

Date: 26-Jul-2026**Time: 60min****Electrostatics****Marks: 20****SECTION A**

Q.1 **Select and write the correct answer for the following multiple choice type of questions:** **(3)**

i If the charge on the condenser of $10\ \mu\text{F}$ is doubled, then the energy stored in it becomes _____.

- (A) zero (B) twice that of initial energy
(C) half the initial energy (D) four times the initial energy

ii The flow of electrons which does not pass through the battery is known as _____ current.

- (A) conduction (B) charging
(C) leakage (D) displacement

iii A parallel plate capacitor is charged and then isolated. The effect of increasing the plate separation on charge, potential, capacitance respectively is

- (A) constant, decreases, decreases (B) increases, decreases, decreases
(C) constant, decreases, increases (D) constant, increases, decreases

Q.2 **Answer the following questions:** **(3)**

i State formula for work done against electrostatic force while displacing charge $+q_0$ at distance r_1 towards charge $+Q$ at distance r_2 .

ii A parallel plate air condenser has a capacity of $15\ \mu\text{F}$. What will be the new capacity if a marble slab of dielectric constant 6 is introduced between the two plates such that entire space between plates is filled by marble slab?

iii What is capacitor?

SECTION B

Attempt any TWO questions of the following: **(4)**

Q.3 Two charges of magnitudes $-4Q$ and $+2Q$ are located at points $(2a, 0)$ and $(5a, 0)$ respectively. What is the electric flux due to these charges through a sphere of radius $4a$ with its centre at the origin?

- Q.4** Explain energy storing in a capacitor.
- Q.5** Obtain an expression for electric field intensity due to an infinitely long straight charged wire or charged conducting cylinder.
- Q.6** (A) How is capacitor represented symbolically?
- (B) Determine the work done in bringing a charge of $5\text{ }\mu\text{C}$ from infinity to the point A. The potential at point A is 400 kV.

SECTION C

Attempt any TWO questions of the following: (6)

- Q.7** Obtain an expression for capacitance of a parallel plate capacitor without a dielectric.
- Q.8** Obtain an expression for energy of a charged capacitor and express it in different forms. _
- Q.9** A parallel plate air condenser has a capacity of $20\text{ }\mu\text{F}$. What will be the new capacity if
- the distance between two plates is doubled?
 - a marble slab of dielectric constant 8 is introduced between the two plates?

SECTION D

Attempt any ONE question of the following: (4)

- Q.10** Obtain expression for electric field intensity due to uniformly charged spherical shell or hollow sphere.
- Q.11** (A) Distinguish between polar and non-polar dielectrics.
- (B) A wire is bent in a circle of radius 10 cm. It is given a charge of $250\text{ }\mu\text{C}$ which spreads on it uniformly. What is the electric potential at the centre?