INDIAN SCHOOL AL WADI AL KABIR

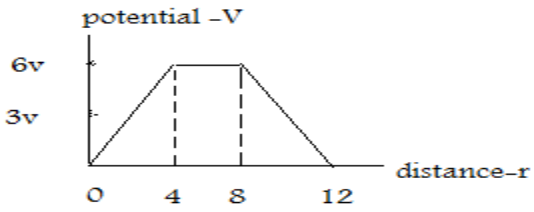
Class: XII	**Department: SCIENCE 2021 – 22** **SUBJECT: PHYSICS**	**Date: 06.05.2021**
Worksheet No.: 2	**Topic: ELECTRIC POTENTIAL**	**NOTE: A4 FILE FORMAT**
NAME OF THE STUDENT:	**CLASS & SEC:**	**ROLL NO.**

QUESTIONS BASED ON BOARD PAPERS

SECTION A

Directions (Q1-Q6) Select the most appropriate option from those given below each question

[1]The graph shows the variation of potential with distance from a fixed point charge, find the electric field 3m from the point charge.



[a] 2v/m [b] 3v/m [c.] -1.5v/m [d] – 3v/m

[c]

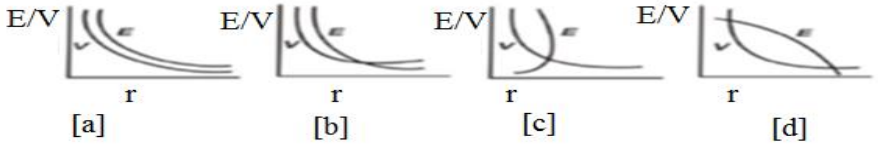
[2] When charge is supplied to a conductor, its potential depends upon

[a] amount of charge [b] geometry and size of the conductor [.c] both [a]&[b]

[d]only on [a]

[c]

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



[b]

[4] A dipole is placed parallel to electric field .If W is the workdone in rotating the dipole from 0^0 to 60^0 ,then work done in rotating it from o^o to 180^0 is

[a] 2W[b] 3W [c] 4W [d] $\frac{W}{2}$

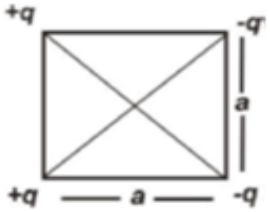
[c]

[5] A parallel plate capacitor is charged by a battery .Once it is charged ,battery is removed. Now a dielectric material is inserted between the plates of the capacitor, which of the following does not change?

[a] Electric field[b] potential difference [c.] charge on the plates[d] energy stored

[c]

[6] The potential at the centre of the square is



[a] zero [b] 2kq [c] $\frac{kq}{a^2}$ [d] $\frac{kq}{2a^2}$

[a]

SECTION B[2 marks]

[7] A 4μF capacitor is charged by a 200 v supply.It is then disconnected from the supply and is connected to another 2 μF capacitor. How much energy of the first capacitor is lost in the form of radiation?

$E1 = ½ C1 V1^2$

$E2 = ½ C_p V^2$

Energy lost = E1 –E2 = 2.67×10^{-2} J

[8]The electric field intensity at a point due to a point charge is 20 N/C and the electric potential is 10 J/C. Find the magnitude of the charge and distance of the point from charge.

$V = \frac{KQ}{r}$, E = V/d

Q = 0.55×10^{-9} C

[9]A capacitor with air between the plates has a capacitance of 8F.The separation between the plates is now reduced by half and the space between them is filled with a medium of dielectric constant 5.Calculate the value of the capacitance of the capacitor in second case.

$C = \frac{\epsilon o A}{d}$

$C^1 = \in r \frac{\in oA}{\frac{d}{2}}$

$C^1 = 80F$

SECTION C[3 marks]

[10] A charge +lμc is placed at a distance of 0.lm from another charge of +4μc in air. At what point on the line joining the charges, is the electric field intensity zero?

[x = 10/3 cm from +1μc]

[11]Two point charges of +3 x 10^{-19} C and +12 x 10^{-19} C are separated by a distance of 2.5m. Find the point on the line joining them where electric field intensity is zero.

[x = 5/3cmfrom 12 x 10^{-19} c]

[12]A neutral hydrogen molecule has two protons and two electrons. If one of the electrons is removed, we get a hydrogen molecule ion (H_2). In the ground state of H_2 the protons are separated by roughly 1.5A° and the electron is roughly 1A° from each proton. Estimate the potential energy of the system.

$U = \frac{Kq1q2}{r12} + \frac{kq2q3}{r23} + \frac{kq3q1}{r31} = -19.2eV$

[13][a]Define electrostatic potential energy[b] Derive the expression for electrostatic potential energy of a system of 3 charges q1, q2 and q3

[14] Derive the expression for the capacitance of a capacitor in presence of a dielectric

SECTION D [5 marks]

[15]Derive the expression for capacitance of a parallel plate capacitor

[16] Derive the expression for energy stored in a capacitor

[17]What is an electric dipole. Derive an expression for electrostatic potential energy of an electric dipole in an external electric field of strength E

PREPARED BY : MR.WILLIAM	CHECKED BY : HOD - SCIENCE