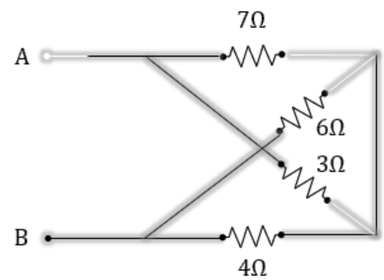
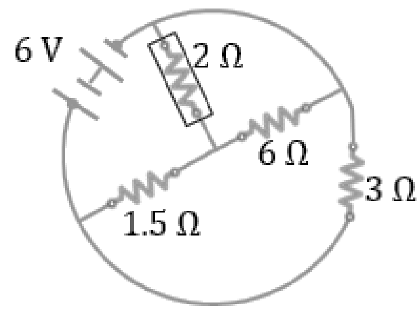
Q.1 The equivalent resistance between A and B (of the circuit as shown in figure) is

(A) 4.5 Ω **(B)** 12 Ω **(C)** 5.4 Ω **(D)** 20 Ω



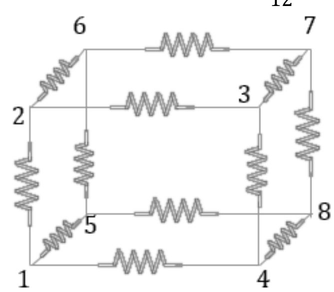
Q.2 The total current supplied to the circuit by the battery is

(A)1 A **(B)**2 A **(C)**4 A **(D)**6 A



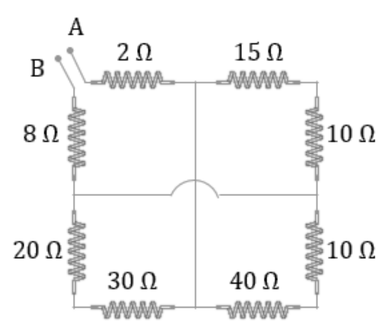
Q.3 Twelve resistors each of resistance r are connected together so that each lies along the edge of the cube as shown in the figure. The equivalent resistance between points 1 and 4 is

(A) $\frac{5r}{12}$ **(B)** $\frac{7r}{12}$ **(C)** $\frac{11r}{12}$ **(D)** $\frac{13r}{12}$



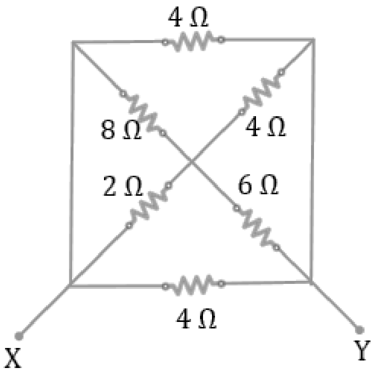
Q.4 The equivalent resistance between point's A and B is

(A) $\frac{65}{2}$ Ω **(B)** $\frac{45}{2}$ Ω **(C)** 45 Ω **(D)**135 Ω



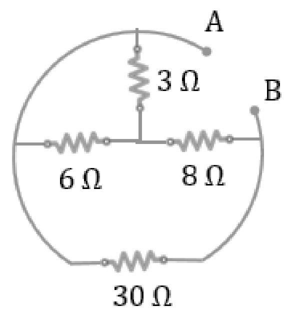
Q.5 Find the equivalent resistance between XandY.

(A)1 Ω **(B)**4 Ω **(C)** $\frac{4}{3}$ Ω **(D)**$\frac{2}{3}$ Ω



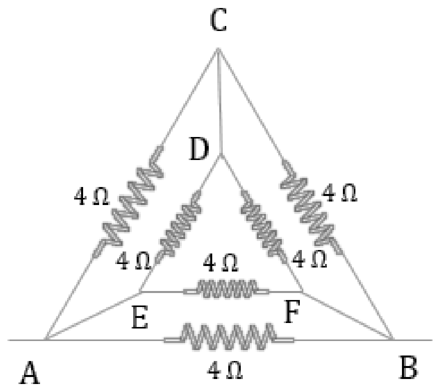
Q.6 Find the equivalent resistance between AandB.

(A)$\frac{15}{2}$ Ω **(B)**15 Ω **(C)** $\frac{7}{2}$ Ω **(D)**7 Ω



Q.7 Find the equivalent resistance between AandB.

(A)2 Ω **(B)**3 Ω **(C)**4 Ω **(D)**8 Ω



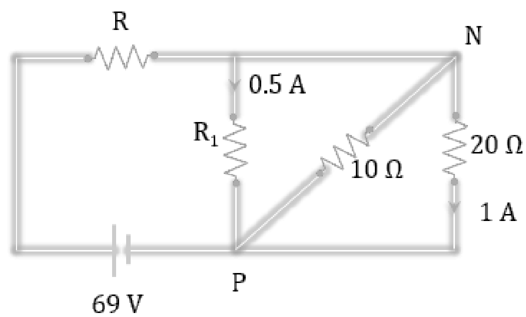
Q.8 For the circuit shown in the figure, choose the correct options

(A) The current through 10 Ω resistor connected across NP is 0.5 A

(B) The value of $R_1 = 50\ \Omega$

(C) The value of $R = 14\ \Omega$

(D) The potential difference across resistor R is equal to 20 V



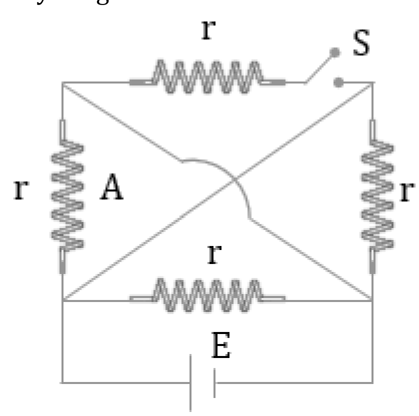
Q.9 In the circuit shown in figure, after closing the switchS, what is the change in current flowing through the resistanceA?

(A) No change in the value of current passing through resistance *A*

(B) The current passing through resistance *A* decreases

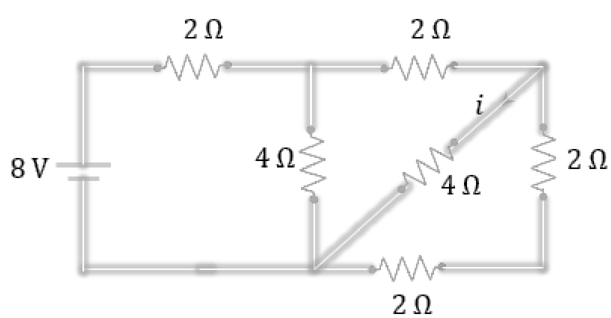
(C) The current passing through resistance *A* increases

(D) Data is insufficient to say anything



Q.10 Find the current i in the circuit shown below.

(A)1 A **(B)**3 A **(C)** $\frac{3}{2}$ A **(D)**$\frac{1}{2}$ A

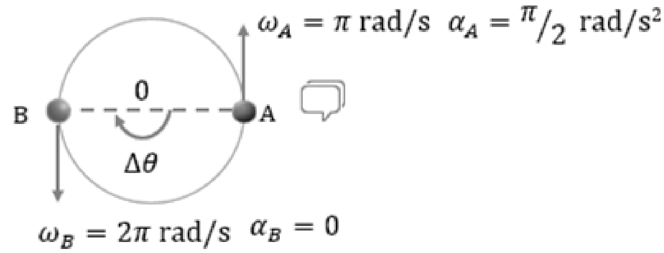


WORKSHEET

Angular Velocity

Q.1 Two particles A and B are moving in opposite directions on a circle. Initially particles A and B are diagonally opposite to each other. Particle A move with angular velocityπ rad/s, angular acceleration π/2 rad/s2 and particle B moves with constant angular velocity2π rad/s. Find the time after which both the particles A and B will collide.

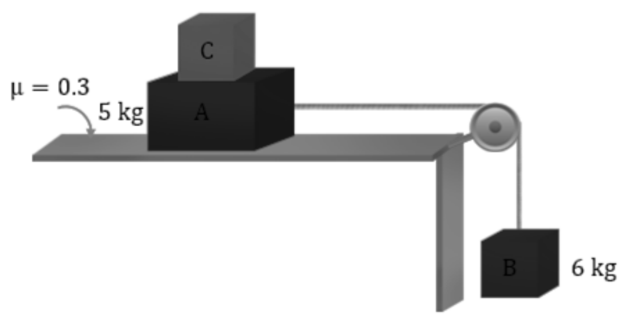
(A)3.2 sec **(B)**2 sec **(C)** 3.6 sec **(D)**4.5 sec



Net Contact Force

Q.2 The minimum mass of C that must be placed on A to prevent it from moving is equal to

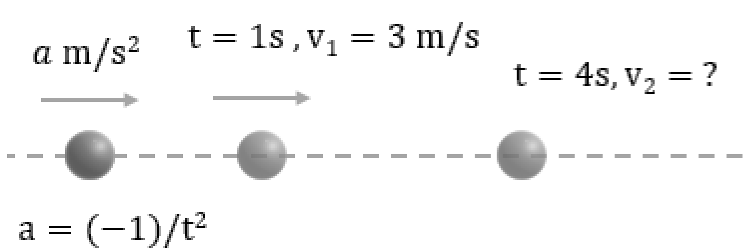
(A)15 kg **(B)**10 kg **(C)**5 kg **(D)**3 kg



Motion under Variable Acceleration

Q.3 A particle moves in a straight line with an acceleration 'a' m/s2 given as function of time,a = (−1)/t2 . At time t = 1 s the particle has a velocity of3 m/s, then find the velocity att = 4 s.

(A)2.25 m/s **(B)**5 m/s **(C)** 4.5 m/s **(D)**7 m/s



Partially Inelastic Collision

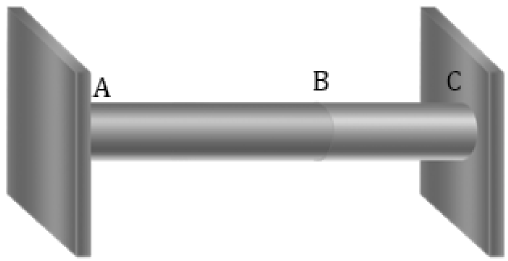
Q.4 A 1.0 kg ball drops vertically onto a floor from a height of25 cm. It rebounds to a height of4 cm. The coefficient of restitution for the collision is-

(A)0.16 **(B)**0.32 **(C)** 0.40 **(D)**0.56

Thermal Stress

Q.5 Two uniform rods AB and BC have Young's modulus 1.2×10^{11} N/m^2 *and* 1.5 10^{11} N m^2 respectively. If coefficient of linear expansion of AB is $1.5 \times 10^{-5}/°\text{C}$ and both have equal area of cross section, then coefficient of linear expansion of BC, for which there is not shift of the junction at all temperatures, is

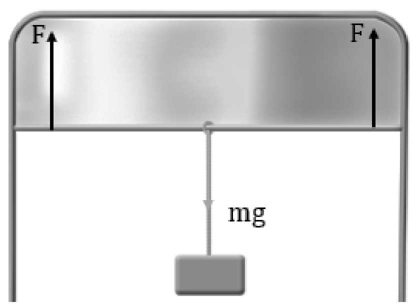
(A)$1.5 \times 10^{-5}/°\text{C}$ **(B)**$1.2 \times 10^{-5}/°\text{C}$ **(C)** $0.6 \times 10^{-5}/°\text{C}$ **(D)**$0.75 \times 10^{-5}/°\text{C}$



Surface Tension

Q.6 Consider a U-shaped frame with a sliding wire of length ℓ and mass 'm' on its arm. It is dipped in a soap solution, taken out and placed in a vertical position such that a thin film is formed on it as shown in figure. Find maximum value of m so that wire does not descend: (Surface tension of soap solution is S)

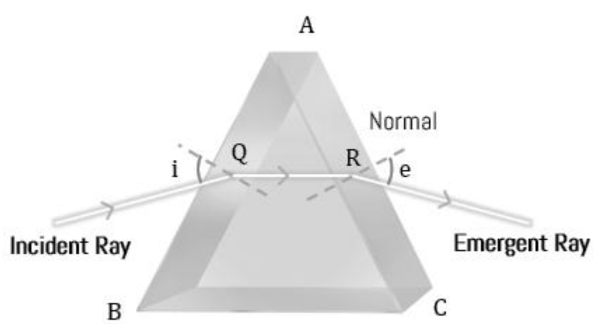
A)$\frac{2S\ell}{g}$ **(B)**$\frac{S\ell}{g}$ **(C)** $\frac{S\ell}{2g}$ **(D)**$\frac{S\ell}{4g}$



Deviation in Prism

Q.7 A ray of light passes through an equilateral prism ($\mu = 1.5$) such that the angle of incidence is equal to the angle of emergence & the either is equal to $3/4\,th$ of the angle of prism. Calculate angle of deviation.

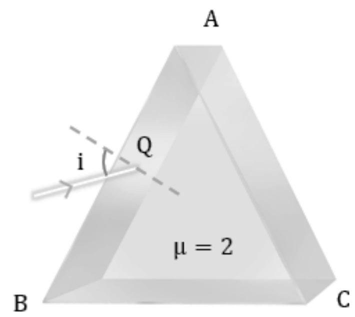
(A)30° **(B)**45° **(C)** 20° **(D)**60°



Minimum Deviation

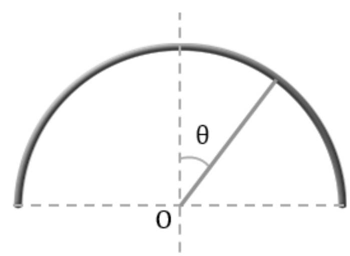
Q.8 If a light ray is incident at $i = 90°$, find the minimum value of the prism angle in degrees for which emergence is not possible.

(A) 15^o **(B)** 30^o **(C)** 45^o **(D)** 60^o



Q.9 The following diagram represents a semicircular wire of linear charge density $\lambda = \lambda 0 \sin\theta$, where $\lambda 0$ is a positive constant. The electric potential at O is $(ta\ k = 1/(4\pi\epsilon 0\ ))$

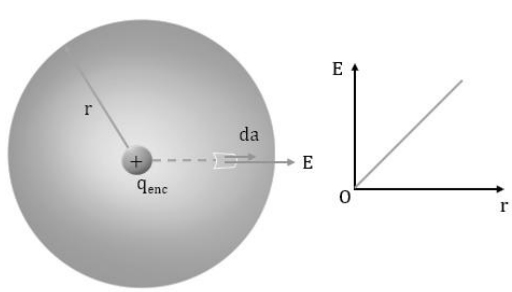
(A) $k\lambda_0 \sin\theta$ **(B)** $\frac{k\lambda \cos\theta}{2}$ **(C)** Zero **(D)** $k\lambda_0 \cos\theta$



Application of Gauss's Law

Q.10 Electric field in a certain region is acting radially outward and the variation of electric field with distance from the origin is represented below. The slope of the graph is A'. The charge contained in a sphere of radius a centre at the origin will be given by

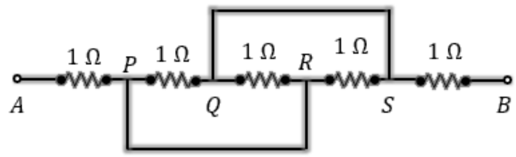
(A) $8\pi\epsilon_0 A'a^3$ **(B)** $4\pi\epsilon_0 A'a^3$ **(C)** $4\pi\epsilon_0 A'a^2$ **(D)** $\pi\epsilon_0 A'a^2$



Series and Parallel Combination of Resistors

Q.11 Equivalent resistance between the points A and B is (in Ω)

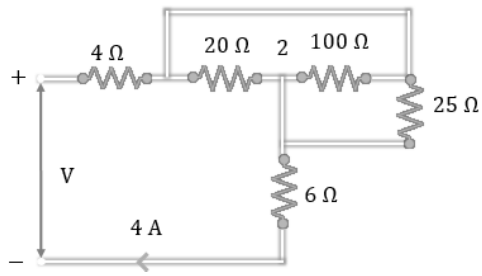
(A) $\frac{1}{5}$ **(B)** $\frac{5}{4}$ **(C)** $\frac{7}{3}$ **(D)** $\frac{7}{2}$



Series and Parallel Combination of Resistors

Q.12 In the circuit shown in figure, the potential difference V must be

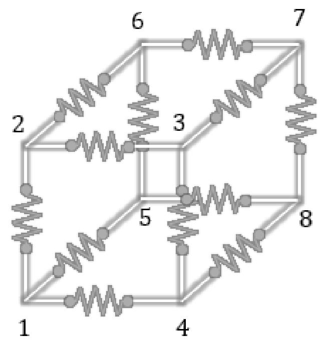
(A)50 V **(B)**80 V **(C)** 100 V **(D)**1290 V



Series and Parallel Combination of Resistors

Q.13 Twelve resistors each of resistance r are connected together so that each lies along the edge of the cube as shown in the figure. The equivalent resistance between points 1 and 3 is

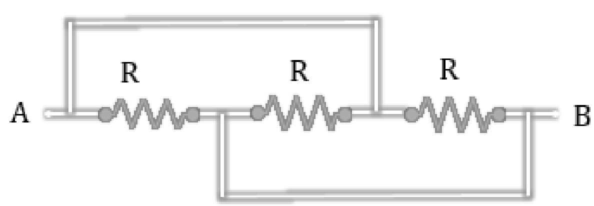
(A)$\frac{1}{4}$r **(B)**$\frac{1}{2}$r **(C)** $\frac{3}{4}$r **(D)**$\frac{5}{4}$r



Series and Parallel Combination of Resistors

Q.14 Find the equivalent resistance between Aand B.

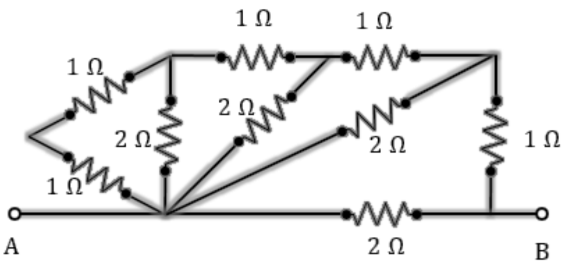
(A)R **(B)**$\frac{R}{3}$ **(C)** 3R **(D)**$\frac{R}{6}$



Series and Parallel Combination of Resistors

Q.15 What is the equivalent resistance between *A* and *B* in the following circuit?

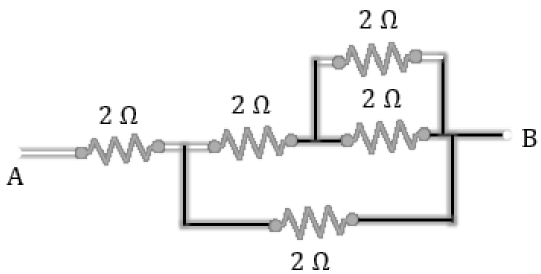
(A)1 Ω **(B)**2 Ω **(C)** 3 Ω **(D)**4 Ω



Series and Parallel Combination of Resistors

Q.16 The equivalent resistance between A and Bis :

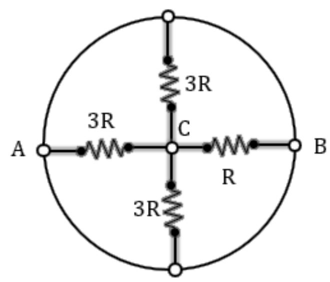
(A) $\frac{7}{5}\ \Omega$ **(B)** $\frac{13}{5}\ \Omega$ **(C)** $\frac{16}{5}\ \Omega$ **(D)** $2\ \Omega$



Series and Parallel Combination of Resistors

Q.17 The equivalent resistance between A and Bis :

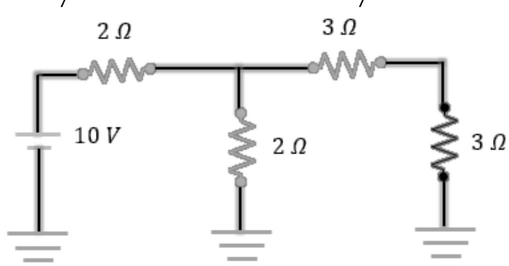
(A) $\frac{R}{2}$ **(B)** R **(C)** 2R **(D)** 3R



Kirchhoff's Voltage Law

Q.18 In the circuit shown, the current in 3 Ω resistance is

(A) 1 A **(B)** $\frac{1}{7}$ A **(C)** $\frac{5}{7}$ A **(D)** $\frac{15}{7}$ A

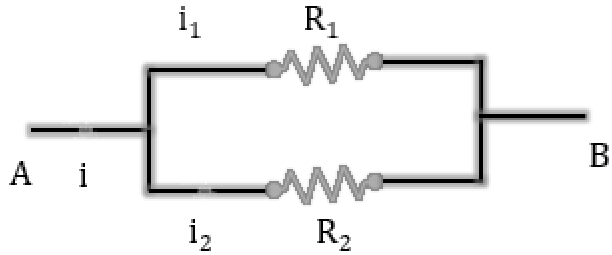


Kirchhoff's Voltage Law

Q.19 When 2 resistors are in parallel combination, then determine i1 andi2, if the combination carries a current i?

(A) $i_1 = \frac{iR_2}{R_1+R_2}$ And $i_2 = \frac{iR_1}{R_1+R_2}$ **(B)** $i_1 = \frac{iR_2}{R_1+R_2}$ and $i_2 = \frac{iR_1}{R_1+R_2}$

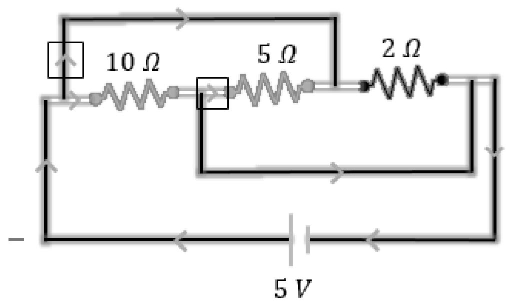
(C) $i1 = \frac{iR_2}{R_1}$ And $i_2 = \frac{iR_1}{R_2}$ **(D)** None



Kirchhoff's Voltage Law

Q.20 Find the current i in the circuit shown below:

(A) $\frac{3}{2}$ A **(B)** $\frac{5}{2}$ A **(C)** $\frac{7}{2}$ A **(D)** $\frac{1}{2}$ A



ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
Sol.	(A)	(C)	(B)	(B)	(C)	(A)	(B)	(C)	(A)	(D)
WORK SHEET										
Q.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Sol.	(B)	(A)	(A)	(C)	(B)	(A)	(A)	(D)	(C)	(B)
Q.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Sol.	(C)	(B)	(C)	(B)	(A)	(C)	(C)	(C)	(A)	(C)