INDIAN SCHOOL AL WADI AL KABIR

DEPARTMENT OF SCIENCE 2021 - 22

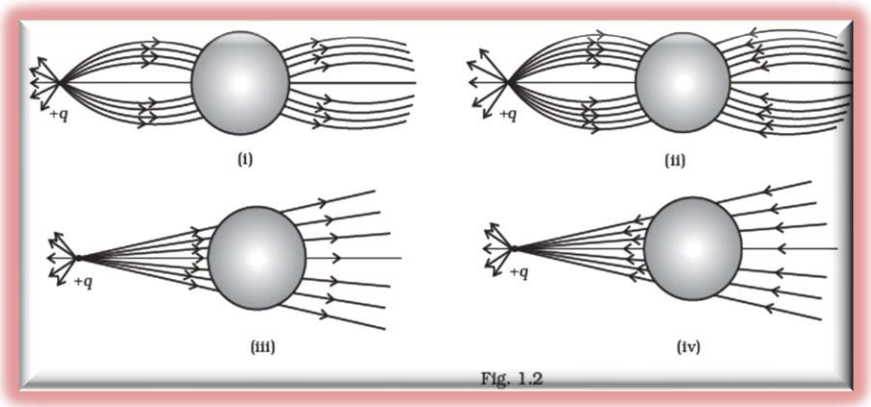
CLASS 12- UNIT TEST 1 -PHYSICS - 2021

[QUESTIONPAPER & ANSWER KEY]

CLASS XII **MAXIMUM MARKS: - 30**

03-06-2021 **SUBJECT: PHYSICS (042)** **TIME- I HOUR**

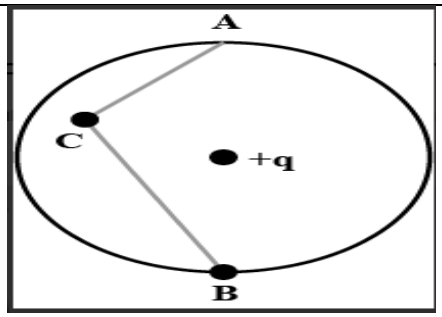
SL.NO	QUESTIONS	MARKS ALLOTED
1.	A charge q is placed at the centre of a cube of side l. What is the electric flux passing through each face of the cube? a) $q/2\varepsilon_o$ b) $q/8\varepsilon_o$ c) q/ε_o d) $q/6\varepsilon_o$	1
2.	The electric field strength at a distance 'r' on the equatorial line of a dipole is E. If the distance of the point from the dipole is doubled, how will the electric field intensity be affected? a) E'= E/2 b) E'= 2E c) E'= E/8 d) E'= E	1
3.	A point charge +q is paced at a distance d from an isolated conducting plane. The field at a point P on the other side of the plane is (a) Directed perpendicular to the plane and away from the plane. (b) Directed perpendicular to the plane and towards the plane. (c) Directed radially away from the point charge. (d) Directed radially towards the point charge.	1
4.	When the distance between two charged particles is halved, the Coulomb force between them becomes	1

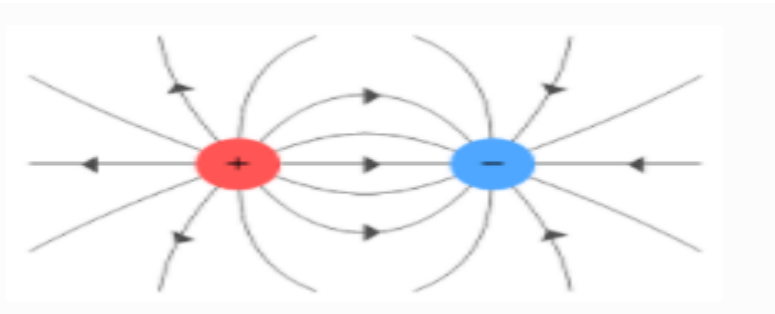
	(a) One- half (b) One-fourth (c) Double (d) Four time	
5.	Two charges are at distance d apart in air. Coulomb force between them is F. If a dielectric material of dielectric constant K is placed between them, the Coulomb force now becomes (a) FK (b) F/K (c) F/K^2 (d) K^2F	1
6.	An arbitrary surface encloses a dipole. What is the flux through this surface. What is the electric flux through this surface? (a) $q/\varepsilon 0$ (b) $2q/\varepsilon 0$ (c) Infinity (d) Zero	1
7.	Two concentric metallic spherical shells of radii R and 2R are given charges Q1 and Q2 respectively. The surface charge densities on the outer surface of the shells are equal. The ratio Q1: Q2 is a) 4:1 b) 1:4 c) 1:2 d) 2:1	1
8.	A point positive charge is brought near an isolated conducting sphere. The electric field is best given by  Fig. 1.2	1

	(a) Fig (i) (b) Fig (ii) (c) Fig (iii) (d) Fig (iv)	
9.	An infinite line charge produces an electric field of 9 x 10^4 N/C at a distance of 2cm.Calculate the linear charge density. (ε_0 = 8.85 x $10^{-12}C^2/Nm^2$) and $1/4\pi\varepsilon_0$ = 9 x 10^9 (a) 10^{-7} C/m (b) 10^7 C/m (c) 10^{-9} C/m (d) 10^9 C/m	1
10.	Consider a uniform electric field E = 3 x $10^3\hat{\imath}$ N/C. What is the flux of this field through a square of 10 cm on a side whose plane is parallel to the y-z plane? (a) 15 Nm^2C^{-1} (b) 20 Nm^2C^{-1} (c) 30 Nm^2C^{-1} (d) 60 Nm^2C^{-1}	1
11.	Careful measurement of the electric field at the surface of a black box indicate that the net outward flux through the surface of the box is 8.0 x $10^3Nm^2/C$. What is the net charge inside the box? (a) 78.8nC (b) 78.8mC (c) 70.8mC (d) 70.8nC	1
12.	Two large thin metal plates are parallel and close to each other. On their inner faces, the plates have surface charge densities of opposite signs and of magnitude 17.0 x $10^{-22}Cm^{-2}$. What is the electric field E (i) in the outer region of the first plate, (ii) Between the plates. (a) (i) zero (ii)$\sigma/2\varepsilon_0$ (b) (i) σ/ε_0 (ii)σ/ε_0	1

	(c) (i) zero (ii)σ/ε_0 (d) (i) σ/ε_0 (ii) zero	
13.	Equipotential surfaces (a) are closer in regions of large electric fields compared to regions of lower electric fields. (b) will be more crowded near sharp edges of a conductor. (c) will always be equally spaced. (d) both (a) and (b) are correct.	1
14.	A capacitor is charged by using a battery which is then disconnected. A dielectric slab then slipped between the plates, which results in (a) reduction of charge on the plates and increase of potential difference across the plates. (b) increase in the potential difference across the plate, reduction in stored energy, but no change in the charge on the plates. (c) decrease in the potential difference across the plates, reduction in the stored energy, but no change in the charge on the plates. (d) none of these	1
15.	Which of the following statements is false for a perfect conductor? (a) The surface of the conductor is an equipotential surface. (b) The electric field just outside the surface of a conductor is perpendicular to the surface. (c) The charge carried by a conductor is always uniformly distributed over the surface of the conductor. (d) None of these.	1
16.	Dielectric constant for a metal is (a) zero (b) infinite (c) 1 (d) 10	1
17.	In a parallel plate capacitor, the capacity increases if (a) area of the plate is decreased. (b) distance between the plates increases.	1

	(c) area of the plate is increased. (d) dielectric constantly decreases	
18.	The dimension of electric potential is (a) $[MLT^{-3} A^{-1}]$ (b) $[ML^2T^{-3}A^{-1}]$ (c) $[ML^2T^{-2}A^{-3}]$ (d) $[MLT^{-2}A^{-2}]$	1
19.	Minimum number of capacitors of 2μF each required to obtain a capacitance of 5μF will be: (a) 4 (b) 3 (c) 5 (d) 6	1
20.	What is the potential of earth or any conductor connected to earth? a) Infinity b) Zero c) 110 V d) 220V	1
21	What orientation of an electric dipole in a uniform electric field correspond to (i) stable equilibrium (ii) unstable equilibrium? a) (i) $\theta = 0$ (ii) $\theta = 180$ b) (i) $\theta = 180$ (ii) $\theta = 0$ c) (i) $\theta = 90$ (ii) $\theta = 180$ d) (i) $\theta = 180$ (ii) $\theta = 90$	1
22.	If a point charge is taken from A to C and then from C to B on a circle drawn with another point charge +q placed at its centre. Which statement is correct?	1

	 a) Work done in moving from A to C is more. b) Work done in both the cases are equal c) Work done in moving from A to C and B to C are infinity. d) Work done in moving from C to B is more.	
	For assertion reasoning questions two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below. **a) Both A and R are true and R is the correct explanation of A** **b) Both A and R are true but R is NOT the correct explanation of A** **c)A is true but R is false** **d) A is false and R is also false**	
23.	Assertion- Electric field is always normal to equipotential surfaces and along the direction of decreasing order of potential. Reason- Negative gradient of electric potential is electric field.	1
24.	Assertion- When a body acquires negative charge, its mass increases. Reason – A body acquires positive charge when it gains electrons.	1
25.	Assertion - Electrostatic field lines start at positive charges and end at negative charges. Reason – Field lines are continuous curves without any breaks and they form closed loop.	1

26.	Assertion - Total flux through a closed surface is zero if no charge is enclosed by the surface. Reason – Gauss law is true for any closed surface, no matter what its shape or size is.	1
	CASE STUDY BASED QUESTIONS Read the following source and answer the following questions: **Electric charge is the physical property of matter that causes it to experience a force when placed in an electromagnetic field. There are two types of charges positive and negative charges. Also, like charges repel each other whereas unlike charges attract each other. There are three methods of charging- charging by friction, charging by conduction and charging by induction.** 	
27.	Charge on a body which carries 200 excess electrons is: a) $-3.2 \times\times 10^{-18}$ C b) $3.2 \times\times 10^{18}$ C c) $-3.2 \times\times 10^{-17}$ C d) $3.2 \times\times 10^{-17}$ C	1
28.	When some charge is transferred to …A… it readily gets distributed over the entire surface of … A… If some charge is put on … B…, it stays at the same place. Here, A and B refer to (a) insulator, conductor (b) conductor, insulator (c) insulator, insulator (d) conductor, conductor	1

29.	Quantisation of charge implies (a) charge cannot be destroyed (b) charge exists on particles (c) there is a minimum permissible charge on a particle (d) charge, which is a fraction of a coulomb is not possible.	1
30.	A body is positively charged, it implies that: a) there is only a positive charge in the body b) there is positive as well as negative charge in the body but the positive charge is more than negative charge c) there is equally positive and negative charge in the body but the positive charge lies in the outer regions d) the negative charge is displaced from its position	1

ANSWER KEY

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