INDUS RANGERS INSTITUTE PVT. LTD.

ELECTROSTATIC

1.The electric field due to a distance r from its centre is proportional to
(a)r^3 (b)1/r^3 (c)r² (d)1/r²

2.The electric intensity due to uniform charged infinite cylinder of radius R, at a distance r(>R) from its axis, is proportional to
(a)a^3 (b)r (c)1/r (d)1/a^3

3.Two charges of magnitude 4 x 10^{-8}C and -6 x 10^{-8} C are at points A and B respectively, 50cm apart. The electrical potential due to them is zero on the line AB at a distance from A equal to
(a)10 cm (b)20 cm (c)30 cm (d)40 cm

4.There are 27 identical spherical drops of a conducting fluid. Each is charged to a potential V_0 .If these are combined to form a bigger drop, its potential will be
(a)V_0 (b)$3V_0$ (c)$9V_0$ (d)$27V_0$

5.The electric field between the two spheres of a charged spherical condenser
(a)is zero (b)is constant
(c)increase with distance from centre
(d)decrease with distance from centre

6.A 4 μF capacitor is charged to 400 V and then its plates are joined through resistance of 1 kΩ.The heat produced in the resistance is
(a)0.16 J (b)0.32 J
(c)0.64 J (d)1.28 J

7.The capacitance of a parallel plate condenser does not depend on
(a)area of the plates
(b)metal of the plates
(c)medium between the plates
(d)distance between the plates

8.Elecrtic field intensity at a point inside a hollow charged spherical conductor
(a)is zero (b)is constant
(c)increase with the distance from the centre of the sphere
(d)none of the above

9.The space between the plates of a capacitor is filled by a liquid of dielectric constant K. The capacitance of the capacitor
(a)increase by a factor
(b)increase by a factor k^2
(c)decrease by a factor k
(d)decrease by a factor k²Its energy in joules is

10.A condenser of 50 μF is charged to 10 volts. Its energy in joules is
(a)2.5 x 10^{-3} (b)5 x 10^{-3}
(c)10 x 10^{-4} (d)2.5 x 10^{-4}

11.A parallel plate capacitor is charged and the charging battery is then disconnected .If the plates of the capacitor are now moved farther by means of insulated handles, then
(a)the charge on the capacitor increase
(b)the voltage across the plates decrease

(c)the capcacitance increase
(d)the electrostatic energy stored in the capacitor increase

12. When 10^{12} electrons are removed from a neutral metal sphere, the change on it becomes
(a)16μ C (b)-16μ C
(c)32μ C (d)-32μ C

13. It requires 4 joules of work to move a charge of 20 C from point A to point B, separated by a distance of 0.2m.The potential difference between the points A and B , in volts ,is
(a)80 (b)16 (c)5 (d)0.2

14.electron volt(eV) is a unit of
(a)energy (b)potential
(c)current (d)charge

15.A solid sphere of radius R has charge distributed uniformly over its entire volume .The electric field at a distance r(<R) from the centre of the sphere is proportional to
(a)r^{-2} (b)r^{-1} (c)r² (d)r

16. The unit of intensity of electric field is
a.Newton/coulomb b.joule/ coulomb
c.Volt- metre d.Newton/metre

80.Eight diploes of charges of magnitude e are placed inside a cube. The total flux coming out of the cube will be
(a)$\frac{8_e}{\epsilon_0}$ (b)$\frac{16_e}{\epsilon_0}$ (c)$\frac{e}{\epsilon_0}$ (d)zero

17. Equal charges are given to two spheres of different radii. The potential will
A.Be more on the smaller sphere
B.Be more on the the bigger sphere
C.Be equal on the the both spheres
D.depend on the nature of the material of the sphere

18.The dielectric constant of metals is
a.1 b. Greater than 1
c. Zero d. Infinite

19. To obtain 3μF capacity from three capacitors of 2 $\mu F\ each$,they will be arranged
a.all the three in series
(b)all the three in parallel
(c)two capacitors in series and the third in series with the combination of first two
(d)two capacitors in parallel and the third in series with the combination of first two

20.A parallel plate capacitor is first charged parallel and then a dielectric slab is introduced between the plates the quantity that remains unchanged is
A. Charge Q. B. Potential v.
C. Capacity C D. Energy u.

21.Two spherical conductors of radii 4 m and 5 m are charged to the same potential .If $\sigma_1\ and\ \sigma_2$ be the respective value of the surface density of charge on the two conductors ,then the ratio $\frac{\sigma_1}{\sigma_2}$ is
(a)$\frac{16}{25}$ (b)$\frac{25}{26}$ (c)$\frac{4}{5}$ (d)$\frac{5}{4}$

22.The electric potential V is given as a function of distance x (metre)by V=(5x²+10x-9)volt. Value of the electric field at x=1 m is
(a)20 V/m (b)6 V/m

(c)11 V/m (d)23 V/m

23. Eight identical spherical drop of liquid, each charged to a potential of 10 v, are brought together and form into a single drop. The potential on the drop will be.

a.20 V b.80 V c.40 v d.10 V

24. The terminal potential difference of a battery exceed its emf, when it is connected

a. In series with the battery of higher emf

b. In parallel with a battery of higher emf

c. In parallel with a battery of lower emf

d. In series with the battery of lower emf

25..The capacity and energy stored in a parallel plate condenser with air between the plates are respectively C and W.If air is replaced by mica (dielectric constant =6)between the plates and the charge remaining constant, the capacity and energy will become respectively

(a)6C,$\frac{W}{6}$ (b)$\frac{C}{6}$,6W

(c)$\frac{C}{6}$, $\frac{W}{6}$ (d)6C, 6W

26.A semi-circular are of radius 'a' is charged uniformly and the charge per unit length is λ.The electric field at the center is

(a)$\frac{\lambda}{2\pi\epsilon_{0a}}$ (b)$\frac{\lambda}{2\pi\epsilon_0 a^2}$

(c)$\frac{\lambda}{4\pi^2\varepsilon_0 a}$ (d)$\frac{\lambda^2}{2\pi\epsilon_{0a}}$

27. Electric charges of 1 μC,-1μC and 2μC are placed in air at the corners A,B and C respectively of an equilateral triangle ABC having length of each side 10 cm. The resulting force of the charge at C is

(a)0.9N (b)1.8 N

(c)2.7 N (d)3.6 N

28.A charged particle of mass 5 x 10^{-5} Kg is held stationary in space by placing it in an electric field of strength $10^7 NC^{-1}$ directed vertically downwards .The charge on the particle is

(a)-20 x 10^{-5} μC (b)-5 x $10^{-5}\mu C$

(c) 5 x $10^{-5}\mu C$ (d)20 x$10^{-5}\mu C$

29. Two electric charges 12 μC and -6 μC are placed 20 cm apart in air .There is a point P on the line joining these charges and outside the region between them, at which the electric potential is zero. The distance of P from the -6μC charge is

(a)0.10 m (b)0.15 m

(c)0.20 m (d)0.25 m

30.The displacement of a charge Q in the electric field $\vec{E} = e_i\hat{\imath} + e_2\hat{\jmath} + e_3\hat{k}$ *is* $\vec{r} = \hat{a\imath} + b\hat{\jmath}$. The work done is

(a)Q(ae_1+be_2)

(b)Q$\sqrt{(ae_1)^2 + (be_2)^2}$

(c)Q$(e_1 + e_{2)}\sqrt{a^2 + b^2}$

(d)Q$(e_1^2 + e_2^2)$(a+b)