

Assignment 2

Applied Physics II

1. Determine the force between two charges, each of one coulomb when they are separated at one metre distance in air.
2. What is the coulomb's force between two protons in air when separated by, $r = 2.0 \times 10^{-5}$ m.
3. The magnitude of two charges is double and distance of their separation is also doubled. Find the coulomb's force between them.
4. 10^6 electrons are added to a body, find the total charge on the body.
5. One Coulomb point charge is placed at a distance of one metre from an equal and similar point charge. Find the repulsive force acting on the charge.
6. What is the number of electrons when a charge of one coulomb is given to a body?
7. If $E = 3i + 4j + 8k$ and surface area = $100k$. Find the electric flux crossing through the given area.
8. Three identical capacitors each of capacitance C coulomb are connected in series. This combination is connected with one more similar capacitor. Find the capacitance of whole combination.
9. Three capacitors each of capacitance $2\mu\text{F}$ are connected in parallel. This combination is connected in series with fourth $2\mu\text{F}$ capacitor. Find the resultant capacitance of the system.
10. Capacitor of 4, 5 and $6\mu\text{F}$ are connected; (i) in parallel and (ii) in series. Compare the effective capacitances in the two cases.
11. Three equal capacitors are first connect in series and have capacitance C_S , and then they are connected in parallel, their capacitance is C_P . Find the ratio $\frac{C_S}{C_P}$ and interpret the result.
12. When a current of one micro ampere flows through a wire, how many electrons per second will pass a point in the wire?
13. A current of 1 ampere is flowing through a conductor. Find the number of electrons flowing through the conductor in one second.
14. The length of wire of radius 0.007 cm is 1000 cm. if resistance of wire is 30 ohm, then what is specific resistance of its material?
15. A given piece of wire of length l , cross-sectional area A and resistance R is stretched uniformly to a wire of length $2l$. What is the new resistance?

16. If length and area of cross-section of a conductor is doubled, find the net resistance of conductor.
17. A piece of wire of resistance 4 ohm is bend through 180° at its mid points and two halves are twisted together. Find the resistance of wire.
18. Length of wire is halved, what will be its conductance?
19. The resistance of wire of length l is R ohm. What will be resistance if wire is stretched n times of its original length (l)?
20. An incandescent lamp draws a current of 0.3 A at 240 volt. Find the resistance of the lamp.
21. Three resistors of 20 ohm, 15 ohm and 15 ohm are connected in series and a voltage of 100 volt is applied to the combination. Calculate
 - (a) Total resistance
 - (b) Current
 - (c) Voltage drop across each resistor.
22. A cell of e.m.f. 2 volt and negligible resistance is connected in series with 3, 5 and 20 ohm resistors. Draw the circuit diagram and calculate the current in the circuit.
23. A 100 W and a 200 W bulb have filament resistance R_1 and R_2 . They operate on same main voltage. Find relation between R_1 and R_2 .
24. Convert 1kW h into joule.