PHYSICS

AAKASH INSTITUTE ENGLISH

Mock Test 24: PHYSICS

Example

1. A positive charge 50 muC is located in xy plane at a position vector $r_0 = 4\hat{i} + 4\hat{j}$. the electric field strength E at a point whose

position vector is $\vec{r} = 10\hat{i} - 4\hat{j}$ is ($\vec{r}_0$ and $\vec{r}$ are expressed in metre)

A. $\left(-1.6\hat{i} - 3.6\hat{j}\right)k\frac{V}{m}$

B. $\left(3.6\hat{i} + 1.6\hat{j}\right)k\frac{V}{m}$

C. $\left(\hat{i} - 3\hat{j}\right)k\frac{V}{m}$

D. $\left(2.7\hat{i} - 3.6\hat{j}\right)$ kV/m

Answer: D

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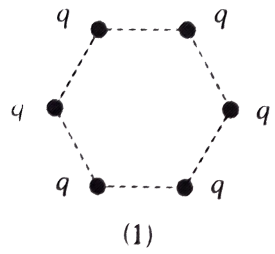
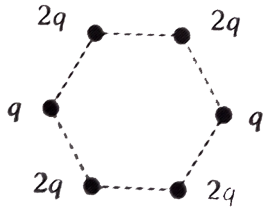
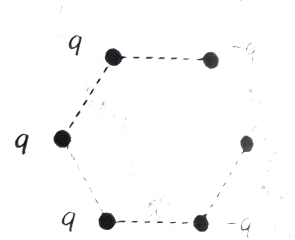
2. Figure below show regular hexagons, with charges at the vertices. In which of the following cases the elecetric field at the centre is not zero ?

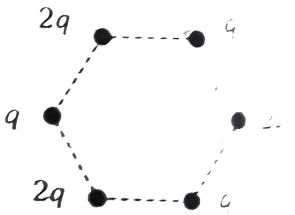


(1)





(2)



A. (a)

B. (b)

C. (c)

D. (d)

Answer: A

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3. two point charges + 16 q and -4q located at x=0 and x=L respectively. the location of a point on the x-axis from x=0, at which the net electric field due to these two charges is zero is

A. L

B. 2L

C. $\frac{L}{2}$

D. $\frac{L}{4}$

Answer: B

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4. a proton placed in an electric field would experience an electrical force equal to its

weight. the magnitude of electric field intensity E would be

A. $m^2 \frac{g}{e}$

B. $e^2 \frac{m^2}{g}$

C. mg/e

D. e/mg

Answer: C

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5. the electric field at origin due to infinite number of changes as shown in figure is 

A. $4K\frac{q}{5}$

B. $4K\frac{q}{3}$

C. $3K\frac{q}{4}$

D. $5K\frac{q}{4}$

Answer: B

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6. what is the net force on a dipole in a uniform electric field ?

A. can never be zero

B. is always zero

C. depends on the orientation of the dipole

D. depends on the strength of the dipole

Answer: B

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7. a positive test charge is released in the following field. at which point the acceleration of the test charge is maximum? 

A. A

B. B

C. C

D. D

Answer: A

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8. A small electric dipole is placed at origin with its dipole moment directed along positive x-axis. The direction of electric field at point $\left(2, 2\sqrt{2}, 0\right)$ is

A. along positive z axis

B. along positive y axis

C. along negative y axis

D. along negative z axis

Answer: B

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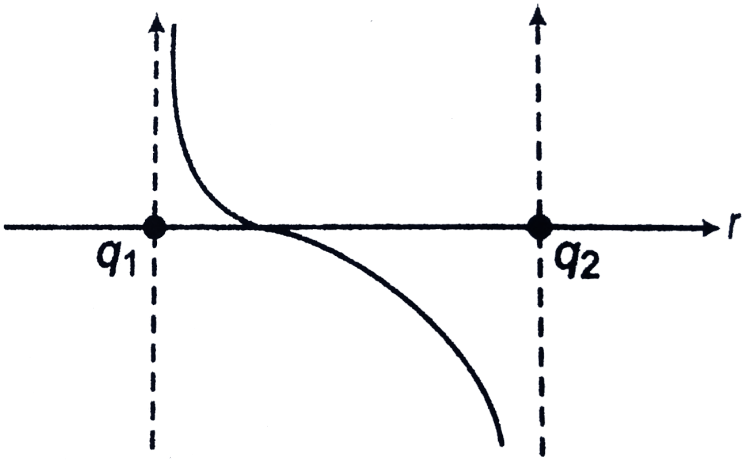
9. The variation of electric field between two charge q_1 and q_2 along the line joining the charges is plotted against distance from q_1 (taking rightward direction of electric field as positive) as shown in the figure. Then the correct statement is



A. q_1 and q_2 are positive and abs

$(q_1) > |q_2|$

B. q_1 and $q_2$are positive and$|q_1| < |q_2|$

C. q_1 is positive and q_2 is negative

$|q_1| < |q_2|$

D. q_1 is negative and q_2 is positive

$|q_1| > |q_2|$

Answer: B

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10. find the magnitude of dipole moment of the the following system 

A. qasqrt21

B. qasqrt13

C. 4qa

D. Zero

Answer: B

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11. The SI unit of electric flux is

A. $N - \frac{m^2}{C^2}$

B. $\frac{N}{C^2 - m^2}$

C. V-m

D. $V - m^3$

Answer: C

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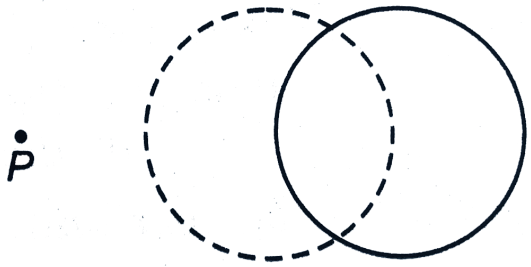
12. Figure shows a closed dotted surface which intersects a conduccting uncharged shere. If a positive charge is placed at the point P, the flux of the electric field through the closed surface



A. will remain zero

B. will be negative

C. will be positive

D. will be infinite

Answer: B

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13. An electric dipole is placed at the centre of a hollow conducting sphere. Which of the following is correct ?

A. the electric field is zero at every point of the spere

B. the flux of the electric field through to the sphere is zero

C. the electric field is not zero at anywhere on the sphere

D. both (2) and (3)

Answer: D

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14. In a region of space, the electric field is given by $\overrightarrow{E} = 8\hat{i} + 4\hat{j} + 3\hat{k}$. The electric flux through a surface of area 100 units in the xy plane is

A. 800 units

B. 300 units

C. 400 units

D. 1500 units

Answer: B

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15. Under what conditions can the electric flux ϕ_E be found through a closed surface?

A. if the magnitude of the electric field is known everywhere on the surface

B. if the total charge outside the surface is specified

C. only if the location of each point charge inside the surface is specified

D. if the total charge inside the surface is specified

Answer: D

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16. If the flux of the electric field through a closed surface is zero,

A. the charge outside the surface must be zero

B. the electric field must be zero everywhere on the surface

C. the total charge inside the surface must be zero

D. the electric field must be uniform throughout the closed surface

Answer: C

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17. An electric dipole is placed in an electric field generated by a point charge

A. the net electric force on the dipole must be zero

B. the date electric force of the dipole may be zero

C. the torque on the dipole due to the field must be zero

D. the torque on the dipole due to the field may be zero

Answer: D

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18. A proton and an electron are placed in a uniform electric field. Which of the following is correct?

A. the elective forces acting on them will be equal

B. their acceleration will be equal

C. the magnitude of the forces will be equal

D. the magnitude of their acceleration will be equal

Answer: C

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19. consider the situation shown in the figure the ratio $\frac{q_2}{q_1}$ is 

A. 36

B. 18

C. 6

D. 3

Answer: D

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20. four charges are placed each at a distance from origin. the dipole moment of configuration is 

A. $2qa\hat{j}$

B. $3qa\hat{j}$

C. $2aq(i+j)$

D. $3aq(i-j)$

Answer: A

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21. which of the following statement is correct?

A. electric field calculated by gauss law is the the field due to only those charges which are enclosed inside the Gaussian surface

B. gauss law is applicable only when there is a symmetrical distribution of charge

C. electric flux through a closed surface is equal to total / due to all the charge

enclosed with in that surface only

D. all of this

Answer: C

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22. Consider two concentric spherical surfaces S_1 with radius a and S_2 with radius 2a, both centered at the origin. There is a charge +q at the origin and there are no other charges.

Compare the flux ϕ_1 through S_1 with the flux ϕ_2 through S_2.

A. $\phi_1 = 2\phi_2$

B. $\phi_1 = 4\phi_2$

C. $\phi_1 = \phi_2$

D. $\phi_1 = \frac{\phi_2}{2}$

Answer: C

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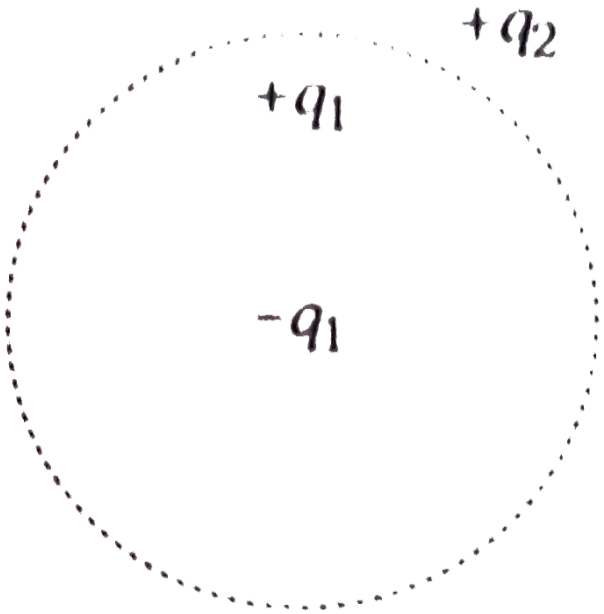
23. Consider the charge configuration and spherical Gaussian surface as shown in the figure. When calculating the flux of the electric field over the spherical surface the electric field will be due to



A. q_1 and q_2 alone

B. q_1, q_2 and q_3 alone

C. q_3 and q_4 alone

D. all charges q_1, q_2, q_3 and q_4

Answer: D

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24. an electric dipole is placed perpendicular to an charge at some distance as shown in figure identify the correct statement 

A. the dipole is attached towords the line charge

B. the dipole is repelled away from the line charge

C. the dipole does not experience a force

D. the type of experience the force as well as the torque

Answer: A

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25. a circular ring carries a chargeQ_1 the variation of electric field with distance x measured from centre along Axis for x>>R can be given as (R radius of ring)

A. $E \propto \frac{1}{x^3}$

B. $E \propto x$

C. $E \propto \frac{1}{x^2}$

D. $E \propto \frac{1}{x}$

Answer: C

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26. the linear change density of the semicircular ring on both side is same in magnitude. the electric field intensity at O is along 

A. $\hat{i}$

B.

C. $\hat{j}$

D. #NAME?

Answer: A

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27. A thin conducting spherical shell of radius R has charge Q spread uniformly over its surface. Using Gauss's law, derive an expression for an electric field at a point outside the shell.

Draw a graph of electric $E(r)$ with distance r from the centre of the shell for

A. 

B. 

C. 

D. 

Answer: C

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28. the figure shows the path of A positively charged particle through a rectangular region of uniform electric field as shown in the figure. the direction of deflection of particle 2, 3 and 4 is 

A. down, down, up

B. up, up, down

C. down,. up, down

D. up, down, down

Answer: C

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29. The maximum electric field intensity on the axis of a uniformly charged ring of charge q and radius R will be

A. $\frac{1}{4}\pi\varepsilon_0\frac{q}{3}\sqrt{2}R^2$

B. $\frac{1}{4}\pi\varepsilon_0 2\frac{q}{3}R^2$

C. $\frac{1}{4}\pi\varepsilon_0\frac{q}{3}\sqrt{3}R^2$

D. $\frac{1}{4}\pi\varepsilon_0 2\frac{q}{3}\sqrt{3}R^2$

Answer: D

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30. the given figure shows two parallel plates A and B of change densities $+3\sigma$ and -3σ

respectively. electric intensity will be zero in the 

A. region I and II

B. region II and III

C. region II

D. region I and III

Answer: D

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31. in the given figure a cone lies in a uniform electric field E the electric flux entering the cone is 

A. $ER\frac{h}{2}$

B. 2ERh

C. ERh

D. zero

Answer: C

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32. Two identical infinite positive line changes are places into the lines $x = \pm a$ in the $x = y$ plane. A positive point charge placed at origin is restricted to move along x-axis its equilibrium is

A. unstable

B. stable

C. neutral

D. none of these

Answer: B

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33. Mark the correct statement :.

A. if we displays the enclosed charges (with a Gaussian surface) without

crossing the boundary then both vecE and phi remain same

B. if we displays the enclosed changes without crossing the boundary then vecE changes but phi remains the same

C. if the charge crosses the boundary then both vecE and phi would change

D. both (2) and (3)

Answer: D

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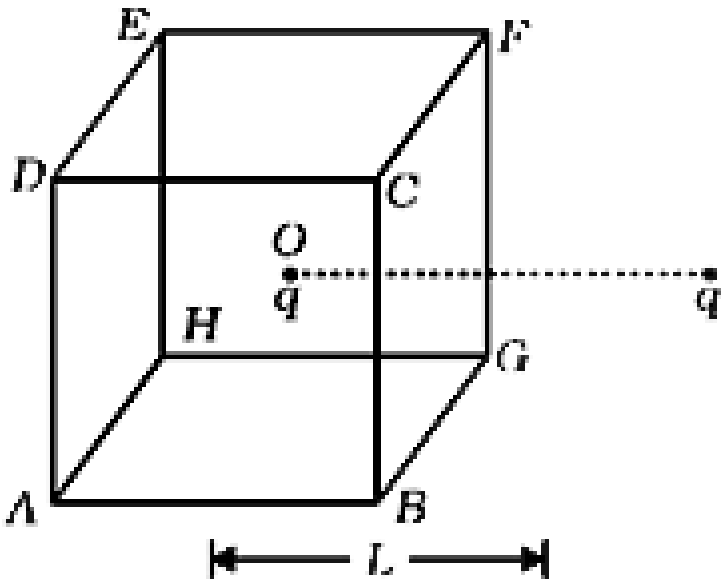
34. A charged particle q is placed at the centre O of cube of length L(ABCDEFGH). Another same charge q is placed at a distance L from O.Then, the electric flux through ABCD is :



A. $\frac{q}{4}\pi\varepsilon_0 L$

B. $\frac{q}{2}\pi\varepsilon_0 L$

C. $2\frac{q}{2}\pi\varepsilon_0 L$

D. Zero

Answer: D

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35. a hemispherical hollow body is placed in a uniform electric field E. the total flux linked with the curved surface is 

A. $\pi R^2 E$

B. $2\pi R^2 E$

C. $4\pi R^2 E$

D. Zero

Answer: D

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