

**2012 Wyoming State FFA CDE  
Agricultural Technology and Mechanical Systems  
Energy Systems – Small Gas Engine Skill**

You are a manager for a feed operation and you are modifying a large bin for the storage of feed cake. The operation is consuming more time loading the feed truck than needed, therefore making your operation less efficient than your competitors. There is a hydraulically powered auger system used to move the cake from the storage bin to a waiting feed truck. You recently have replaced all of the auger components but found the old engine was too weak to operate the refurbished system. You have replaced the engine that operates the hydraulic system with a slightly used Briggs and Stratton Vanguard V-Twin engine. The previous owner of the engine identified that the valves and the valve clearance may need to be adjusted.

**Using the measurement tools provided, answer the following questions:**

1. What is the exhaust valve clearance measurement? \_\_\_\_\_ **.005 (.13mm)**
2. Taking a measurement approximately 1-1/2" (38 mm) from the end of the intake valve stem provided, what is the dia. measurement of the valve stem located at this station? \_\_\_\_\_ **.247 (.244 - .250 will be accepted)**
3. Using the owner's manual provided, is this valve stem **within** standard dimension, or should it be rejected? \_\_\_\_\_ **Reject**

**Locate the following information from the owner's manual for this engine.** Model # 305447

1. What is the cubic inch displacement of this engine? \_\_\_\_\_ **30**
2. What is the starter type designed for use with this engine?  
\_\_\_\_\_  
**Electric starter 12-24 Volt gear drive and alternator (page 6)**
3. What is the sparkplug torque recommendation for this engine? \_\_\_\_\_  
**180 in. lbs. (20Nm)(page 179)**
4. What is the exhaust manifold torque recommendation for this engine? \_\_\_\_\_  
**150 in. lbs. (17Nm)(page 179)**
5. What is the exhaust valve clearance range (measured cold) for this engine? \_\_\_\_\_  
**0.004-0.006 (0.10-0.15) (page178)**

Criterion	Points Possible	Points Earned
Calculations	12 (4 points each)	
Questions	15 (3 points each)	
Safety	3	