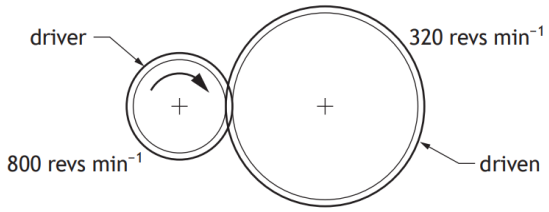
7. Drive Systems Past Paper Problems

2019 Q4

1. A simple gear train is shown below.



a) Calculate the velocity ratio of this simple gear train. **2**

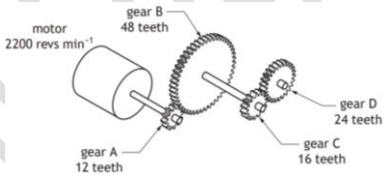
The driver gear in the diagram above rotates clockwise.

b) State the direction of rotation of the driven gear. **1**

2019 Q14b

2. A conveyor belt used to transport fruit along the machine is shown below.

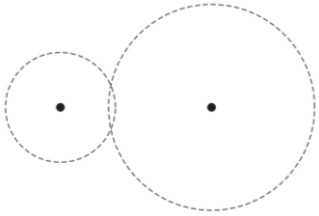
Part of the conveyor belt mechanism is shown below.



Calculate the output speed of gear D. **4**

2018 Q8

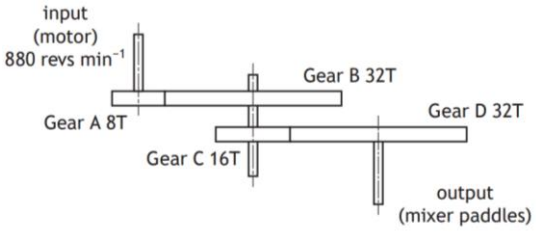
3. The simple gear train, shown below, has been drawn using incorrect conventions.



Describe two errors that were made when drawing this simple gear train. **2**

2018 Q15

4. A food processing company uses an industrial mixing machine to combine pastry ingredients. A compound gear train which forms part of the mixing machine is shown below



a)

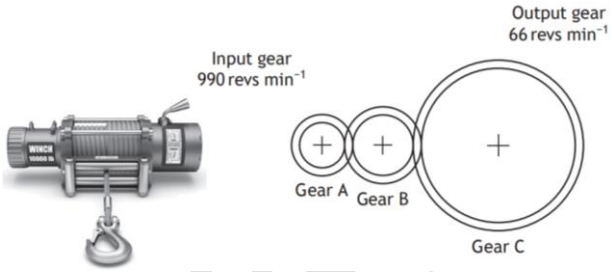
i. Calculate the output speed of the mixer paddles. **4**

ii. Calculate the velocity ratio of the compound gear train. **2**

b) During testing it was found that the mixing paddles were rotating too slowly. **1**
Describe one change that could be made to Gear B in order to increase the speed of the mixing paddles.

2017 Q7

5. A simple gear train used in a winch system is shown below.



a) **1**

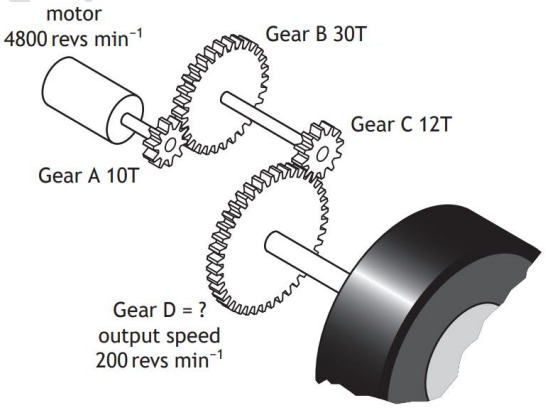
i. State the name of gear B.

ii. State the effect of gear B on the output speed. **1**

b) Calculate the velocity ratio of the gear train. **2**

2017 Q12 c&d

6. The mechanical system used in the scooter is shown below.

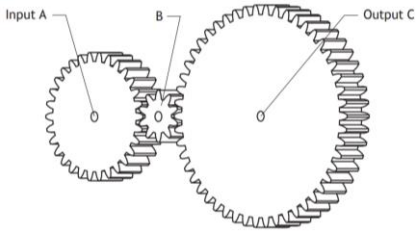


a) Calculate the number of teeth on gear D. **4**

b) Explain how this mechanical system could be made more efficient. **2**

2016 Q6

7. A diagram of part of a gear mechanism for an electric food mixer is shown below.



a) 1

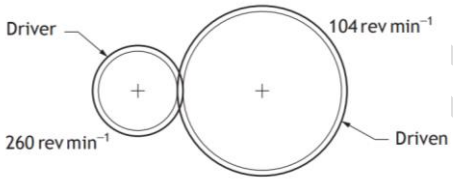
i. State the name of gear B.

ii. Describe the function of gear B. 1

b) Calculate the velocity ratio when Input A rotates at 1200 revs min^{-1} and Output C has a speed of 720 revs min^{-1} . Show all working. 2

2015 Q4

8. A motorised coffee grinder uses a simple gear train.



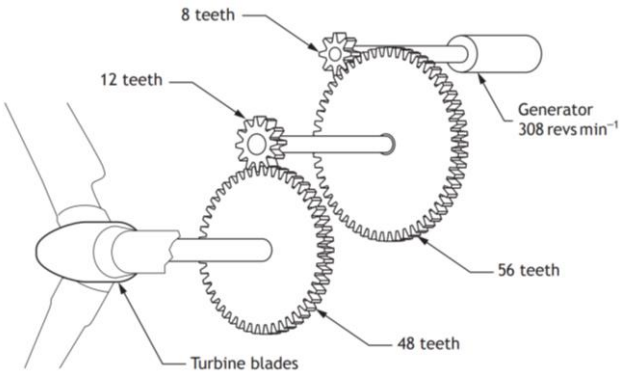
a) Calculate the velocity ratio of the gear train. 2
Show all working and final unit.

b) Describe how the simple gear drive could be altered to make the driver and driven gears turn in the same direction. 1

2015 Q10 C&d

9. A pupil's model of the wind turbine's compound gear train is shown in the diagram below.

a) Describe an advantage of using a compound gear train over a simple gear train. 1



b) Calculate the speed of the turbine blade. 4
Show all working and final unit.