INDIAN SCHOOL ALWADI ALKABIR

UNIT TEST – 1

CLASS 12

SUBJECT:PHYSICS

MARKS :30 **TIME: 60 MINUTES**

Fill in the blanks[1-10]

[1] The total normal flux emerging out from any closed surface is equal to $\frac{1}{\epsilon_0}$ times the net charge enclosed by it. This law is called ----------

[a] Coulomb's law [b] Biot-Savart's law [c] Gauss's law

[2] Charges exists either as the basic charge or some integral multiple of the basic charge. This is called ----------

[a] Quantization of electric charges [b] conservation of charges

[c] conservation of energy

[3] -------- is the S.I unit of electric flux

[a] $Nm^2\ C^{-1}$ [b] Nm^2 C [c] Nm^{-2} C

[4] The maximum value of electric field that can be given to a dielectric without electric breakdown is called ----------

[a] dielectric polarization [b] dielectric strength [c] electric field intensity

[5] A charge 0.2 C is moved from a point A above a dipole of dipole moment 2 Coulomb metre to a point B below the dipole in equatorial plane without acceleration. The work done in the process is ----------

[a] 0.4J [b] 0.1J [c] 0J

[6] A device used to store charge is -----

[a] resistor [b] electric dipole [c] Capacitor

[7] A hollow metal sphere of radius 50 cm is charged such that the potential on its surface is 100 V.Then the potential at the centre is ----

[a] 0v [b] 100 v [c] 50v

[8] A capacitor of capacitance C is charged to a potential V. Then the flux of the electric field through a closed surface enclosing the capacitor is --------

[a] $\frac{CV}{\varepsilon o}$ [b] $\frac{2CV}{\varepsilon o}$ [c] zero

[9] ----- is the SI unit of Electric field intensity

[a] $\frac{Newton}{Coulomb}$ [b] $\frac{Joule}{coulomb}$ [c] weber

[10] An air filled parallel plate capacitor has a capacitance of 1.3PF.The separation of the plate is doubled and the wax is inserted between them. The new capacitance is 2.6PF.Then the dielectric constant of the wax is -----

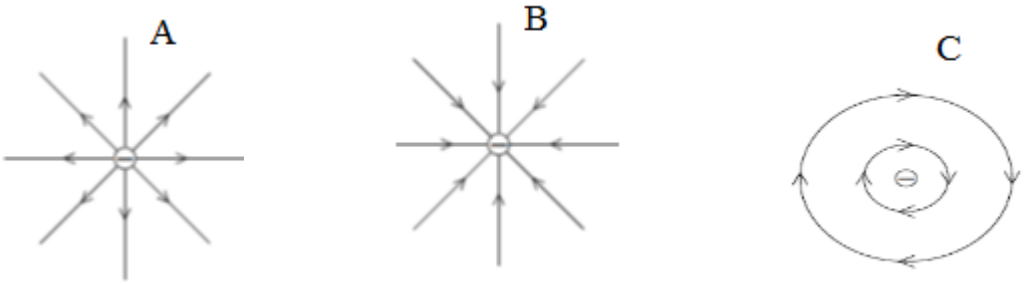
[a] K = 2 [b] K = 4 [c] K = 1.2

Select the most appropriate option from those given below each question[11-30]

[11] In lightening thunderstorm, it is safe to sit inside the car, rather than near a tree or in open ground. Name the phenomenon involved

[a] electrostatic shielding [b] dielectric polarization[c]electrostatic induction

[12] Which diagram shows the electric field pattern of an isolated negative point charge ?



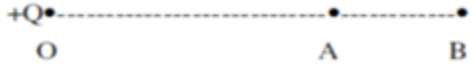
[a] diagram A [b] diagram B [c] diagram C

[13] A spherical rubber balloon carries a charge that is uniformly distributed over its surface. As the balloon is blown up and increases in size, how does the total electric flux coming out of the surface change?
[a] increases [b] decreases [c] remains same

[14] In which orientation , a dipole placed in a uniform electric field is in stable equilibrium

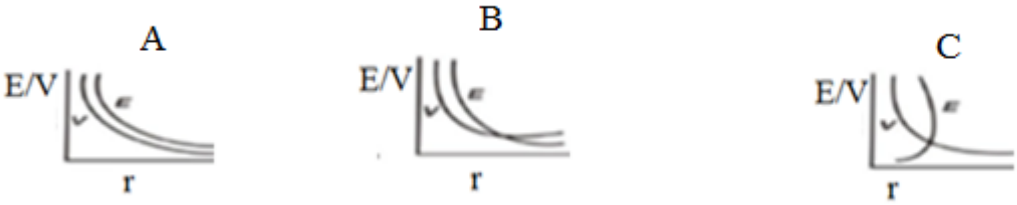
[a] $\theta = 0^0$ [b] $\theta = 90^0$ [c] $\theta = 180^0$

[15] A point charge +Q is placed at a point 'O' as shown in the figure. Is the potential difference VA-VB positive, negative or zero



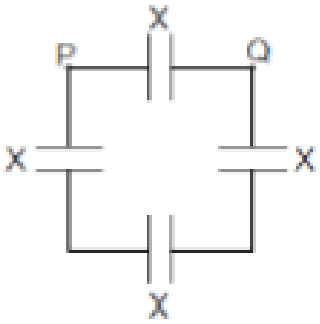
[a] positive [b] negative [c] zero

[16] The variation of potential V with r & electric field with r for a point charge is correctly shown in the graphs



[a] figure A [b] figure B [c] figure C

[17] Four identical capacitors of capacitance X are connected as shown in the figure .What is the effective capacitance between P and Q ?



[a] $\frac{X}{3}$ [b] x [c] $\frac{4X}{3}$

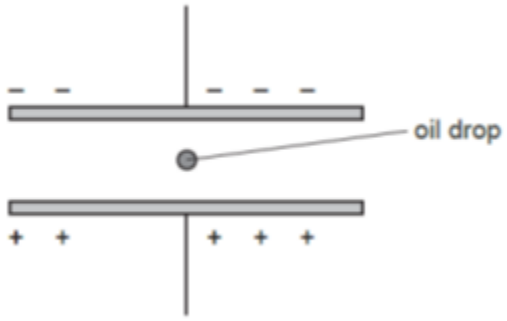
[18] A capacitor is charged by a constant current of 2.5μA for 100s. As a result the potential difference across the capacitor increases by 5V.What is the capacitance of the capacitor ?

[a] 20μF [b] 50 μF [c] 50F

[19] When an electric dipole is kept in a non uniform electric field with certain angle , then the

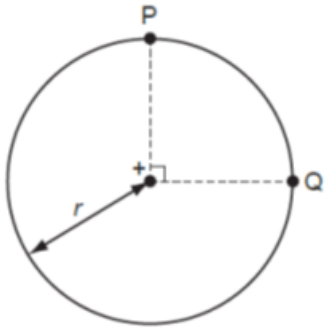
[a] Net force is not equal to zero, torque is not zero [b] Net force is equal to zero, torque is not zero [c] Net force is equal to zero, torque is zero

[20] A small oil drop of mass m carries a charge +q The potential difference across the plates is V and the separation is d. The weight of the drop is balanced by the electric force [Buoyancy forces may be considered to be negligible].Which formula gives the charge on the drop ?



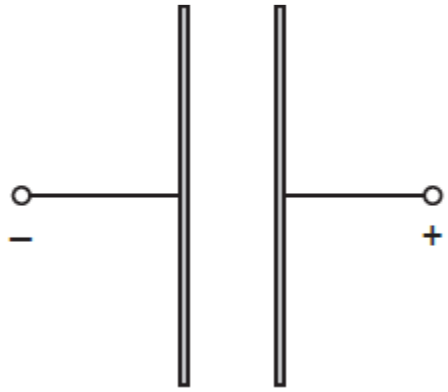
[a] q = $\frac{mgd}{V}$ [b] q = $\frac{mgV}{d}$ [c] $\frac{dV}{mg}$

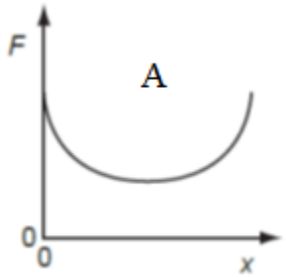
[21] The diagram shows two points P and Q which lie , 90^0 apart, on a circle of radius r.A positive point charge at the centre of the circle creates an electric field of magnitude E at both points P and Q.Which expression gives the workdone in moving a unit positive charge from P to Q

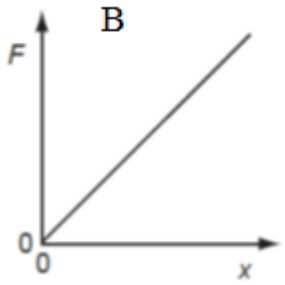


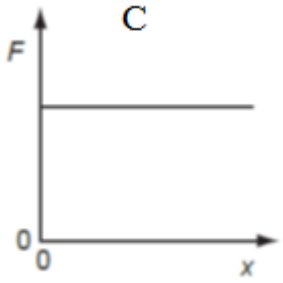
[a] $2\pi rE$ [b] πrE [c] zero

[22] Two oppositely –charged parallel plates are arranged as shown . An electron is released from rest from the surface of the negatively charged plate. The electron travels from the negatively charged plate towards the positively charged plate. Which graph shows how the force F on the electron varies with its distance X from the negative plate ?









[a] graph A [b] graph B [c] graph C

[23] Net capacitance of 3 identical capacitors in series is 1μF.What will be their net capacitance if connected in parallel ?

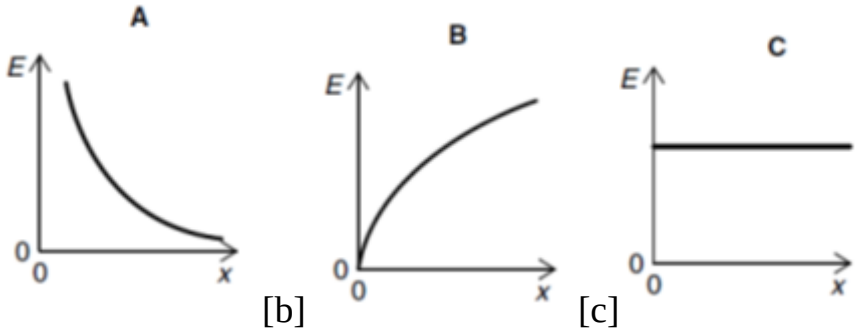
[a] 9 μF [b] 1.5 μF [c] 3μF

[24] A capacitor of unknown capacitance is connected across a battery of v volts. The charge stored in it is 360μC.When the potential across the capacitor is reduced by 120V,the charge stored in it becomes 120 μC. Calculate the potential V

[a] V = 80V [b] V = 180V [c] V = 90V

[25] Two parallel conducting plates are connected to a battery, one plate to the positive terminal and the other plate to the negative. The plate separation is gradually increased, the plates remaining connected to the battery.

Which graph shows how the electric field E between the plates depends on the plate separation x ?



[a] [b] [c]

[a] graph A [b] graph B [c] graph C

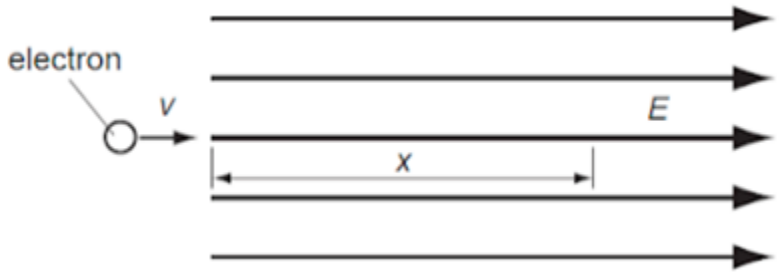
[26] Name the physical quantity whose S.I unit is J/C

[a]electric field intensity[b] electric potential [c] electric flux

[27] A capacitor of capacitance C is charged fully by connecting it to a battery of emf E. It is then disconnected from the battery. If the separation between the plates of the capacitor is now doubled, how will the electric field between the plates of the capacitor be effected ?

[a] remains the same [b] doubled [c] reduced to half

[28] Diagram shows an electron ,with charge ‘e’, mass ‘m’ and velocity ‘v’ entering a uniform electric field of strength E.



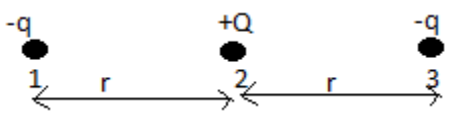
Direction of the electric field and the electron’s motion are both horizontal and to the right .Which expressions gives the distance x through which electron travels before it stops momentarily ?

[a] $x = \frac{mv}{E}$ [b] $x = \frac{mv}{E\,e}$ [c] $\frac{mv^2}{2Ee}$

[29] Two long thin parallel wires having equal and opposite linear charge densities [$+\lambda$ & $-\lambda$] are kept ‘2d’ cm apart in air. Find the magnitude of the electric field at a point ‘d’ cm from each wire

[a] $\frac{\lambda}{\pi\varepsilon 0 d}$ [b] zero [c] $\frac{\lambda}{2\pi\varepsilon 0 d}$

[30] 3 charges - q, + Q and - q are placed at equal distances on a straight line. If the potential energy of the system of 3 charges is zero, then what is the ratio Q : q ?



[a] $\frac{Q}{q} = \frac{1}{4}$ [b] $\frac{Q}{q} = \frac{1}{1}$ [c] $\frac{Q}{q} = \frac{1}{2}$

KEY

Question number	option
1	c
2	a
3	a
4	b
5	c
6	c
7	b
8	c
9	a
10	b
11	a
12	b
13	c
14	a
15	a
16	b
17	c
18	b
19	a
20	a
21	c
22	c
23	a
24	b
25	a
26	b
27	a
28	c
29	a
30	a