

★ ■ DPP – 4 (Energy Stored in Capacitor + Series & Parallel Combination)

A. MCQ (20 Questions)

1. Energy stored in capacitor is:
(A) $\frac{1}{2}CV^2$
(B) CV
(C) C/V
(D) V/C
2. Energy density between capacitor plates is: (PYQ Term-1 2022)
(A) $\frac{1}{2}\epsilon_0 E^2$
(B) $\epsilon_0 E$
(C) $\frac{1}{2}E^2$
(D) None
3. When voltage doubles, energy stored becomes:
(A) 4 times
(B) 2 times
(C) $1/2$
(D) same
4. In series combination of capacitors:
(A) $1/C_{eq} = 1/C_1 + 1/C_2$
(B) $C_{eq} = C_1 + C_2$
(C) $C_{eq} = C_1 C_2$
(D) none
5. In parallel combination:
(A) $C_{eq} = C_1 + C_2$
(B) $1/C_{eq} = 1/C_1 + 1/C_2$
(C) subtract
(D) none
6. Three capacitors each of C in series give: (PYQ 2017)
(A) $C/3$
(B) $3C$
(C) C
(D) $1/C$
7. Energy stored depends on:
(A) V
(B) C
(C) both
(D) none
8. If capacitor is disconnected from battery and plate separation is increased:
(A) V increases
(B) V decreases
(C) V constant
(D) C increases

9. A capacitor stores:
(A) electric energy
(B) magnetic energy
(C) mechanical energy
(D) sound energy
10. Loss of energy on sharing charge is:
(A) Joule heating
(B) radiation
(C) due to redistribution
(D) none
11. Work done in charging capacitor equals:
(A) stored energy
(B) twice energy
(C) zero
(D) infinite
12. Equivalent capacitance of parallel combination is:
(A) Maximum
(B) Minimum
(C) equal
(D) none
13. In series combination, charge on each capacitor is:
(A) same
(B) different
(C) doubled
(D) zero
14. Energy per unit volume depends on:
(A) ϵ
(B) E^2
(C) both
(D) none
15. Capacitance of two capacitors $4C$ and $2C$ in series is:
(A) $\frac{4}{3} C$
(B) $\frac{2}{3} C$
(C) $8C$
(D) $6C$
16. If voltage is kept constant and C increases:
(A) stored energy increases
(B) stored energy decreases
(C) cannot say
(D) zero
17. When dielectric is inserted after disconnecting battery:
(A) V decreases
(B) q decreases
(C) q increases
(D) none
18. In parallel combination, voltage across each capacitor is:
(A) equal

- (B) half
- (C) double
- (D) zero

19. Series combination is used when we need:

- (A) high voltage rating
- (B) high capacitance
- (C) constant flux
- (D) none

20. Parallel combination is used when we need:

- (A) high capacitance
- (B) low capacitance
- (C) high resistance
- (D) none

B. Short Questions (5 Questions)

1. Write the formula for energy stored in a capacitor.
2. Define energy density. (PYQ Term-1 2022)
3. Explain series combination of capacitors.
4. Explain parallel combination.
5. Why does energy loss occur during charge sharing?

C. Long Questions (2 Questions)

1. Derive the expression for energy stored in a charged capacitor. (PYQ Term-1 2022 – concept)
2. Derive equivalent capacitance for series and parallel combination.