Name_____ School_____ Contestant Number _____

2016 Wyoming State FFA CDE
Agricultural Technology and Mechanical Systems
Energy Systems – Small Gas Engine Skill

You have agreed to work on your Grandfathers cattle ranch, southeast of Torrington Wyoming after the school year is over. Recently, several of the ponds used to water the cattle have dried up, necessitating a new well being drilled to provide water for the stock. Since the cost of drilling the new well is considerable, it is important to recycle everything thing possible to bring water to the cattle from the new well. Your old water pump, which is operated by a Briggs and Stratton Single Cylinder L Head engine, is not providing the GPM (Gallons Per Minute) that it specifies in the owners manual. During your diagnosis of the engine, you have determined that the cylinder compression is low which could have an effect on the performance of the water pump.

Determine compression for each of the engines provided, list them and their ranking (High [#1] to Low [#3]) in the table below. (Ex. 50 PSI, #1)

Compression Engine 1		Compression Engine 2		Compression Engine 3
16 - 20 PSI #2		25 - 36 PSI #1		0 PSI #3

After determining the compression for each of the small engines, your Grandfather has remembered that he has an newer Briggs and Stratton Vanguard V-Twin that he feels would be a better choice to power the water pump, but the engine will need a little maintenance first. Before pulling the engine apart you did a compression test to determine if a loss in compression existed in either of the cylinders. Using the measurements in the following table, consult the manual to determine if a loss of compression exists, and complete the table for the requested information.

Cylinder	Compression in PSI	Cylinder Difference	Cylinder % Difference
#1	70 PSI	10 PSI	14.29%
#2	60 PSI		

Is the difference in compression outside of the manual specifications? No

Identify two possible reasons why a loss of compression exists.

Loose Cylinder Head Bolts Blown Head Gasket Burned or Lose Valves/Valve Seats
Insufficient Valve Clearance Warped Cylinder Head Warped Valve Stems
Worn Bore and/or Rings Broken Connecting Rods

In performing maintenance, you discover the following parts that must be repaired or replaced.

Part Identification			Part Selection			
1. B	5. H		A	Breather	E	Governor Spool
2. A	6. D		B	Cylinder Shields	F	Rocker Arm Assembly
3. E	7. F		C	Debris Screen	G	Starter Motor
4. G	8. C		D	Governor Link	H	Valley Cover

Criterion	Points Possible	Points Earned
Small Engine Skill	15	
Questions	13 (1 point each)	
Safety	2	