 is

A. $x^2 + y^2 + 4 = 0$

B. $x^2 + y^2 - 4 = 0$

C. $x^2 + y^2 + 4y = 0$

D. $x^2 + y^2 - 4y = 0$

Answer: D

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10. $\lim_{x \to 0} \frac{\sin nx}{x}$ is equal to

A. n^2

B. $\frac{1}{n^2}$

C. n

D. $\frac{1}{n}$

Answer: C

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11. In how many ways can 12 books be arranged on a shelf if 4 particular books must always be together.

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12. Find the derivative of :

$$\frac{x^4 + 3x^3 + 4x^2 + 2}{x^3}$$

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13. An urn contains 60 blue pens and 40 red pens. Half of the each one is defective . If one pen is chosen at random , what is the probaility that it is a defective or a red pen ?

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14. Find the angle between the lines whose slopes are $\left(2 - \sqrt{3}\right)$ and $2 + \sqrt{3}\Big)$.

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15. Find the number of terms in the expansion of $\left(1 + 6x + 9x^2\right)^{23}$

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16. If A = {x,y,z} B = {a,x} ; then find $(A \times B)$.

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17. If A and B are two sets. A has 20 elements , $A \cup B$ has 46 elements and $A \cap B$ has 15 elements , how many elements will B have ?

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18. Prove that : $\cos 10^\circ + \cos 110^\circ + \cos 130^\circ = 0.$

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19. Prove that: $\frac{\cos 2\theta}{1 + s \in 2\theta} = \tan\left(\frac{\pi}{4} - \theta\right)$

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20. In any ΔABC, prove that

$$\frac{\sin A}{\sin(A+B)} = \frac{a}{c}$$

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21. If $\frac{2+3i}{3-4i} = a + ib$, find the values a and b.

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22. If α and β the roots of the equation $px^2 + qx + 1 = 0$, find $\alpha^2\beta^2$.

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23. Find the domain and range of : $2 - |x - 4|$.

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24. Solve $\sin 7x + \sin 4x + \sin x = 0$ and $0 < x < \frac{\pi}{2}$

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25. Prove that $\frac{\cos A + \cos 3A + \cos 5A + \cos 7A}{\sin A + \sin 3A + \sin 5A + \sin 7A} = \cot 4A$

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26. Using Mathematical induction, prove that $10^n + 3.4^{n+2} + 5$ is divisible by 9 for all $n \in N$.

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27. Differentiate the function sin $(2x - 3)$.

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28. Evaluate: $\lim_{x \to 0} \frac{(1-x)^n - 1}{x}$

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29. If 'x' be real, find the maximum and minimum value of : $y = \frac{x+2}{2x^2+3x+6}$

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30. If α, β be the roots of the equation $x^2 + lx + m = 0$, then from an equation whose roots are : $(\alpha+\beta)^2$ and $(\alpha-\beta)^2$

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31. The sum of three consecutive numbers of a G.P is 56. If we sunbtract 1,7 and 21 from the these numbers in the order the resulting numbers from an A.P. Find the numbers.

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32. Find the equation of the tangent to the circle $x^2 + y^2 - 2x - 2y - 23 = 0$ and parallel to $2x + y + 3 = 0$.

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33. Find the equation of the circle which passes through the points $(2, 3), (4, 5)$ and the centre lies on the straight line $y - 4x + 3 = 0$.

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34. Find the mean for the following data:

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	2	3	5	10	3	5	2

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Section B

1. The eccentricity of the ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$ is ,

A. a) $\frac{4}{5}$

B. $-\frac{4}{5}$

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

D. d) $-\frac{3}{5}$

Answer: A

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2. If the distance between the points (a,2,1)and (1,-1,1) is 5, then the value (s) of a is

A. $5,\ -5$

B. $3,\ -3$

C. $5, \ -3$

D. $-5, 3$

Answer: C

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3. If the parabola of $y^2 = 4ax$ passes through the point (3,2), find the length of its latus rectum.

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4. Find the equation of the hyperbole with eccentricity 5/3 and foci $(\pm 5, 0)$.

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5. Write the negation of the statement sum of 4 and 5 is 10 ?

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6. Prove that : $\sim(p \Rightarrow q) = p \wedge (\sim q)$

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7. Write converse and inverse of the given conditional statement:

If a number $\frac{I}{F}$ is even , then n^2 is even.

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8. Find the equation of the ellipse in the following case: focus is (1,2), directrix is $3x + 4y - 5 = 0 \; and \; e = \frac{1}{2}$.

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9. Find the eccentricity, coordinates of the foci equations of directrices and length of the latus rectum of the hyperbola $16x^2 - 9y^2 = 144$

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10. In what ratio the point P(-2, y, z) divides the line joining the points A(2, 4, 3) and B(-4, 5, -6). Also, find the coordinates of point P.

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11. The wholesale price index (or price relative) of rice in 2012 compared to 2010 is 130. If the cost of rice was Rs 12 per kg in 2010, calculate the cost in 2012.

A. (i) 16.50

B. (ii) 16.00

C. (iii) 15.60

D. (iv) 15.00

Answer: C

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12. Q_1 is always equal to :

A. P1

B. P10

C. P25

D. P50

Answer: C

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13. During a certain period , the cost of living index number goes from 110 to 200 and the salary of a worker is also raised from Rs 325 to Rs 500. Does the worker really gains or loses, and by how much amount in real terms ?

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14. Find the Q1 and Q2 for the follwing distrbution . 2,4,3,7,8,9,1,14,18,16,19.

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15. Compute D3 for the following distribution :

Marks	$0-10$	$10-20$	$20-30$	$30-40$	$40-50$	$50-60$	60
No.of students	3	10	17	7	6	4	2

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16. The mean weight of 150 students in a certain class is 60 kg. The mean weight of boys is 70 kg and that of girls in the class is 55 kg. Find the number of boys and girls in the class.

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17. The length of 50 ears of barley (to the nearest millimeter) gave the following frequency distribution .

Length (mm)	$15-19$	$20-24$	$25-29$	$30-34$	$35-39$
Frequency	1	8	10	16	15

Find the median.

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18. Find the correlation coefficient r(x,y) if :

$n=10, \sum x=60, \sum y=60, \sum x^2=400, \sum y^2=580, \sum xy=305$

.

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19. Ten students got the following percentages of marks in Mathematics and Physics:

Mathematics	56	64	75	85	85	87	91	95	97	98
Physics	89	90	86	74	78	66	56	74	86	90

Find the spearman's rank correlation coefficient for the above data.

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