MHT CET 2025

Maharashtra Common Entrance Test

April 27 · Shift 1 · Question Paper

Time Allowed	Maximum Marks	Total Questions
3 Hours	200	150

General Instructions: All questions are compulsory. Each question carries equal marks. There is no negative marking. Use blue/black ball-point pen only. Rough work must be done in the space provided.

MATHEMATICS

Q1. **Evaluate the integral:**

$$\int \sqrt{(\tan x)} / (\sin x \cdot \cos x)\, dx$$

(A) $2 / \cos^2 x$

(B) $2 / \sin^2 x$

(C) $2 / \cos x$

(D) $2 / \sin x$

Q2. **Population of Town A and B was 20,000 in 1985. In 1989, the population of Town A was 25,000, and Town B had 28,000. What will be the difference in population between the two towns in 1993?**

(A) 5950

(B) 6950

(C) 4500

(D) 0

Q3. **A die was thrown n times until the lowest number on the die appeared. If the mean is n/g, then what is the value of n?**

(A) 2

(B) 3

(C) 4

(D) 5

Q4. **There are 6 boys and 4 girls. Arrange their seating arrangement on a round table such that 2 boys and 1 girl can't sit together.**

(A) 6! × 4!

(B) 6! × 3! × 4!

(C) 5! × 4!

(D) 5! × 3! × 4!

Q5. **Choose a randomly selected leap year, in which 52 Saturdays and 53 Sundays are to be there. Given the following probability distribution:**

x: 1 2 3 4 | p(x): 0.1 0.2 0.3 0.4 Find the mean and standard deviation.

(A) Mean = 2.7, Standard Deviation = 1.5

(B) Mean = 2.5, Standard Deviation = 1.2

(C) Mean = 2.4, Standard Deviation = 1.4

(D) Mean = 3.0, Standard Deviation = 1.6

Q6. **If $\tan^{-1}(\sqrt{\cos\alpha}) - \cot^{-1}(\cos\alpha) = x$, then what is $\sin\alpha$?**

(A) tan(x/2)

(B) cot(x/2)

(C) $\cot^2(x/2)$

(D) $\tan^2(x/2)$

Q7. **If $\tan(\pi\cos x) = \cot(\pi\sin x)$, then what is $\sin(\pi/2 + x)$?**

(A) 1/2

(B) $1/\sqrt{2}$

(C) –1/2

(D) $-1/\sqrt{2}$

Q8. **Evaluate the integral:**

$$\int 1 / (\sin^2 2x \cdot \cos^2 2x)\, dx$$

(A) (1/2) tan 2x

(B) (1/2) cot 2x

(C) (1/4) cot 2x

(D) (1/4) tan 2x

Q9. **Given the equation: $81^{\sin^2 x} + 81^{\cos^2 x} = 30$. Find the value of x.**

(A) $x = \pi/4$

(B) $x = \pi/6$

(C) $x = \pi/3$

(D) $x = \pi/2$

Q10. **The angle between the lines whose direction cosines satisfy the equations: l + m + n = 0 and $m^2 + n^2 - l^2 = 0$. Find the angle between the two lines.**

(A) 30°

(B) 45°

(C) 60°

(D) 90°

Q11. **Let a, b, and c be vectors of magnitude 2, 3, and 4 respectively. If: a is perpendicular to (b + c), b is perpendicular to (c + a), and c is perpendicular to (a + b), then the magnitude of |a + b + c| is equal to:**

(A) 29

(B) $\sqrt{29}$

(C) 26

(D) $\sqrt{26}$

Q12. **A boy tries to message his friend. Each time, the chance the message is delivered is 1/6, and the chance it fails is 5/6. He sends 6 messages. Find the probability that exactly 5 messages are delivered.**

(A) 1/6

(B) 5/6

(C) $C(6,5) \cdot (1/6)^5 \cdot (5/6)$

(D) 5/36

Q13. **Given that cot((A+B)/2) · tan((A−B)/2) = [expression], and the equation x/2 + y/3 + 2/6 − 1 = 0, find the area**

(A) 2

(B) 3

(C) 4

(D) 5

Q14. **Evaluate the following integrals:**

$$\int (x^4 + 1) / [x(2x + 1)^2]\, dx \text{ and } \int 1 / (x^4 + 5x^2 + 6)\, dx$$

(A) 1 / (2x+1)

(B) $1 / (x^4 + 5x^2 + 6)$

(C) $(1/2) \cdot \ln |(x^2 + 3)/(x + 2)|$

(D) $(1/3) \cdot \ln |x^2 + 5x + 6|$

Q15. **Given that cot((A+B)/2) · tan((A−B)/2) and the equation involving coordinates: x/2 + y/3 + 2/6 − 1 = 0. Find the area**

(A) 2

(B) 3

(C) 4

(D) 5
