1. The rate of alpha particle falls on neutral sphere is 1012 per second. The time in which sphere gets charged by 2μc is .... sec. (A) 2.25   (B) 3.15   (C) 6.25   (D) 1.66

2. Two point charges repel each other with a force of 100 N. One of the charges is increased by 10% and other is reduced by 10%. The new force of repulsion at the same distance would be........ N.

  (A) 121   (B) 100   (C) 99   (D) 89

3. Two small conducting sphere of equal radius have charges +1μc and – 2μc respectively and placed at a distance d from each other experience force F_1. If they are brought in contact and separated to the same distance, they experience force F_2. The ratio of F_1 to F_2 is..........

(A) –8 : 1   (B) 1 : 2   (C) 1 : 8   (D) –2 : 1

4. Three charges, each of value Q, are placed at the vertex of an equilateral triangle. A fourth charge q is placed at the centre of the triangle. If the charges remain stationery then, q =...............

(A) $Q/\sqrt{2}$ (B) $Q/\sqrt{3}$ (C) $-Q/\sqrt{2}$ (D) $-Q\sqrt{3}$

5. Two equal negative charges –q are fixed at points (o, a) and (o, –a). A positive charge Q is released from rest at the point (2a, o) on the X - axis. The charge Q will..........

(A) move to the origin and remain at rest there   (B) execute simple harmonic motion about the origin (C) move to infinity   (D) execute oscillations but not simple harmonic motion

6. Two point positive charges q each are placed at (–a, o) and (a, o). A third positive charge q_o is placed at (o, y). For which value of y the force at q_o is maximum.........

(A) a   (B) 2a   (C) $a/\sqrt{2}$ (D) $a/\sqrt{3}$

7. Two identical charged spheres suspended from a common point by two massless strings of length l are initially a distance d (d << l) apart because of their mutual repulsion. The charge begins to leak from both the spheres at a constant rate. As a result the spheres approach each other with a velocity υ . Then function of distance x between them becomes...........

(A) $v\alpha x$ (B) $v\alpha x^{-1/2}$ (C)) $v\alpha x^{-1}$ (D)) $v\alpha x^{1/2}$

8. Two identical balls having like charges and placed at a certain distance apart repel each other with a certain force. They are brought in contact and then moved apart to a distance equal to half their initial separation. The force of repulsion between them increases 4.5 times in comparison with the initial value. The ratio of the initial charges of the balls is........

(A) 4 : 1   (B) 6 : 1   (C) 3 : 1   (D) 2 :1

9. A point charge q is situated at a distance r from one end of a thin conducting rod of length L having a charge Q (uniformly distributed along its length). The magnitude of electric force between the two is...............

(A) 2kqQ/ r(r + L)   (B) kqQ /r(r + L)   (C) kqQ/ r(r – L)   (D) kQ /r(r + L)

10. Two point charges of +16μc and –9μc are placed 8 cm apart in air. .... Distance of a point from –9μc charge at which the resultant electric field is zero.

(A) 24 cm　　　　　　(B) 9 cm　　　　　　(C) 16 cm　　　　　　(D) 35 cm

11. An inclined plane making an angle of 30o with the horizontal is placed in an uniform electric field　　E = 100 Vm−1. A particle of mass 1 kg and charge 0.01 c is allowed to slide down from rest from a height of 1m. If the coefficient of friction is 0.2 the time taken by the particle to reach the bottom is .... sec.

(A) 2.337　　　　　　(B) 4.337　　　　　　(C) 5　　　　　　(D) 1.337

12. A small sphere whose mass is 0.1 gm carries a charge of 3×10^{-10} C of a silk fibre 5 cm long. The other end of the fibre is attached to a large vertical conducting, which has a surface charge of 25×10^{-25} Cm^{-2} on each side. When the system is freely hanging the angle fibre makes with vertical is...............

(A) 41.8^0　　　　　　(B) 45^0　　　　　　(C) 40.8^0　　　(D) 45.8^0

13. A Semicircular rod is charged uniformly with a total charge Q coulomb. The electric field intensity at the centre of curvature is.......

(A) $2KQ/\pi r^2$　　　　(B) $3KQ/\pi r^2$　　　　(C) $KQ/\pi r^2$　　　　(D) $4KQ/\pi r^2$

14. Two uniformly charged spherical conductors A and B having radius 1mm and 2mm are separated by a distance of 5 cm. If the spheres are connected by a conducting wire then in equilibrium condition, the ratio of the magnitude of the electric fields at the surfaces of spheres A and B is.........

(A) 4 : 1　　　　　　(B) 1 : 2　　　　　　(C) 2 : 1　　　　　　(D) 1 : 4

15. In Millikan's oil drop experiment an oil drop carrying a charge Q is held stationary by a p.d. 2400 v between the plates. To keep a drop of half the radius stationary the potential difference had to be made 600 v. What is the charge on the second drop?

(A) 3Q /2　　　　　　(B) Q/ 4　　　　　　(C) Q　　　　　　(D) Q/ 2

16. Equal charges q are placed at the vertices A and B of an equilateral triangle ABC of side a. The magnitude of electric field at the point c is.........

(A) Kq/a^2　　　　(B) $3Kq/a^2$　　　　(C) $2Kq/a^2$　　　(D) q/πє 2 t a

17. A Charge q is placed at the centre of the open end of cylindrical vessel. The flux of the electric field through the surface of the vessel is...........

(A) $q/\in_0$　　　　　　(B) $q/2\in_0$　　　　　　(C) $2q/\in_0$　　　　　　(D) Zero

18. A sphere of radius R has a uniform distribution of electric charge in its volume. At a distance x from its centre, (for x < R), the electric field is directly proportional to..........

(A) x　　　　　　(B) x^{-1}　　　　　　(C) x^{-2}　　　　　　(D) x^2

19. An infinitly long thin straight wire has uniform linear charge density of 1/3 c/m . Then, the magnitude of the electric intiensity at a point 18 cm away is.......... NC^{-1}

(A) 0.66×10^{11}　　　(B) 1.32×10^{11}　　　(C) 033×10^{11}　　　(D) 3×10^{11}

20. A long string with a charge of λ per unit length passes through an imaginary cube of edge l. The maximum possible flux of the electric field through the cube will be...........

(A) $\sqrt{3}\lambda l/\epsilon_0$ (B) $\lambda l/\epsilon_0$ (C) $\sqrt{2}\lambda l/\epsilon_0$ (D) $6\lambda l^2/\epsilon_0$

21. Three charges $2q$, $-q$, $-q$ are located at the vertices of an equilateral triangle. At the centre of the triangle.
(A) The Field is Zero but Potential is non - zero   (B) The Field is non - Zero but Potential is zero (C) Both field and Potential are Zero   (D) Both field and Potential are non- Zero

22. In the electric field of a point charge q, a certain charge is carried from point A to B, C, D and E. Then the work done....   (A) Is least along the Path AB   (B) Is least along the Path AD   (C) Is Zero along all the Path AB, AC, and   (D) Is least along AE

23. Three concentric spherical shells have radii a, b and c (a < b < c) and have surface charge densities σ, $-\sigma$ and σ respectively. If V_A, V_B and V_C denote the Potentials of the three shells, then for c = a + b, we have   (A) $V_C = V_B = V_A$
(B)) $V_C = V_B \neq V_A$ (C) $V_C \neq V_B \neq V_A$ (D) $V_C = V_A \neq V_B$

24. Two charged spheres of radii R1 and R2 having equal surface charge density. The ratio of their potential is ...   (A) R_2/R_1 (B) $(R_2/R_1)^2$ (C) $(R_1/R_2)^2$ (D) $R1/R2$

25. If a charged spherical conductor of radius 10cm has potential v at a point distant 5 cm from its centre, then the potential at a point distant 15cm from the centre will be .....

(A) 1V/3   (B) 3V/2   (C) 3V   (D) 22V/3

26. Electric potential at any point is $V = -5x + 3y + \sqrt{15}z$, then the magnitude of the electric field is ..... N/C.
(A) $3\sqrt{2}$ (B) $4\sqrt{2}$ (C) 0   (D) $5\sqrt{2}$

27. A simple pendulum of period T has a metal bob which is negatively charged. If it is allowed to ascillate above a positively charged metal plate, its period will........   (A) Remains equal to T   (B) Less than T   (C) Infinite   (D) Greater than T

28. The effective capacitances of two capacitors are $3\mu F$ and $16\mu F$, when they are connected in series and parallel respectively. The capacitance of each capacitor is   (A) $2\mu F, 14\mu F$
(B) $4\mu F, 12\mu F$ (C) $6\mu F, 8\mu F$ (D) $10\mu F, 6\mu F$

29. A $5\mu F$ capacitor is charged by a 220 V supply. It is then disconnected from the supply and is connected to another uncharged $2.5\mu F$ capacitor. How much electrostatic energy of the first capacitor is lost in the form of heat and electromagnetic radiation?

(A) 0.02 J   (B) 0.121 J   (C) 0.04 J   (D) 0.081 J

30. Capacitance of a parallel plate capacitor becomes 4 3 times its original value if a dielectric slab of thickness t = d/2 is inserted between the plates (d is the separation between the plates). The dielectric constant of the slab is
(A) 8   (B) 4   (C) 6   (D) 2

ANSWER KEY

1	2	3	4	5	6	7	8	9	10
C	C	A	B	D	C	B	D	B	A
11	12	13	14	15	16	17	18	19	20
D	C	A	C	D	C	D	A	C	A
21	22	23	24	25	26	27	28	29	30
B	C	D	D	D	C	B	C	C	D