SHIKSHA CLASSES

BOARD QUESTION PAPER

Subject : Physics **Topic: 8. Electrostatics** **Total Marks : 20**
Class : XII **Time : 1 Hr.**

Section (A)

Q.1 : Select and write the most appropriate answer from given alternatives in each sub-question. 5

i) There are two charges $+1\ \mu C$ and $+5\ \mu C$ the ratio of the forces acting on them will be..

a) 1:5 b) 1:1 c) 5:1 d) 1:25

ii) A capacitor of capacity C has a charge Q and stored energy is W. If the charge is increased to 2Q. the stored energy will be…

a) 2W b) W/2 c) 4W d) W/4

iii) The energy stored in a condenser is in the form of

a) Kinetic energy b) Potential energy

c) Elastic energy d) Magnetic energy

iv) A metal plate of area 0.5 m^2 is given a charge of $50\mu C$. The mechanical force acting on the metal plate is

a) 585 N/m^2 b) 500 N/m^2

c) 565 N/m^2 d) 665 N/m^2

v) In n condensers each of capacity C are connected in series, effective capacity of combination is

a) $\frac{C}{n}$ b) nC c) $\frac{n}{C}$ d) $\frac{2C}{n}$

Q.2 : Very short answer type question. 2

i) A wire is bent in a circle of radius 20 cm. it is given a charge of $200\ \mu C$. Which spread on it uniformly. What is electric potential at the centre?

ii) Explain the concept of potential.

Section (B)

: Attempt any THREE. **6**

Q.3 : Define : i) electric flux ii) Capacitance

Q.4 : Define capacity of a condenser and state its S.I. unit.

Q.5 : Calculate the surface density of charge on a metal sphere of diameter 10 cm situated in air, if electric intensity at a point of 15 cm is 2×10^4 N/C.

Q.6 : Explain the concept of a condenser.

Section (C)

: Attempt any one **3**

Q.7 : Derive the formula for effective capacity of three condensers connected in series.

Q.8 : A condenser of capacity of 100 mF is charged up to a potential of 500 V. If the area of each plate of the condenser is 20 cm^2 and the distance between the plates is 1 mm. Find the energy density of the space between the plates.

Section (D)

: Attempt any one **4**

Q.9 : i) Derive the formula for energy stored in a charged condenser.

ii) Three condensers with capacitance $10\mu F$, $20\mu F$ and $30\mu F$ are connected in series and a potential difference of 220 volt is applied across the combination. Find the resultant capacity, charge on each condenser and P.D. across each condenser.

Q.10: i) Derive the formula for effective capacity of three condensers connected in parallel.

ii) A positively charged sphere of radius 10cm is surrounded by a medium of dielectric constant 5. If the magnitude of the electric field intensity at a point outside the sphere at a distance r from the centre of sphere is 6.4×10^{-4} V/m and charge on the sphere is 6.4×10^{-12} C, find r.

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