



# BISHNUPUR PUBLIC PRIVATE ITI

Approved by DGE&T and Affiliated by NCVT, New Delhi &  
Accredited by QCI

(AN ISO 9001:2015 CERTIFIED TRAINING INSTITUTE)

ESTD: 2015 Siromonipur, Bishnupur, Bankura, 722122 (W.B.)



## WORKSHOP CALCULATION & SCIENCE CLASS NOTE.

### ◆ ANSWER THE FOLLOWING QUESTIONS :

- 1) In a simple machine , the velocity ratio is found to be 20. An effort of 25kg lifts a load 400kg. Calculate the Mechanical Advantage and Efficiency .
- 2) In a wheel and axle , the diameter of the wheel is 15cm & that of the axle is 6 cm. If the efficiency of the machine is 75%, what would be the effort required to lift a load of 150kg?
- 3) Find the current following through 10 ohm resistance when connected to a voltage of 20 V.
- 4)The potential difference between two ends of a conductor is 10 V. If 2 A current flows through the conductor , what will be the resistance of the conductor ?
- 5) In an electric circuit , three resistance are connected in series across a voltage of 200 V. The value of  $R_1$  ,  $R_2$  , &  $R_3 = 8, 5, 3$  ohm. Calculate the total resistance and value of current passing the circuit.

## Answer Sheet

1) Given, Load = 400 kg,  
Effort = 25 kg,  
Velocity Ratio = 20

$$\therefore \text{Mechanical Advantage} = \frac{\text{Load}}{\text{Effort}} = \frac{400}{25} = 16 \text{ Ans}$$

$$\therefore \text{Efficiency, } \eta = \frac{\text{MA}}{\text{VR}} \times 100\%$$

$$\text{or, } \eta = \frac{16}{20} \times 100\%$$

$$\text{or, } \eta = \boxed{80\%} \text{ Ans}$$

2) Given, Diameter of Wheel,  $D = 15 \text{ cm}$   
" of Axle,  $d = 6 \text{ cm}$ .



Load = 150 kg.

Effort =  $x \text{ kg}$ .

$$\therefore \text{V.R.} = \frac{D}{d} = \frac{15}{6}$$

$$\therefore \text{M.A.} = \frac{\text{Load}}{\text{Effort}} = \frac{150}{x} \text{ --- (1)}$$

$$\therefore \text{M.A.} = \eta \times \text{V.R.}$$

$$\therefore \frac{150}{x} = \frac{15}{8}$$

$$\text{or, M.A.} = \frac{75}{100} \times \frac{15}{6}$$

$$\text{or, } x = \frac{150 \times 8}{15}$$

$$\text{or, M.A.} = \frac{15}{8} \text{ --- (2)}$$

$$\text{or, } x = 80 \text{ kg Ans}$$

3) Given,  $V = 20\text{ V}$ ,  $R = 10\text{-}\Omega$ ,

$$\therefore \text{Current, } I = \frac{V}{R}$$

$$\text{or, } I = \frac{20}{10} = 2\text{ A } \underline{\underline{\text{Answer}}}$$



4) Current,  $I = 0.2\text{ A}$ .

Resistance,  $R = 10\text{-}\Omega$

$$\begin{aligned} \therefore \text{Voltage} &= \text{Current} \times \text{Resistance} \\ &= 0.2 \times 10 \\ &= 2\text{ Volt. } \underline{\underline{\text{Answer}}} \end{aligned}$$

5)  $V = 10\text{ volt}$ ,  $I = 2\text{ A}$ ,

$$\therefore R = \frac{V}{I}$$

$$\text{or, } R = \frac{10}{2}$$

$$\text{or, } R = 5\text{-}\Omega \quad \underline{\underline{\text{Answer}}}$$