DPP Daily Practice Problem *Physics*	*Topic : Electrostatics* DPP No. 162	Time : 30 min. Total Marks : 64 Max.

Type of Questions
Single choice Objective ('–1' negative marking) Q. 1 to Q. 11

Q 1) A conducting sphere of radius 5 cm is charged to 15 C. Another uncharged sphere of radius 10 cm is allowed to touch it for enough time. After the two are separated, the surface density of charge on the two spheres will be in the ratio

A) 1:2 B) 2:1
C) 1:1 D) 3:1

Q 2) A charge q is placed at the center of the line joining two equal charges Q. The system of the three charges will be in equilibrium if q is equal to

A) $\frac{Q}{5}$ B) $\frac{Q}{2}$
C) $\frac{Q}{4}$ D) $-\frac{Q}{4}$

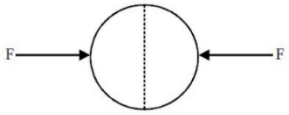
Q 3) There is a uniform field of strength 10^3 Vm^{-1} along the y-axis. A body of mass 1g and charge 10^{-6} C is projected into the field from the origin along the positive x-axis with a velocity of 10 ms^{-1} . Its speed (in ms^{-1} after 10 second will be (neglect gravitation)

A) $10\sqrt{2}$ B) 20.0
C) $5\sqrt{2}$ D) 10.0

Q 4) Electrostatic force is

A) force exerted by one charge on another when the two are at rest in a given frame of reference
B) force exerted by an electron on a neutron
C) force exerted by one charge on another when the two are accelerating in a given frame of reference
D) force exerted by one charge on another when the two are moving in a given frame of reference

Q 5) A uniformly charged thin spherical shell of radius R carries uniform surface charge density of per unit area. It is made of two hemispherical shells, held together by pressing them with force F(See figure). F is proportional to

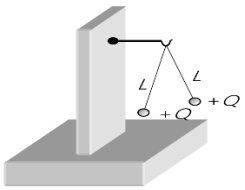


A) $\frac{\sigma^2 R^2}{\epsilon_0}$ B) $\frac{\sigma^2 R}{\epsilon_0}$
C) $\frac{\sigma^2}{\epsilon_0 R^3}$ D) $\frac{\sigma^2}{\epsilon_0 R}$

Q 6) Two point charges +3μC and +8μC repel each other with a force of 40 N. If a charge of –5μC is added to each of them, then the force between them will become

A) +10 N B) -10 N
C) +20 N D) -20 N

Q 7) Two small balls having equal positive charge Q (coulomb) on each are suspended by two insulated string of equal length L meter, from a hook fixed to a stand. The whole set up is taken in satellite into space where there is no gravity (state of weight less ness). Then the angle between the string and tension in the string is



A) $180^0, \frac{1}{4\pi\epsilon_0}\frac{Q^2}{(2L)^2}$ B) $90^0, \frac{1}{4\pi\epsilon_0}\frac{Q^2}{(L)^2}$
C) $180^0, \frac{1}{4\pi\epsilon_0}\frac{Q^2}{4(L)^2}$ D) $180^0, \frac{1}{4\pi\epsilon_0}\frac{Q^2}{2(L)^2}$

Q 8) Two point charges 1 μC & 5μC are separated by a certain distance. What will be ratio of forces acting on these two

A) 1:5 B) 5:1
C) 1:1 D) $1:\sqrt{5}$

Q 9) Two charges of 40 μC and –20 μC are placed at a certain distance apart. They are touched and kept at the same distance. The ratio of the initial to the final force between them is

A) 8:1 B) 1:8
C) 4:1 D) 1:1

Q 10) A total charge Q is broken in two parts Q_1 and Q_2 and they are placed at a distance R from each other. The maximum force of repulsion between them will occur, whe

A) $Q_1 = Q - \frac{Q}{R}, Q_2 = \frac{Q}{R}$ B) $Q_1 = Q - \frac{2Q}{3}, Q_2 = \frac{Q}{4}$
C) $Q_1 = \frac{3Q}{4}, Q_2 = \frac{Q}{4}$ D) $Q_1 = \frac{Q}{2}, Q_2 = \frac{Q}{2}$

Q 11) **The force between two charges 0.06m apart is 5 N. If each charge is moved towards the other by 0.01m, then the force between them will become**

A) **7.20 N** **B)** **11.25 N**

C) **22.50 N** **D)** **45.00 N**

Q 12) **Two charges equal in magnitude and opposite in polarity are placed at a certain distance apart and force acting between them is F. If 75% charge of one is transferred to another, then the force between the charges becomes**

A) $\frac{F}{16}$ **B)** $\frac{9F}{16}$

C) F **D)** $\frac{15F}{16}$

Q 13) **Three equal charges each +Q, placed at the corners of on equilateral triangle of side a what will be the force on any charge($k = \frac{1}{4\pi\epsilon_0}$)**

A) $\frac{kQ^2}{a^2}$ **B)** $\frac{2kQ^2}{a^2}$

C) $\frac{\sqrt{2}kQ^2}{a^2}$ **D)** $\frac{\sqrt{3}kQ^2}{a^2}$

Q 14) **Equal charges Q are placed at the four corners A, B, C, D of a square of length a. The magnitude of the force on the charge at B will be**

A) $\frac{3Q^2}{4\pi\epsilon_0 a^2}$ **B)** $\frac{4Q^2}{4\pi\epsilon_0 a^2}$

C) $\left(\frac{1+\sqrt{2}}{2}\right)\frac{Q^2}{4\pi\epsilon_0 a^2}$ **D)** $\left(2+\frac{1}{\sqrt{2}}\right)\frac{Q^2}{4\pi\epsilon_0 a^2}$

Q 15) **Two equal charges are separated by a distance d. A third charge placed on a perpendicular bisector at x distance, will experience maximum coulomb force when**

A) $x = \frac{d}{\sqrt{2}}$ **B)** $x = \frac{d}{2}$

C) $x = \frac{d}{2\sqrt{2}}$ **D)** $x = \frac{d}{2\sqrt{3}}$

Q 16) **Five point charges each of value +Q are placed on five vertices of a regular hexagon of side L. What is the magnitude of the force on a point charge of value – q placed at the centre of the hexagon**

A) $k\frac{Q^2}{L^2}$ **B)** $k\frac{Q^2}{4L^2}$

C) **zero** **D)** **Information is insufficient**