

Space for rough work



CANDIDATE ANSWER BOOKLET

JEE ADVANCED LEVEL

CANDIDATE DETAILS

NAME OF STUDENT

DATE OF EXAMINATION / /

CLASS

BOARD

TIME DURATION : To :

READ THE INSTRUCTIONS CAREFULLY

- Please read these instructions carefully. A candidate who breaches any of the Examination Regulations will be liable to disciplinary action
- Examinations will be conducted during the allocated times shown in the examination timetable.
- Do NOT turn over the question paper until instructed at the time of commencement of the examination.
- Any unauthorised materials or devices found in your possession after the start of the examination will be confiscated, and you will be liable to disciplinary action.
- Handphones brought into the examination hall must be switched off at ALL times. If your handphone is found to be switched on in the examination hall, the handphone will be confiscated and retained for investigation of possible violation of regulations.
- Please check that you have the correct question paper and read the instructions printed on your examination question paper carefully.
- You are not allowed to communicate by word of mouth or otherwise with other candidates (this includes the time when answer scripts are being collected).
- Please raise your hand if you wish to communicate with an invigilator.
- Unless granted permission by an invigilator, you are not allowed to leave your seat.
- Once you have entered the examination hall, you will not be allowed to leave the hall until one hour after the examination has commenced.

QUESTION PAPER FORMAT

- The question paper contains **15 INTEGER TYPE QUESTIONS** (TOTAL: 120 Marks)
- Answer to every question is an integer ranging from **0 to 9**.
- Mark your answer in the boxes alongside the questions (without units).
- Each question carries **8 marks**.
- Marking Scheme:
Correct answer: +8 marks
Wrong answer: -2 marks
No attempt: 0 marks

SCORE CARD

+8

0

-2

Total Score

Pass Score

Result



1. Find x:

$$\tan^{-1} \frac{1}{1+2x} + \tan^{-1} \frac{1}{1+4x} = \tan^{-1} \frac{2}{x^2}$$

Answer:

2. A right circular cone is to be circumscribed about a sphere of a given radius. Find the ratio of the altitude of the cone to the radius of the sphere, if the cone is of least possible volume.

Answer:

3. If $f(x)$ is derivable at $x = 3$ & $f'(3) = 2$, then $\lim_{h \rightarrow 0} \frac{f(3+h^2) - f(3-h^2)}{2h^2} = \underline{\hspace{2cm}}$.

Answer:

4. Given the function $g(x) = \sqrt{6-2x}$ and $h(x) = 2x^2 - 3x + a$. Then

If $f(x) = \begin{cases} g(x), & x \leq 1 \\ h(x), & x > 1 \end{cases}$, find 'a' so that f is continuous.

Answer:

5. Let $f(x)$ be a function satisfying the condition $f(-x) = f(x)$ for all real x . If $f'(0)$ exists, then its value is .

Answer:

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6. If $f(\pi) = 2$ & $\int_0^{\pi} (f(x) + f''(x)) \sin x \, dx = 5$, then find $f(0)$

Answer:

7. The value of $\int_1^{e^{37}} \frac{\pi \sin(\pi \ln x)}{x} \, dx$ is _____.

Answer:

8. If $f(x) = \begin{cases} e^{\cos x} \cdot \sin x & \text{for } |x| \leq 2 \\ 2 & \text{otherwise} \end{cases}$. Then $\int_{-2}^3 f(x) \, dx$:

Answer:

9. If $A = \begin{pmatrix} a & b & c \\ b & c & a \\ c & a & b \end{pmatrix}$, where a, b, c are real positive numbers, $abc = 1$ and $A^T A = 1$, then find the value of $a^3 + b^3 + c^3$.

Answer:

10. Find the rank of the following matrix

$$\begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$$

Answer:

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11. Let $f(\theta) = \begin{vmatrix} \cos^2\theta & \cos\theta\sin\theta & -\sin\theta \\ \cos\theta\sin\theta & \sin^2\theta & \cos\theta \\ \sin\theta & -\cos\theta & 0 \end{vmatrix}$ then $f\left(\frac{\pi}{6}\right) =$

Answer:

12. If $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = k abc (a+b+c)^3$ then the value of k is

Answer:

13. If $f(x) = x^2 - 5x + 7$, find $f(A)$ where $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$

Answer:

14. The chord of the parabola $y = -a^2x^2 + 5ax - 4$ touches the curve $y = \frac{1}{1-x}$ at the point $x = 2$ and is bisected by that point. Find 'a'.

Answer:

15. If the normal to the curve, $y = f(x)$ at the point $(3, 4)$ makes an angle $\frac{3\pi}{4}$ with the positive x-axis. Then $f'(3)$

Answer:

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