

PHYSICS

**CAPACITORS AND CURRENT
ELECTRICITY**

51. A fully charged capacitor has a capacitance C . It is discharged through a small coil of resistance wire embedded in a thermally insulated block of specific heat capacity s and mass m . If the temperature of the block is raised by ΔT , the potential difference V across the capacitance is

- (1) $\frac{mC\Delta T}{s}$
- (2) $\sqrt{\frac{2mC\Delta T}{s}}$
- (3) $\sqrt{\frac{2ms\Delta T}{C}}$
- (4) $\frac{ms\Delta T}{C}$

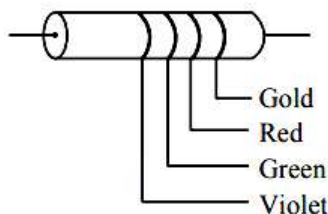
52. If there are n capacitors in parallel connected to V volt source, then the energy stored is equal to

- (1) CV
- (2) $\frac{1}{2}nCV^2$
- (3) CV^2
- (4) $\frac{1}{2n}CV^2$

53. Capacitance (in F) of a spherical conductor with radius 1 m

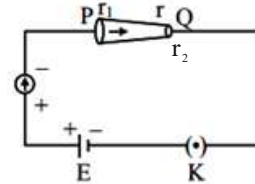
- (1) 1.1×10^{-10}
- (2) 10^{-6}
- (3) 9×10^{-9}
- (4) 10^{-3}

54. The colour coding on a carbon resistor is shown in the given figure. The resistance value of the given resistor is



- (1) $(5700 \pm 285) \Omega$
- (2) $(7500 \pm 750) \Omega$
- (3) $(5700 \pm 375) \Omega$
- (4) $(7500 \pm 375) \Omega$

55. In the given figure, a battery of emf E is connected across a conductor PQ of length l and different area of cross-sections having radii r_1 and r_2 , ($r_2 < r_1$)



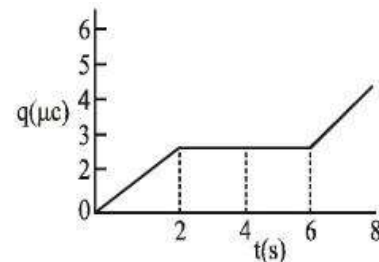
Choose the correct option as one moves from P to Q

- (1) Drift velocity of electron increases.
- (2) Electric field decreases
- (3) Electron current decreases
- (4) All of these

56. A current through a wire depends on time as $I = \alpha_0 t + \beta t^2$, where $\alpha_0 = 20 \text{ As}^{-1}$ and $\beta = 8 \text{ As}^{-2}$. Find the charge crossed through a section of the wire in 15 s

- (1) 2250 C
- (2) 11250 C
- (3) 2100 C
- (4) 260 C

57. The charge on a capacitor plate in a circuit, as a function of time, is shown in the figure



What is the value of current at $t = 4$ s?

- (1) Zero
- (2) $3 \mu\text{A}$
- (3) $2 \mu\text{A}$
- (4) $1.5 \mu\text{A}$

58. A copper wire is stretched to make it 0.5% longer. The percentage change in its electrical resistance if its volume remains unchanged is

- (1) 2.0%
- (2) 2.5%
- (3) 1.0%
- (4) 0.5%

59. The resistance of a wire is R . It is bent at the middle by 180° and both the ends are twisted together to make a shorter wire. The resistance of the new wire is

(1) $2R$

(2) $\frac{R}{2}$

(3) $\frac{R}{4}$

(4) $\frac{R}{8}$

60. The resistance of a wire is 5Ω at 50°C and 6Ω at 100°C . The resistance of the wire at 0°C will be

(1) 3Ω

(2) 2Ω

(3) 1Ω

(4) 4Ω



PARISHRAMA
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