GRADE: XII **Sub: Physics** **Max Marks: 25**

SECTION - A ***Select and write one most appropriate option out of the four options given for each of the questions 1 – 6***		
Q.	**Questions**	**Marks**
1	Three charges 4q,Q and q are in a straight line in the position of 0,l/2 and l respectively. The resultant force on q will be zero, if Q= a)-q b)-2q c) -q/2 d)-4q	1
2	The force between two small charged spheres having charges of 1×10^−7 C and 2×10^−7 C placed 20 cm apart in air is a) 4.5 x 10^-3 N b) 4.5 x 10^-2 N c) 5.4 x 10^-2 N d)5.4x10^-3 N	1
3	The number of electrons taken out from a body to produce 1 coulomb of charge will be a)6.023×10^23 b)6.25 x 10^18 c)625 x 10^18 d) none	1
4	The magnitude of electric force experienced by a charged particle in an electric field depends on: a)charge of the particle b)the velocity of the particle c) the direction of the electric field d) mass of the particle	1
5	**Assertion :** If there exists coulomb attraction between two bodies, both of them may not be charged. **Reason :** In coulomb attraction two bodies are oppositely charged.	1
6	Assertion (A) : A point charge is brought in an electric field. The field at a nearby point is increase, whatever be the nature of the charge. Reason (R) : The electric field is independent of the nature of charge.	1
SECTION – B ***Q. no. 7 to 8are very short answer questions.***		
7	Show mathematically that the electric field due to a short dipole at a distance 'd' along its axis is twice the value of field at the same distance along the equatorial line. OR How does the force between two point charges change if the dielectric constant of the medium in which they are kept, increases ?	2

8	Consider 3 charges q,q,-q placed at the vertices of an equilateral triangle ABC of side length l. Calculate the force on each charge.	2
	SECTION - C ***Q.no. 9 to 10 are short answer questions.***	
9	A charged metallic sphere A is suspended by a nylon thread. Another charged is brought close to A such that the distance between their centers is 10 cm. The resulting repulsion of A is noted. Spheres A and B are touched by uncharged spheres C and D respectively, C and D are then removed and B is brought closer to A to a distance of 5.0 cm between their centers. What is the expected repulsion of A on and spheres B and D have identeical sizes.	3
10	A dipole with a dipole moment of magnitude is in stable equilibrium in an electrostatic field of magnitude E. Find the work done in rotating this dipole to its position of unstable equilibrium? OR Find the amount of work done in rotating a dipole of dipole moment 3 x 10^-8 cm from its position of stable equilibrium to the position of unstable equilibrium in a uniform electric field of intensity 10^-4N/C.	3
	SECTION - D ***Q.no. 11 is case- based question.***	
11	Concept of field lines was introduced by Michael Faraday as an aid in visualizing electric and magnetic fields. Electric line of force is an imaginary straight or curved path along which a unit positive charge tends to move in an electric field. Properties of lines of forces observed by the scientist such as: Lines of force start from positive charge and terminate at negative charge, Lines of force never intersect, the tangent to a line of force at any point gives the direction of the electric field E at that point, the number of lines per unit area, through a plane at right angles to the lines, is proportional to the magnitude of E. This means that, where the lines of force are close together, E is large and where they are far apart, E is small. Each unit positive charge gives rise to 1/ ε0 lines of force in free space. Hence number of lines of force originating from a point charge q is N = q/ε0 in free space. 1. Choose correct statement regarding electric lines of force: (a) Emerges from (-ve) charge and meet at (+ve) charge. (b) Electric field in a region is strong when the electric lines of force at that region is closelyspaced. (c) Just as it is shown for a point system in the same way it represents for a solid sphere. (d) has a physical nature. 2. Two electric field lines due to a point charge: (a) Never intersect (b) May intersect near the charge (c) Always intersect at 2 points(d) None of these 3. The tangent at any point on the electric field line gives: (a) The direction of magnetic field at that point (b) The direction of electric field at that point (c) The direction of acceleration due to gravity (d) All of the above 4. If the direction of the electric field line due to two unlike point charges is from left to right then: (a) Positive charge is at left and negative charge is at right (b) Negative charge is at left and positive charge is at right (c) Both charges are at left (d) Both charges are at right	4

SECTION - E *Q.no. 12 is Long answer question.*		
12	i)Define Electric dipole ii)Derive the equation of Electric field on the Equatorial line iii)Find the net electric field at an equatorial point P of an dipole at 4 mm from the centre.The dipole is made of of charge ±10μC seperated by 3 mm. OR i)Define Electric dipole ii)Derive the equation of Electric field on the Axial line iii)Calculate the electric field at a point on the axial line of a dipole at 20 cm from the centre. The dipole is made of ±10μC charges separated by 1 cm.	5