

MULTIPLE CHOICE QUESTIONS IN MATHEMATICS (HSE FIRST YEAR) 2015

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- 1 . If $n(A) = 3$, $n(B) = 4$ $n(A \times B)$ equals (a) 7 (b) 8 (c) 12 (d) 32
- 2 . Conjugate of the complex number $3 - 2i$ is
(a) $2 + 3i$ (b) $3 + 2i$ (c) $2 - 3i$ (d) $3 - 2i$
3. Real part of the complex number $i(2 - i)$ is
(a) 1 (b) 2 (c) - 1 (d) - 2
4. If $n(A) = 24$ $n(B) = 32$ and $n(A \cup B) = 40$ then $n(A \cap B)$ equals
(a) 8 (b) 10 (c) 16 (d) 24
5. The domain of the function $\sqrt{9 - x^2}$ is
(a) $(-3, 3)$ (b) $[-3, 3]$ (c) $(0, 9)$ (d) $(0, 3)$
- 6 . If $n C_5 = n C_8$ then n equals (a) 5 (b) 8 (c) 13 (d) 40
- 7 . The value of $6! - 5!$ is (a) 4 (b) 30 (c) 500 (d) 600
8. If $x + \frac{x}{2} + \frac{x}{3} < 11$ Then (a) $x < 6$ (b) $x < 5$ (c) $x \geq 6$ (d) $x \geq 5$
9. What is the value of i^{2015} ? (a) 1 (b) i (c) - 1 (d) $-i$
10. If $z = 3 + 4i$ then $|z|$ equals (a) 5 (b) 7 (c) 9 (d) 12
11. The A.M of numbers 5 and 19 is (a) 7 (b) 12 (c) 17 (d) 24
12. In an A.P if the 7th term is 12 and 12th term is 7 then 10th term is
(a) 5 (b) 9 (c) 19 (d) 0
13. In how many ways 4 letters can be mailed if there are 3 mail boxes available? (a) 7 (b) 12 (c) 64 (d) 81
14. How many different words can be formed using all the letters of the word ROSE once? (a) 10 (b) 16 (c) 24 (d) 256
15. How many chords can be drawn through 7 points on a circle?
(a) 14 (b) 19 (c) 21 (d) 42

16. What is the total number of rectangles in a chess board?
(a) 56 (b) 64 (c) 204 (d) 1296
17. How many triangles can be formed by joining 9 points when 5 of them are collinear? **(a) 45 (b) 74 (c) 75 (d) 84**
18. In the expansion $(a + b)^{2n}$ which is the middle term?
(a) t_n (b) t_{n+1} (c) t_{n-1} (d) $t_{n/2}$
19. If $n \in \mathbb{N}$, $7^n - 3^n$ is always divisible by
(a) 10 (b) 7 (c) 4 (d) 3
20. The 3rd term of an AP is 4. What is the sum of first 5 terms?
(a) 12 (b) 15 (c) 20 (d) 24
21. What is the sum of 500 A.Ms between 2 and 3 ?
(a) 1000 (b) 1250 (c) 1500 (d) 2500
22. How many terms of a G.P $1, 2, 2^2, \dots$ are needed to give the sum 63 ?
(a) 4 (b) 5 (c) 6 (d) 7
23. If $\sum n^3 = 2025$ what is $\sum n$? **(a) 45 (b) 55 (c) 60 (d) 65**
24. $\lim_{x \rightarrow \pi/4} \sin x + \cos x$ equals **(a) 1 (b) 2 (c) 0 (d) $\sqrt{2}$**
25. What is the derivative of $\log 2$? **(a) 2 (b) $1/2$ (c) $\sqrt{2}$ (d) 0**
26. Derivative of $\sqrt{x}$ is **(a) $\sqrt{x}$ (b) 1 (c) $\frac{1}{2\sqrt{x}}$ (d) $\frac{1}{\sqrt{x}}$**
27. The slope of the line $2x - 3y + 5 = 0$ is
(a) $-2/3$ (b) $-3/2$ (c) $3/2$ (d) $2/3$
28. Choose the line which is perpendicular to $x - 3y + 7 = 0$
**(a) $3x + y + 1 = 0$ (b) $3x - y + 2 = 0$
 (c) $x + 3y + 7 = 0$ (d) $x - 3y + 8 = 0$**
29. The eccentricity of the ellipse $5x^2 + 9y^2 = 1$ is
(a) $2/3$ (b) $3/4$ (c) $4/5$ (d) $1/2$
30. Three coins are tossed once. What is the probability of getting at most 2 heads? **(a) $1/8$ (b) $3/8$ (c) $1/2$ (d) $7/8$**

MULTIPLE CHOICE QUESTIONS IN MATHEMATICS (HSE FIRST YEAR) - ANSWERS

1	c	7	d	13	d	19	c	25	d
2	b	8	a	14	c	20	c	26	c
3	a	9	d	15	a	21	b	27	d
4	c	10	a	16	d	22	c	28	a
5	b	11	b	17	b	23	a	29	a
6	c	12	b	18	b	24	d	30	d

Hints to the answers:

1	$3 \times 4 = 12$	16	$9 C_2 \times 9 C_2$
2	Conjugate of $a + ib$ is $a - ib$	17	$9 C_3 - 5 C_3$
3	$z = 1 + 2i$	18	Total no. of terms $2n + 1$ So $n + 1^{\text{th}}$ term is the middle term
4	$n(A \cup B) = n(A) + n(B) - n(A \cap B)$	19	$a^n - b^n$ is divisible by $a - b$
5	The domain of the function $\sqrt{a^2 - x^2}$ is $[-a, a]$	20	The terms are $4 - 2d, 4 - d, 4, 4 + d, 4 + 2d$ Sum $= 4 \times 5 = 20$
6	If $n C p = n C q$ then either $p = q$ or $p + q = n$.	21	Sum of n AMs $= n \times$ single AM
7	$6! = 720$ and $5! = 120$	22	$2^n - 1 = 63$ $n = 6$
8	Multiply both sides by 6 and simplify	23	$\sum n^3 = (\sum n)^2$
9	$i^{4m+3} = -i$	24	$\sin \pi/4 = \cos \pi/4 = 1/\sqrt{2}$
10	$ z = \sqrt{a^2 + b^2}$	25	$\log 2$ is a constant.
11	$AM = \frac{a+b}{2}$	26	$\frac{1}{2\sqrt{x}}$
12	If the m^{th} term is n and n^{th} term is m p^{th} term is $m + n - p$	27	Slope of $ax + by + c = 0$ is $-a/b$
13	$3 \times 3 \times 3 \times 3 = 81$	28	$m_1 m_2 = -1$
14	$4! = 24$	29	Eccentricity $= c/a$ where $c = \sqrt{a^2 - b^2}$
15	$7C_2 - 7 = 14$	30	No of heads ≤ 20 - TTT 1- HTT, THT, TTH 2- THH, HTH, HHT