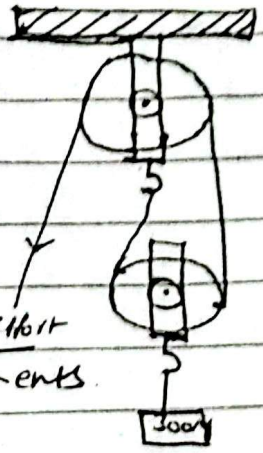
Set 5

Class-9 numericals

Group C

15. The efficiency of the given pulley is 75%. Calculate the amount of effort required to lift a load of 300N in that pulley system.



Soln

Given,

Efficiency of pulley (η) = 75%

Load lifted (L) = 300N

Velocity Ratio (VR) = 2 : no of rope segments

Effort required (E) = ?

Now,

we know that

$$\eta = \frac{MA}{VR} \times 100\%$$

$$75\% = \frac{\frac{L}{E}}{2} \times 100\%$$

$$75 = \frac{300}{E \times 2} \times 100$$

$$E = \frac{300}{75 \times 2} \times 100$$

$$\therefore E = 200N$$

Amount of Effort required to lift a load of 300N is 200N.

Date
Page No.

11. If 10 seconds time is required to move 60 ~~Got~~ coulomb charge in an electric circuit, Calculate current flowing through the circuit.

Soln

Given,

Time taken to move charge (t) = 10s
amount of charge to be moved (Q) = 60C
Current flowing in the circuit (I) = ?

Now,
we know that,

$$Q = I \cdot t$$
$$60 = I \times 10$$
$$I = \frac{60}{10} = 6A.$$

Current flowing through the circuit is 6A.

Group P

26. The mass of stone is 2kg. If it takes 6 seconds to reach maximum height, calculate initial velocity.

Soln

Given,

Time taken to reach max height (t) = 6s

final velocity of stone (v) = 0 m/s

acceleration due to gravity (g) = $-10 m/s^2$

initial velocity of stone (u) = ?

We know that,

$v = u + gt$

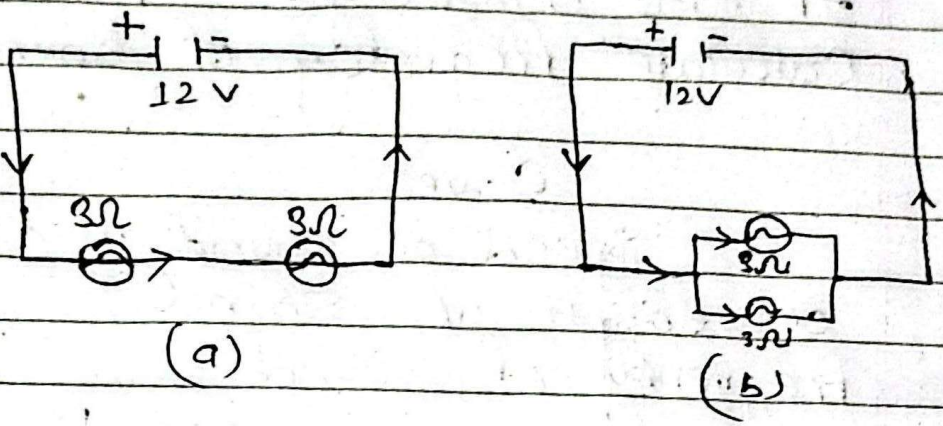
$0 = u + (-10) \times 6$

$0 = u - 60$

$\therefore u = 60 m/s$.

Initial velocity of stone should be 60m/s.

Q8. Study the given figures and answer the following question.



i) which type of combination of loads is shown in fig (a) and (b)?

ii) In fig (a) series combination of loads and in (b) parallel combination of loads is shown.

iii) How much current flows in the circuit in fig. (a) and (b)?

In fig (a)

Voltage (V) = 12 V

Resistance (R_1) = 3Ω

Resistance (R_2) = 3Ω

Current (I) = ?

Now,

~~From~~ we know,

~~$V = IR$~~ $V = V_1 + V_2$

$IR = IR_1 + IR_2$

$R = R_1 + R_2 = 3 + 3 = 6\Omega$

$V = IR$ $\quad \frac{V}{R} = I$ $\quad \frac{12}{6} = 2A$

in fig (b)

voltage (V) = 12

$R_1 = 3\Omega$

$R_2 = 3\Omega$

$I = ?$

we know,

$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$

$\frac{1}{R} = \frac{1+1}{3} = \frac{2}{3}$

$R = \frac{3}{2}\Omega$

Now,

$\frac{V}{R} = I$ $\quad \frac{12}{\frac{3}{2}} = I$

$8A = I$

~~Set-6~~ Set-7

The speed of sound in a medium is 5100m/s. If the wavelength of the sound is 15.5m, Calculate frequency of sound.

Given,

∴ Speed of sound in a medium $(v) = 5100 m/s$

wavelength of sound $(\lambda) = 15.5 m$

frequency of sound $(f) = ?$

we know that,

$v = \lambda f$

$5100 = 15.5 \times f$

$\frac{5100}{15.5} = f$

$329.03 Hz = f$