MATHS

BOOKS - MODERN PUBLISHERS MATHS (HINGLISH)

MOCK TEST

Section A

1. Suppose $A_1, A_2 \ldots . A_{30}$ are thirty sets each having 5 elements and $B_1 B_2 \ldots . B_n$ are n sets each having 3 elements ,Let $\bigcup_{i=1}^{30} A_1 = \bigcup_{j=1}^{n} B_j = s$ and each element of S belongs to exactly 10 of the A_1 and exactly 9 of the value of n.

A. 15

B. 3

C. 45

D. 35

Answer: C

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2. Range of $f(x) = \frac{1}{1 - 2\cos x}$ is :

A. $\left[\frac{1}{3}, 1\right]$

B. $\left[-1, \frac{1}{3}\right]$

C. $(-\infty, -1] \cup \left[\frac{1}{2}, \infty\right)$

D. $\left[-\frac{1}{3}, 1\right]$

Answer: B

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3. If $\sec\theta + \cos\theta = 2$, then the value of $\sec^2\theta + \cos ec^2\theta$ is :

A. 1

B. 4

C. 2

D. None of these

Answer: D

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4. The complex conjugate of $-21 + 20i$ is :

A. $-21 - 20i$

B. $21 - 20i$

C. $-21 + 20i$

D. None of these

Answer: A

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5. If x is a real number and $|x| < 3$, then

A. $-3 \leq x \leq 3$

B. $-3 < x < 3$

C. $x \leq 3$

D. $x > 3$

Answer: B

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6. If $\frac{1}{\lfloor 8} + \frac{1}{\lfloor 9} = \frac{x}{\lfloor 10}$, then x is equal to :

A. 10

B. 20

C. 9

D. 100

Answer: D

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7. The sequence 0.3,0.33,0.333 ....., to ne terms is :

A. an A.P

B. a G.P

C. an infinite G.P

D. None of these

Answer: D

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8. Find the sum to n terms of the series $1^2 + 3^2 + 5^2 + \ldots.$ upto n terms .

A. $\frac{n}{3}\left(4n^2 - 1\right)$

B. $\frac{n}{3}\left(4n^2 - n\right)$

C. $\frac{n}{3}\left(4n^2 + 1\right)$

D. $\frac{n}{3}\left(4n^2 + n\right)$

Answer: A

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9. $\lim_{x \to 0} \frac{1 - \cos x}{x}$ is :

A. 0

B. 1

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

D. None of these

Answer: A

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10. $p \vee q$ is false when :

A. p and q are both ture

B. p is true and q is false

C. p is false and q is ture

D. p and q are both false .

Answer: D

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11. Let R be a relation on Z defined by : $R = \{(a, b) : a \in Z, b \in Z, a^2 = b^2\}$. Then range of R = _____.

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12. $\sin 70^\circ \cos 10^\circ - \cos 70^\circ \sin 10^\circ =$ _____

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13. If $z_1 = 2 - i, \ +2 = \ -2 + i,$ find : $Re\left(\frac{z_1 z_2}{z_1}\right)$

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14. If $iz^3 + z^2 - z + I = 0$, then |z| =_____

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15. If p and q are both false , then $p \Rightarrow q$ is .

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16. The probability that a leap year will have fifty three monday is _____ .

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17. Two finite sets have m and n elements. The number of elements in the power set of first set is 48 more than the total number of elements in the power set of the second set. Then the value of m and n are-

A. $m = 6, n = 3$

B. $m = 7, n = 5$

C. $m = 5, n = 3$

D. $m = 6, n = 4$

Answer:

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18. Find the value of : $2\left(\sin^6 x + \cos^6 x\right) - 3\left(\sin^4 x + \cos^4 x\right) + 2.$

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19. If $\tan A = \dfrac{\sin B}{1 - \cos B}$,then find the value of $\tan 2A.$

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20. Write the least positive intergal value of n when $\left(\dfrac{1+i}{1-i}\right)^{2n}$ =1 .

A. 2

B. 4

C. 6

D. 14

Answer:

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21. A committee of 2 boys and 2 girls is to be slected from 4 boys and 3 girls . In how many ways can this be done ?

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22. Give that $P(A) = 0.5, P(B) = 0.35, P(A \cup B) = 0.7$ find $P(A \cap B)$

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23. A and B are two mutually exclusive events , for which $P(A) = 0.3, P(B) = p$ and $P(A \cup B) = 0.5$. Find the value of p.

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Section B

1. Let

$U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}, A = \{1, 3, 5, \}B = \{2, 4, 6\}, C = \{4, 5, 6\}$

Find (i) $A^c \cap B^c$ (ii) $(A \cup B)^c \cap C^c$

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2. Show that a real value of x will satisfy hte equation $(1 - ix)/(1 + ix) = a - ib$ if $a^2 + b^2 = 1, where a, b$ real.

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3. Let . ${}^nP_r$ denote the number of permutations of n different things taken r at a time . Then , prove that

$1 + 1.\ {}^{1}P_1 + 2.\ {}^{2}P_2 + 3.\ {}^{3}P_3 + \ldots . + n.\ {}^{n}P_n = .\ {}^{n+1}P_{n+1}$

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4. If the middle term in the expreansion of $(1+x)^{2n}$ is $\frac{[1.3.5.\ldots(2n-1)]}{n!}(k)$, where n is a positive integer , then k is .

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5. If the coefficients of $(2r+1)th$ and $(4r+5)$ th terms is the expansion of $(1+x)^{10}$ are equal then $r = ?$

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6. If 'p' be the measure of the perpendicular segment from the origin on the line whose intercepts on the axes are 'a' and 'b'.then prove that :

$$\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$$

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7. Show that the triangle vertices $(6, 10, 10), (1, 0, -5)$ and $(6, -10, 0)$ is a right - angled triangle .

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8. Show that the point $(3, -1, -1), (5, -4, 0), (2, 3, -2)$ and $(0, 6, -3)$ are the vertices of a parallelogram.

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Section C

1. Let A $= \{1, 2, 3, 4, 5, 6, 7, 8\}$ and R be the relation on A defined by :

$R = \{(x, y) : x \in A, y \in A \text{ and } x + 2y = 10\}$.

Find the domains and ranges of R and R^{-1} after expressing them as sets of ordered pairs.

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2. If $f(x) = \frac{1}{2x-1}, x \neq \frac{1}{2}$, then show that : $f(f(x)) = \frac{2x-1}{3-2x}, x \neq \frac{3}{2}$

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3. If $\tan(\alpha+\theta) = n\tan(\alpha-\theta)$, show that : $(n+1)\sin 2\theta = (n-1)\sin 2\alpha.$

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4. Solve : $\frac{2x-3}{4} + 8 \geq 2 + \frac{4x}{3}$ and show the solution se on the number line .

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5. Solve the following system of inequtions graphically.

$x + 3y \leq 12, 33x + y \leq 12, x \geq 0, y \geq 0$

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6. If A and G be A.M. and GM., respectively between two positive numbers, prove that the numbers are $A \pm \sqrt{(A+G)(A-G)}$.

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7. Evaluate : $\lim_{x \to 1} \frac{\left(x + x^2 + x^3 + \ldots\ldots\ldots + x^n\right) - n}{x - 1}$

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8. A bag contains 50 tickets numbered 1, 2, 3, .., 50 of which five are drawn at random and arranged in ascending order of magnitude `(x_1

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Section D

1. If $s\int h\eta = n\sin(\theta + 2\alpha)$, prove that $\tan(\theta + \alpha) = \frac{1+n}{1-n}\tan\alpha$.

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2. Prove the following by using the Principle of mathematical induction

$\forall n \in N$

$$\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\ldots\ldots\left(1-\frac{1}{n+1}\right) = \frac{1}{n+1}$$

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3. Prove by Principle of Mathematical Induction that $\left(10^{2n-1}+1\right)$ is divisible by 11 for all $n \in N$.

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4. Find the equation of a circle passing through the points $(5, 7), (6, 6)$ and $(2, -2)$. Find its centre and radius.

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5. For the ellipse $25x^2 + 9y^2 - 150x - 90y + 225 = 0$, find the eccentricity , centre , veritces , foci and axes (major , minor).

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