JEE Advanced 2026 Paper 1

Question Paper (Memory Based)

Conducted by IIT Roorkee

General Instructions

(i) The examination will be conducted in Computer-Based Test (CBT) mode.

(ii) The total number of questions are 48.

(iii) Duration of the exam is 3 hour (180 minutes).

1. Evaluate: $\cot^{-1}(\cot(-11)) + 10\sin\left(2\cos^{-1}\left(\frac{1}{\sqrt{2}}\right)\right) + 10\sin\left(2\tan^{-1}(2)\right)$

---

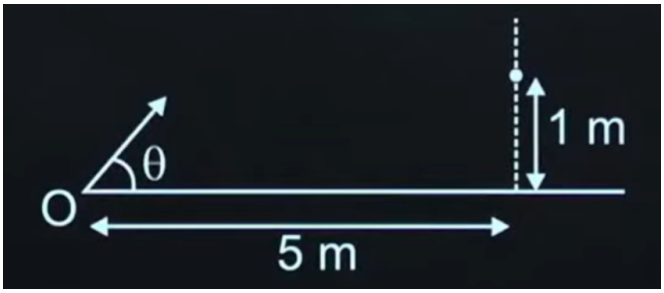
2. If $\alpha = \left(1-2\cos\frac{\pi}{11}\right)\left(1-2\cos\frac{3\pi}{11}\right)\left(1-2\cos\frac{5\pi}{11}\right)\left(1-2\cos\frac{7\pi}{11}\right)\left(1-2\cos\frac{9\pi}{11}\right)$**then find the value of** $5-\alpha^2$.

---

3. In how many ways can 10 identical red pens and 14 identical blue pens be distributed among 4 persons such that each person gets 6 pens?

---

4. A particle is thrown with speed v **from point** O **with an angle** θ **from the horizontal plane such that it passes through point** P **at height** $1\,\text{m}$ **from ground and** $5\,\text{m}$ **of horizontal distance as shown in figure.**



(A) If $\theta = \tan^{-1}\left(\frac{1}{5}\right)$, then $v = 125\sqrt{g}\,\text{m/s}$

(B) If $\theta = 45°$, then $v = \dfrac{5\sqrt{g}}{2}\,\text{m/s}$

(C) If $\theta = 45°$, then the particle attains maximum height before reaching P

(D) If $\theta = 30°$, then the particle attains maximum height after reaching P

---

5. Compare the bond angles of NO_2, NO_2^+, NO_2^-, and NO_3^-.

(A) $NO_2^- < NO_3^- < NO_2 < NO_2^+$

(B) $NO_3^- < NO_2 < NO_2^+ < NO_2^-$

(C) $NO_2 < NO_3^- > NO_2^- < NO_2^+$

(D) $NO_2 < NO_2^- < NO_3^- < NO_2^+$

---

6. Compare dipole moments of BF_3, NH_4^+, NF_3, and NH_3.

(A) $NH_4^+ < BF_3 < NF_3 < NH_3$

(B) $NF_3 < NH_4^+ = BF_3 < NH_3$

(C) $BF_3 < NH_3 < NF_3 < NH_4^+$

(D) $BF_3 = NH_4^+ < NF_3 < NH_3$

---

7. How many faces have one NH_3 and two Cl^- ligands in the following octahedral complexes?

cis-$[M(NH_3)_4Cl_2]$

mer-$[M(NH_3)_3Cl_3]$

---

8. Value of $\int_0^2 \frac{1}{3+3^x}\,dx$ is
