Lab #4 Outboard Motor

Do not start this lab until told that the competition is ready to start.

If there is something you don't understand, you may ask for clarification from the person in charge.

If you have completed this lab early, please check your answers and wait quietly until everyone has finished or all the time is used.

Section 1: Information Retrieval

Using the service manual, locate and record the following specifications and torques.

Locate and record the Model and Serial Number. Determine the following information from the Model and Serial Number.

Model Description:	
Model Name:	
Transom Height:	
Functions:	
Functions:	
Date of Manufacture:	
Serial Number:	
Approved Model Code:	

Specifications

Cam Sprocket Retaining Bolt Torque	
Spark Plug Number	
Spark Checker Part Number	
Crankpin Oil Clearance	

Competitor Name: _____ Province: _____

Driveshaft Runout	
Trim Cylinder Reservoir Cap Torque	
Recommended Power Trim Fluid	
Main Relay Fuse Size	

Section 2: Lower Unit

Following the service manual procedure remove the lower unit to service the water pump and check prop shaft runout.

Torques and Specifications

Torques	
Lower Unit Mount Bolts	
Drain Bolt	
Prop Nut	
Water Pump Cover Bolts	
Prop Shaft Housing Bolts	
Specifications	
Prop Shaft Runout	
Recommended Lower Unit Oil	
Lower Unit Gear Ratio	
Clutch Type	

Lower Unit inspection

Remove the lower unit and measure prop shaft runout. The lower unit is already drained of oil. Remove and inspect the waterpump.

Record the propshaft runout: _____

Is the propshaft reusable? _____

Record any issues with the waterpump:

_____

Theory of Operation Questions

Answer the following questions in regards to the Lower Unit and Cooling System.

1. What gear should the lower unit be in prior to removal?

   _____

2. What is the procedure for refilling the lower unit?

   _____

3. Why must you fill it in this manner?

   _____

4. What would be the most likely cause of milky gear oil?

   _____

5. What would black gear oil indicate?

   _____

6. Does this outboard use an open loop or closed loop cooling system?

   _____

7. What temperature does the thermostat start to open?

   _____

8. Does the water pump utilize a positive displacement design?

   _____

9. What is the purpose of the trim tab?

   _____

10. What is the trim tab made of?

    _____

11. Why is the trim tab made of this metal?

    _____

12. What material is the prop made of?

    _____

13. What is the pitch prop pitch?

14. Explain prop pitch.

15. What type of damage to the water pump would dry running cause to the water pump?

Reassemble the lower unit and reinstall. Torque all fasteners. Have the judge verify your torque wrench settings.

Section 3: Compression

Following the service manual procedure, perform a compression test. Look up all specifications and torques. Record results.

Torques and Specifications

Torques	
Spark Plug	
Specifications	
Compression Test Minimum	

Compression Test

Perform the test and record the results.

Compression Test Results	
Cylinder 1	
Cylinder 2	
Cylinder 3	

Perform a Leak down test on the problem cylinder only!

1. What position of the piston and valves during this test?
2. Where do you suspect the issue is?
3. What would be your next step?