

# EXAMINATION QUESTION - GEARS

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On behalf of The World Association of Technology Teachers

## W.A.T.T.



World Association of Technology Teachers

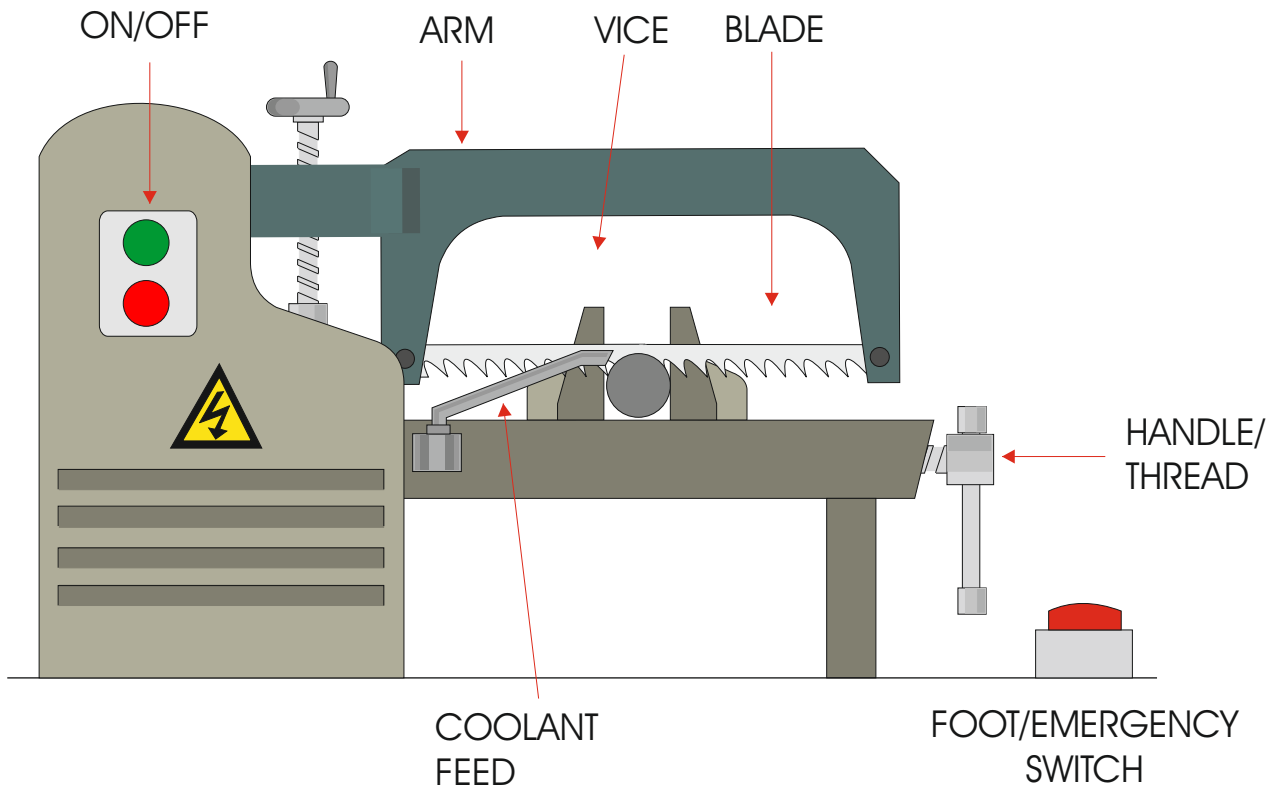
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The machine seen below is a power hacksaw used for cutting large section metals. It is powered by a motor. However, motors tend to rotate at very high speeds and the power hacksaw is cutting far too quickly, over heating the blade. It will eventually snap and damage the material being cut.

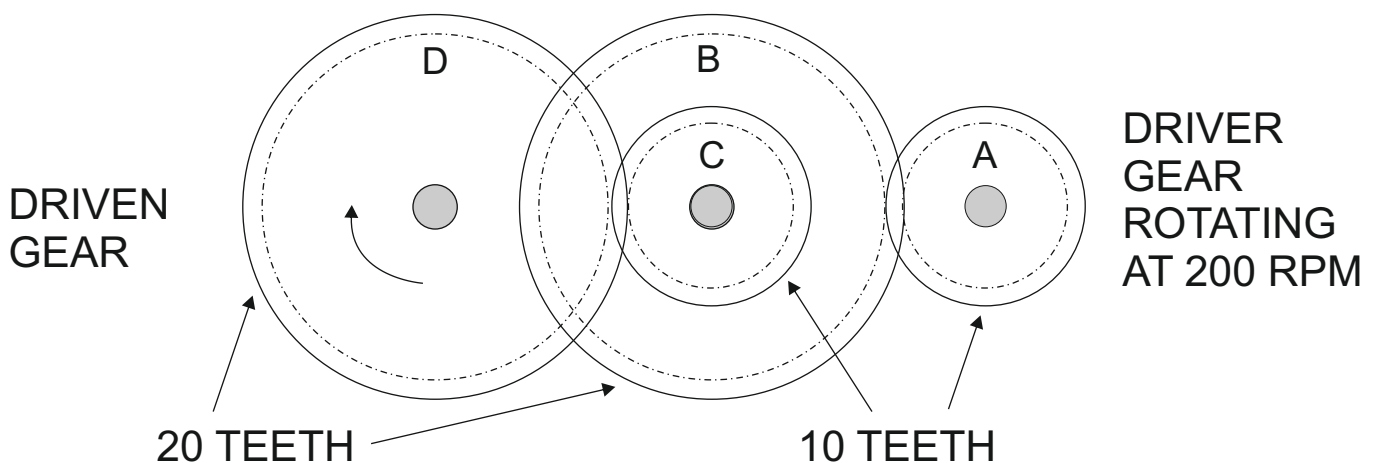


1. List two advantages of controlling the speed of a motor on any machine.

A. Advantage One: \_\_\_\_\_  
\_\_\_\_\_

B. Advantage Two: \_\_\_\_\_  
\_\_\_\_\_

The gear system shown below is to be added to the motor so that the speed of the power hacksaw can be controlled.



2. Calculate the velocity ratio of gears A and B

FORMULA  
VELOCITY RATIO       $\frac{\text{number of teeth on DRIVEN gear}}{\text{number of teeth on DRIVER gear}} = \underline{\hspace{2cm}}$

$= \text{---} = \frac{\text{Output movement}}{\text{Input movement}}$

$= \text{---} \text{ : ---}$

:

3. Calculate the RPM (revolutions per minute) of gear B

GEAR A	GEAR B
__ teeth	__ teeth
___ rpm	?

$\text{---} = \text{---}$

$= \text{---} = 100 \text{ revs/min (AT GEAR B)}$

4. What is the speed (RPM) of gear C ? \_\_\_\_\_

5. Calculate the velocity ratio of gear D

FORMULA  
VELOCITY RATIO       $\frac{\text{number of teeth on DRIVEN gear}}{\text{number of teeth on DRIVER gear}} = \frac{\text{---T (GEAR D)}}{\text{---T (GEAR C)}}$

$= \text{---} = \frac{\text{Output movement}}{\text{Input movement}}$

$= \text{---} \text{ : ---}$

:

6. Calculate the RPM (revolutions per minute) of gear D

GEAR C	GEAR D
__ teeth	__ teeth
___ rpm	?

$\text{---} = \text{---}$

$= \text{---} = \text{---} \text{ revs/min (AT GEAR D)}$