

JEE Main 2024 Mathematics Question Paper

Jan 29 Shift 2 (B.E./B.Tech)

JEE Main Mathematics Questions

Ques 1. Given set = $\{1, 2, 3, \dots, 50\}$ one number is selected randomly from the set. Find the probability that number is multiple of 4 or 6 or 7.

- A. 21/50
- B. 18/50
- C. 8/25
- D. 21/25

Ans. A

Ques 2. The value of $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sqrt{1 - \sin 2x} \, dx$ is

- A. $\sqrt{2} - \sqrt{3} + 1$
- B. $2\sqrt{2} - \sqrt{3} - 1$
- C. $2\sqrt{2} + \sqrt{3} - 1$
- D. $\sqrt{2} + \sqrt{3} - 1$

Ans. B

Ques 3. The remainder when $64^{32^{32}}$ is divided by 9 is

Ans. 1

Ques 4. Area bounded by $0 \leq y \leq \min\{x^2 + 2, 2x + 2\}$, $x \in [0, 3]$ then 12A is

Ans. 164

Ques 5. $A = \{1, 2, 3, 4\}$ minimum number of elements added to make an equivalence relation on set A containing (1, 3) & (1, 2) in it.

- A. 8
- B. 9
- C. 12
- D. 16

Ans. A

Ques 6. If $\ln a, \ln b, \ln c$ are in AP and $\ln a - \ln 2b, \ln 2b - \ln 3c, \ln 3c - \ln a$ are in AP then $a : b : c$ is

- A. $1 : 2 : 3$
- B. $7 : 7 : 4$
- C. $9 : 9 : 4$
- D. $4 : 4 : 9$

Ans. C

Ques 7. If $r = |z|$, $\theta = \arg(z)$ and $z = 2 - 2i \tan(5\pi/8)$ then find (r, θ)

- A. $(2\sec((5\pi)/8), (3\pi)/8)$
- B. $(2\sec((3\pi)/8), (3\pi)/8)$
- C. $(2\tan((3\pi)/8), (5\pi)/8)$
- D. $(2\tan((3\pi)/8), (3\pi)/8)$

Ans. B

Ques 8. In which interval the function $f(x) = x/(x^2 - 6x - 16)$ is increasing?

- A. $\varnothing$
- B. $[1, 3/4) \cup (5/4, \infty)$
- C. $(5/4, \infty)$
- D. $(3/4, 5/4)$

Ans. A

Ques 9. (α, β) lie on the parabola $y^2 = 4x$ and (α, β) also lie on chord with mid-point $(1, 5/4)$ of another parabola $x^2 = 8y$, then value of $|(8 - \beta)(\alpha - 28)|$ is

- A. 192
- B. 92
- C. 64
- D. 128

Ans. A

Ques 10. If first term of non-constant GP be $1/8$ and every term is AM of

next two, then $\sum_{r=1}^{20} T_r - \sum_{r=1}^{18} T_r$ is

- A. 2^{15}
- B. -2^{15}
- C. -2^{18}
- D. 2^{18}

Ans. B

Ques 11. The mean of 5 observations is $24/5$ and variance is $194/25$. If the mean of first four observations is $7/2$, then the variance of first four observations is

- A. $3/2$
- B. $5/2$
- C. $5/4$
- D. $2/3$

Ans. C

Ques 12. The number of ways to distribute 8 identical books into 4 distinct bookshelf is (where any bookshelf can be empty)

Ans. 165

Ques 13. If $f(x) = \ln((1-x^2)/(1+x^2))$ then value of $225(f'(x) - f''(x))$ at $x = \frac{1}{2}$

Ans. 736

Ques 14. $\frac{3\cos 2x + \cos^3 2x}{\cos^6 x - \sin^6 x} = x^3 - x^2 + 6$ then find sum of roots,

Ans. 1