JEE Main 2024 Mathematics Question Paper
April 4 Shift 2
(B.E./B.Tech)

JEE Main Mathematics Questions

Ques 1. If a, b, c are in A. P. and a + 1, b, c + 3 are in G. P., arithmetic mean of a, b, c is 8, then the value of cube of geometric mean of a, b, c is:

- **A. 312**
- **B. 314**
- **C. 318**
- **D. 128**

Ans. A

Ques 2. If $\int_{-1}^{1} \frac{\cos \alpha x}{1+3^x} dx = \frac{2}{\pi}$ then α is

- **A. π/6**
- **B. π/2**
- **C. π/3**
- **D. Π**

Ans. B

Ques 3. If coefficient of x^4, x^5, x^6 of $(1 + x)^n$ are in A.P., then maximum value of n is equal to

- **A. 28**

B. 21
C. 14
D. 7

Ans. C

Ques 4. Let relation defined as (x1, y1) R (x2, y2) x1 ≤ x2, y1 ≤ y2 and given that
(a) R is reflexive but not symmetric.
(b) R is transitive.
then

A. (a) is true, (b) is false
B. (a) is false, (b) is true
C. Both are true
D. Both are false

Ans. C

Ques 5. The value of

$$\frac{1\times 2^2+2\times 3^2+\ldots+100\times(101)^2}{1^2\times 2+2^2\times 3+\ldots+100^2\times 101}$$

A. 305/301
B. 301/305
C. 350/310
D. 310/350

Ans. A

Ques 6. A parabola $y^2 = 12x$ has a chord PQ with mid-point (4, 1) then equation of PQ passes through

A. (½, -20)

B. (½, -10)
C. (10, -½)
D. (-10, -½)

Ans. A

Ques 7. Team A plays 10 matches, probability of winning is 1/3 and losing is ⅔. They win x matches and lose y matches. Probability such that |x – y| ≤ 2 is P then find 3^9P.

A. 8288
B. 8381
C. 8461
D. 8911

Ans. A

Ques 8. For a hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, C1 is a circle touching hyperbola having centre at origin and C2 is circle centred at four and touching hyperbola at vertices, if area of C1 = 36π and area of C2 = 4π. Find a2 + b2 = ?

A. 40
B. 43
C. 64
D. 56

Ans. C

Ques 9. Find area bounded by y2 ≤ 2x and y ≥ 4x – 1

A. 9/ 32
B. 11/ 32
C. 11/ 8
D. 11/ 3

Ans. A

Ques 10. (x2 + 1)2dy + (y(2x3 + x) – 2)dx = 0, y(0) = 0, then y(2) is equal to

- **A. 2/5 $\tan^{-1}2$**
- **B. ⅗ $\tan^{-1}2$**
- **C. 2/5 $\tan^{-1}3$**
- **D. 3/5 $\tan^{-1}3$**

Ans. A

Ques 11. If a, b, c are in increasing A.P. and a + 1, b, c + 3 are in G.P. If A.M. of a, b, c is 8. Find cube of G.M. of a, b, c.

- **A. 123**
- **B. 312**
- **C. 415**
- **D. 213**

Ans. B

Ques 12. The radius of a circle is √10 . x + y = 4 is the line intersecting the circle at P & Q. A chord MN is of length 2 m having slope –1. Find perpendicular distance between the two chords PQ and MN.

- **A. 2**
- **B. 3**
- **C. 4**
- **D. 5**

Ans. B

Ques 13. In group A there are 4 men and 5 women and in group B there are 5 men and 4 women, if 4 people are selected from each group. Find a number of ways to select 4 men and 4 women.

Ans. 5626

Ques 14. If f(x)= 3√(x-2)+√4-x If minimum value = α Maximum value = β find α2 + β2

Ans. 22

Ques 15. If f(x) = $\begin{cases} \dfrac{(72)^x - 9^x - 8^x + 1}{\sqrt{2} - \sqrt{1+\cos x}}; x \neq 0 \\ a \log 2 \log 3 \quad ; x = 0 \end{cases}$ **is continuous at x = 0. Then a2 equals to**

- **A. 1152**
- **B. 572**
- **C. 1225**
- **D. 1005**

Ans. A