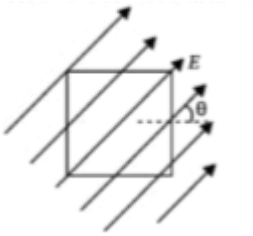
DPP 04

ELECTRIC FLUX

1. A square surface of side L meter in the plane of the paper is placed in a uniform electric field E (volt/m) acting along the same plane at an angle θ with the horizontal side of the square as shown in figure.



The electric flux linked to the surface, in units of volt m is

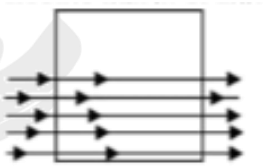
(A) EL^2

(B) $EL^2\cos\theta$

(C) $EL^2\sin\theta$

(D) zero

2. A square surface of side L metres is in the plane of the paper. A uniform electric field E (volt/m). also in the plane of the paper is limited only to the lower half of the square surface (see figure). The electric flux in SI units associated with the surface is



(A) EL^2

(B) $EL^2/2\in_0$

(C) $EL^2/2$

(D) zero

3. Find the Flux due to $\vec{E} = 3\hat{i} + 24\hat{j} + 6\hat{k}$ Through a portion of 5 m^2 area of plane for which Normal is parallel to $2\hat{i} + 4\hat{j} + 6\hat{k}$

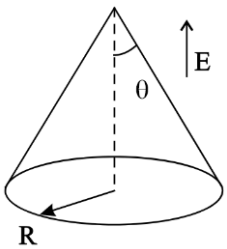
(A) $\frac{690}{\sqrt{56}}$

(B) 138

(C) 690

(D) $\frac{138}{\sqrt{56}}$

4. Find the Flux passing through the Curved Surface of the Cone



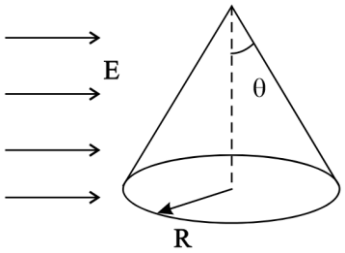
(A) $E\cdot\pi R^2$

(B) $E\cdot\pi R^2\sin\theta$

(C) $E\cdot\pi R^2\cos\theta$

(D) $E\cdot\pi R^2\sin^2\theta$

5. Find the Flux entering the cone



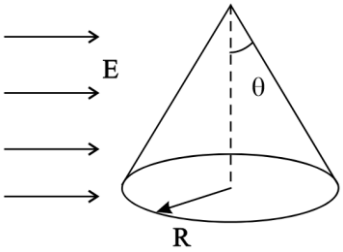
(A) $E\cdot\pi R^2$

(B) $\frac{E\cdot R^2}{\text{Tan }\theta}$

(C) $E^2\text{Tan }\theta$

(D) Zero

6. Find the net flux entering the Cone



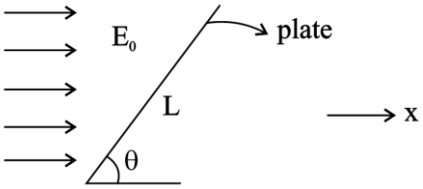
(A) $E \cdot \pi R^2$

(B) $\frac{E \cdot R^2}{\text{Tan } \theta}$

(C) $ER^2 \text{Tan } \theta$

(D) Zero

7. Find the Flux due to electric field E_0 î passing Through a square plate (L) inclined at an angle of θ with the x-axis.



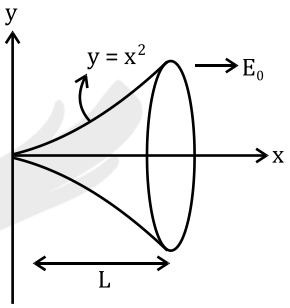
(A) $E_0 l^2$

(B) $E_0 I^2 \cos \theta$

(C) $E_0 L^2 \sin \theta$

(D) $E_0 L^2 \text{Sin}^2 \theta$

8. Find the Flux Passing Through paraboloid



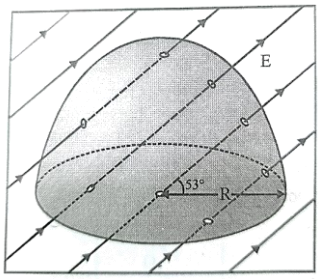
(A) $E_0 \cdot L^2$

(B) $E_0 \cdot \pi L^2$

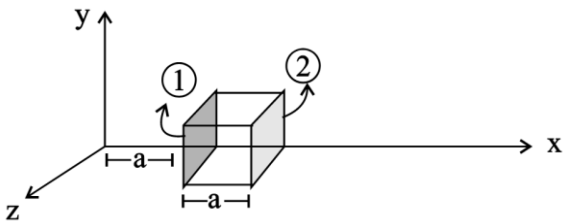
(C) $E_0 \cdot \pi L^4$

(D) $\frac{E_0 \pi L^4}{2}$

9. A uniform electric field $E = 500$ N/C passes through a hemispherical surface of radius $R = 1.2$ m as shown in figure. The net electric flux (in S.I. units) through the hemispherical surface only is Nπ. Then find the value of N.



10. The electric field components of the field shown in figure are $E_x = \alpha x^{1/2}$. $E_y = E_z = 0$, in which $\alpha = 5$ N/cm$^{+1/2}$. Find flux through cube.



11. Consider a uniform electric field $E = 3 \times 10^3$ N/C. What is the net flux of the uniform electric field through a cube of side 20 cm oriented so that its faces are parallel to the coordinate planes?

ANSWER KEY

1.	(D)	**2.**	(D)	**3.**	(D)	**4.**	(A)	**5.**	(B)	**6.**	(D)	**7.**	(C)
8.	(C)	**9.**	(576)	**10.**	$\alpha\, a^{5/2}\left(\sqrt{2}-1\right)$	**11.**	0						