**Revision Questions on Compund Gear Systems**

1. The compound gear train shown below is driven by a motor that runs at 1000 rpm. Calculate the gear ratio of the motor to the output shaft and then the output speed. Show all your working.



A = 20 teeth

B = 60 teeth

C = 40 teeth

D = 50 teeth

**Velocity RatioAB = Driven 60 3:1 Velocity RatioAB = Driven 50 1.25:1**

 **Driver 20 Driver 40**

**Total V.R. = 3 x 1.25 = 3.75**

**Output Speed = Input Speed 1000RPM = 267 RPM**

 **V.R. 3.75**

2. A motor with a single worm wheel output rotates at 500 rpm.

You are given the following sizes of worm gears from which to select.

A = 10 teeth

B = 25 teeth

C = 50 teeth

Explain which gear should be connected to the motor to give the slowest output speed and why. What is the output speed?

***Gear C, The motor revolved at 500RPM and if the 50tooth gear was connected then the ouput speed of this gear would be 10RPM***

3. The motorised winch shown below runs at a speed of 1200 rpm. The drum is to rotate at 25 rpm. Calculate:

(a) The velocity ratio required to produce the speed reduction

(b) The number of teeth gear A must have to meet this requirement.



**V.RTotal = V.R.AB X V.R.CD x V.R.EF**

**V.R.Total = Input Speed = 1200RPM = 48:1**

 **Output Speed 25RPM**

**Velocity RatioEF = Driven 48 4:1 Velocity RatioCD = Driven 45 3:1**

 **Driver 12 Driver 15**

 **48 = V.R.AB x 4 x 3 Therefore V.R.AB = 48**

 **1 1 1 12**

**V.R.AB = Driven 4 = 32T Teeth on A gear = 32 = 8**

 **Driver Teeth on A gear 4**

(c) If the radius of the drum is 50mm, what is the speed of the load being raised?

 (Answer in m/s)

**Radius is half diameter Circumference = dia x π = 100mm x 3.142 = 314mm**

**Drum revolves 25RPM Therefore in one minute distance travelled by the load is**

 **314mm x 25 RPM = 7850mm/min**

 **7.85 m/min in one second 7.85 = 0.13 m/sec**

**60**

