PHYSICS TEST PAPER

Q.1. An electron and a proton are separated by a distance of 1Å. The moment of the dipole formed in C-m will be

(a) $1.6 * 10^{19}$ (b) $0.6 * 10^{-19}$ (c) $1.6 * 10^{-29}$ (d)3.2×10^{-29}

Q.2. If E_n, be the electric field of a short dipole at a point on its axial line and E_e that on the equatorial line at the same distance, then

(a) $E_a = 2E_e$ (b) $E_e=2E_a$ (c)$E_a=E_e$ (d) none of these

Q.3. A point Plies on the perpendicular bisector of a short electric dipole, of dipole moment p, at a distance r from the centre of dipole. The electric field at point P is proportional to

(a)$\frac{p}{r^2}$ (b) $\frac{1}{pr^2}$ (c) $\frac{p}{r^3}$ (d) $\frac{p^2}{r^3}$

Q.4. Ten dipoles, each of dipole moment 'p', are placed inside a hollow sphere. The total electric flux coming out of the sphere will be

(a) 0 (b)$\frac{10p}{\epsilon_0}$ (c)$\frac{p}{\epsilon_0}$ (d))$\frac{20p}{\epsilon_0}$

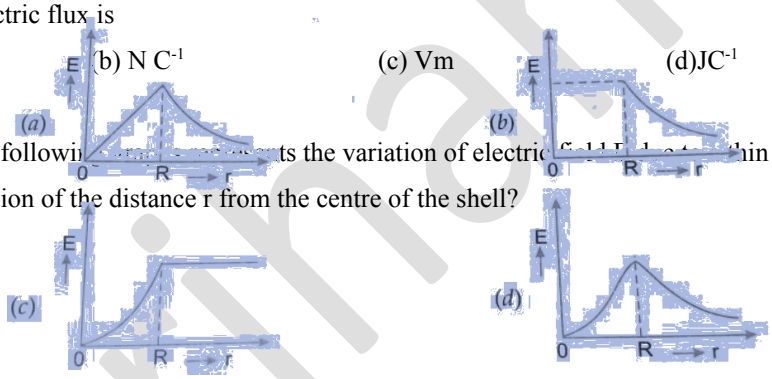
Q.5.Electric field 'E' at a point situated at a normal distance from an infinitely long uniformly charged straight wire is proportional to

(a) $E\propto r$ (b) $E\propto \frac{1}{r}$ (c) $E \propto \frac{1}{r^2}$ (d)$E\propto\frac{1}{r^3}$

Q.6. SI unit of electric flux is

(a) Wb (b) $N C^{-1}$ (c) Vm (d)JC^{-1}

Q.7. Which of the following graphs represents the variation of electric field E due to a thin charged spherical shell of radius R as a function of the distance r from the centre of the shell?



Q.8. If the electric flux entering and leaving an enclosed surface are φ_1, and φ_2 respectively, the electric charge present within the surface is

(a)$\frac{1}{\epsilon_0}(\varphi_1+\varphi_2)$ (b)$\frac{1}{\epsilon_0}(\varphi_2-\varphi_1)$ (c)$\epsilon_0(\varphi_1+\varphi_2)$ (d)$\epsilon_0(\varphi_2-\varphi_1)$

Q.9. Gauss' law is true only if electric force due to a given charge varies with distance 'r' as

(a)r^2 (b)r^{-3} (c)r^2 (d)r^{-1}

Q.10. A hollow metallic sphere of radius 5 cm is charged so that the potential on its surface is 10 V. The potential at the centre of the sphere is

(a)0V (c) same as at a point 5 cm away from the surface

(b) 10 V (d) same as at a point 25 cm away from the surface.

Q.11.If a unit positive charge is taken from one point to another over an equipotential surface, then

(a) work is done on the charge. (c) work done is constant

(b) work is done by the charge (d) no work is done.

Q.12. On rotating a point charge q around a charge Q in a circle of radius r, the work done is

(a) q.2πr (b) $\frac{q.2\pi Q}{r}$

(c) zero (d) $\frac{Q}{2\epsilon_0 r}$

Q13. Electric charges of +10 μC, +5μC, -3μC and +8 μC are placed at the corners of a square of side √2 m. The potential at the centre of the square is

(a) 1.8 V (b) 1.8 x 10^6 V

(c) 18x10^5 V (d) 18x10^4 V

Q.14. An electric dipole has the magnitude of its charge as q and its dipole moment is p. It is placed in a uniform electric field E. If its dipole moment is along the direction of the field, the force on it and its potential energy are respectively

(a) 2qE and minimum. (c) zero and minimum.

(b) qE and pE (d) qE and maximum.

Q.15. An electric charge 10^{-3} μC placed at the origin (0, 0) of x-y coordinate system. Two points A and B are situated at (√2, √2) and (2, 0) respectively. The potential difference between the points A and B will be

(a) zero (b) 9V (c) 45V (d) 2V

Q.16. The capacitance of a capacitor is 4 μF and its potential is 100 V. The energy released on discharging it fully will be

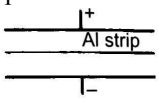
(a) 0.02J (b) 0.04J (c) 0.025J (d)60061

Q.17. If the charge on a capacitor is doubled, the value of its capacitance will be

(a) doubled (b) halved

(c) remain the same. (d) none of these

Q.18. As shown in Fig. a very very thin sheet of aluminium is placed in between the plates of the capacitor. Then the capacitance



(a) will increase. (b) will decrease

(c) remains unchanged (d) may increase or decrease

Q.19. The dielectric constant of dielectric cannot be

(a) 3 (b) 6 (c) 8 (d) ∞

Q.20. Two points P and Q are maintained at the potentials of 10 V and -4 V respectively. The work done in moving 100 electrons from P to Q is

(a) $9.6 * 10^{-17}$J (b) - $2.24 * 10^{-16}$J(c) $2.24 * 10^{-16}$J (d)-) $9.6 * 10^{-17}$J

Q.21. The capacity of a parallel plate capacitor is 10μF, when the distance between its plates is 8 cm. If the distance between the plates is reduced to 4 cm, the new capacity of the parallel plate capacitor will be

(a) 5 μF (b) 10 μF (c) 20 uF (d)40μF

Q.22.A parallel plate capacitor with air between the plates has a capacitance of 9 pF. The separation between its plates is 'd'. The space between the plates is now filled with two dielectrics. One of the dielectrics has dielectric constant $K_1 = 3$ and thickness $\frac{d}{3}$ while the other one has dielectric constant $K_2 = 6$ and thickness $\frac{2}{3}d$. Capacitance of the capacitor is now

(a) 1.8 pF (b) 45 pF (c) 40.5 pF (d) 20.25 pF

Q.23. A parallel plate capacitor has a uniform electric field E in the space between the plates. If the distance between the plates is 'd' and area of each plate is 'A', the energy stored in the capacitor

(a)$\frac{1}{2}\epsilon_0 E^2 Ad$ (b)$\frac{E^2 Ad}{\epsilon_0}$ (c) $\frac{1}{2}\epsilon_0 E^2$ (d)ϵ_0 EAd

Q.24. A positively charged particle is released from rest in an uniform electric field. The electric potential energy of the charge

(a) remains a constant because the electric field is uniform (b) increases because the charge moves along the electric field.

(c) decreases because the charge moves along the electric field. (d) decreases because the charge moves opposite to the electric field.

Q.25. Equipotentials at a great distance from a collection of charges, whose total sum is not zero, are approximately

(a) spheres (b) planes (c) paraboloids (d) ellipsoids

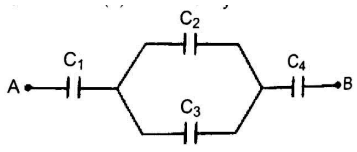
Q.26.The electric potential V at a point on the axis of an electric dipole depends on the distance 'r' of the point from the dipole as

(a)$V \propto \frac{1}{r}$ (b) $V \propto \frac{1}{r^2}$ (c) $V \propto \frac{1}{r^3}$ (d) $V \propto r$

Q.27. A capacitor of capacitance 50μF is charged to 100 volts. Its energy is equal to

(a) 25×10^{-2} J (b) 25×10^{-3} J (c) 25×10^{-4} J (d) 25×10^{-6} J

Q.28. Four capacitors, each of capacitance 4μF, are connected as shown here. The equivalent capacitance between the points A and B will be



(a) 16 μF (b)10 uF

(c) 16μF (d) 4μF

Q.29. . Four equal charges Q are placed at the four corners of a square of side a. The work done in removing a charge -Q from the centre of the square to infinity is

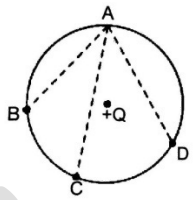
(A)Zero (B)$\frac{\sqrt{2}Q^2}{4\pi\varepsilon_0 a}$ (C)$\frac{\sqrt{2}Q^2}{\pi\varepsilon_0 a}$ (D)$\frac{Q^2}{2\pi\varepsilon_{0a}}$

Q30.Energy density in an electrostatic field is E is

(a)$\frac{1}{2}CV^2$ (b)$\frac{1}{2}\epsilon_0 E^2$ (c)$\frac{2E^2}{\epsilon_0}$ (d)$\epsilon_0 E^2$

Q.31.In the electric field of a point charge Q placed at the centre of a circle, as shown in Fig. a certain test charge q_0 is carried from

point A to B, C and D. Then the work done



(a) is least along the path AB

(b) is least along the path AC

(c) is same along all the three paths AB, AC as well as AD and has a finite value

(d) is zero for all the three paths

Q.32.At a certain distance from a point charge the electric field is 500 V m^{-1} and the potential is 3000V. The distance is

(a)6m (b) 12 m (c) 36 m (d)144m

Q.33.An alpha particle is accelerated through a potential difference of 10^6 volts. Its kinetic energy will be

(a) 1 MeV (b) 2 MeV (c)4MeV (d)8MeV

Q.34, If S identical charges of -q each are placed at the eight comers of a cube of side, then electrostatic potential energy of a charge $+q_0$, placed at the centre of the cube will be

(a)$\frac{8\sqrt{2}qq_0}{4\pi\epsilon_0 b}$ (b) $\frac{8\sqrt{2}qq_0}{4\pi\epsilon_0 b}$ (c)+ $\frac{4qq_0}{\sqrt{3}\pi\epsilon_0 b}$ (d)- $\frac{4qq_0}{\sqrt{3}\pi\epsilon_0 b}$

Q.35.An electric dipole of dipole moment p is placed in a uniform electric field E. Initially the dipole is aligned parallel to the field. The dipole is now rotated so that it becomes antiparallel to the field. Work required to be done on the dipole by an extemal agency is

(a)-2pE (b)-pE (c)pE (d)2pE

Q.36. A capacitor of capacitance 50 μF is charged to 10V.Its electrostatic potential energy is

(a) 2.5×10^{-3} J (b) 2.5×10^{-4} J (c) 5×10^{-2} J (d) 1.2×10^{-5} J

Q.37. A parallel plate capacitor with a sheet of paper (dielectric constant) between the plates has a capacitance C. If the sheet is removed then capacitance of the capacitor becomes

(a)KC (b)$\frac{C}{K}$ (c)$\sqrt{KC}$ (d)$\frac{C}{\sqrt{K}}$

Q.38 A capacitor of capacitance 10 uF is charged to 100 V. It is now connected to uncharged capacitor in parallel so that the common potential becomes 40 V. The capacitance of the second capacitor is

(a) 10 μF (b) 5μP (c) 15 μF (d) 25 μP

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1	(c)	2	(a)	3	(c)	4	(a)	5	(b)	6	(c)	7	(b)	8	(d)	9	(a)	10
11	(d)	12	(c)	13	(c)	14	(c)	15	(a)	16	(a)	17	(c)	18	(c)	19	(d)	20
21	(c)	22	(c)	23	(a)	24	(c)	25	(a)	26	(b)	27	(a)	28	(c)	29	(a)	30
31	(d)	32	(a)	33	(b)	34	(d)	35	(d)	36	(a)	37	(b)	38	(c)			

Answer key