**Level 3 Diploma in Land-based Engineering Operations (0059-3)**

**Unit** **306 Assignment**

**Service & Repair Engines and Components**

**Underpinning Knowledge**

**Candidate:**

**OVERVIEW**

The aim of this unit is to provide you with the knowledge, understanding and skills required to perform service and repair procedures on engines.

This assignment consists of elements three and four of this unit and successful completion will demonstrate that you understand how to take engine measurements, analyse them and interpret the findings.

**The following questions are about causes of engine problems.**

1. State THREE possible effects on an engine:

a) of a partially blocked air cleaner

b) of an engine misfiring.

2(a) State two possible reasons for low engine oil pressure.

(b) In the event of an oil filter not getting changed when due, explain what will

eventually happen.

3. List two possible faults in an engine cooling system that may cause the engine to overheat.

4. Suggest some possible reasons for an engine to be difficult to start. Include issues when ‘cold-starting’ is required.

5. State the main reason for heavy breathing and excessive oil consumption in an engine.

6. Link the following symptoms with their conditions by typing the correct letter to the number:

|  |  |  |  |
| --- | --- | --- | --- |
| **Symptom** | **Condition** | Number | Letter |
| 1. Blue smoke | 1. Water combustion | 1 |  |
| 1. Black smoke | 1. Oil consumption | 2 |  |
| 1. White smoke | 1. Fuel consumption | 3 |  |

7. An engine appears to be “sluggish” when picking up and seems to over-rev. State one reason why this might be so.

**The following questions are about the sealing of engines.**

8. Describe how combustion chambers are sealed against loss of compression pressure, oil pressure and coolant.

9. Describe the ways fuel systems are sealed against loss of fuel and drawing-in of air.

10. Describe the ways ignition systems are sealed against contamination and water.

**The following questions are about the timing of engines.**

11(a) Give one example of how to statically time a SI engine.

(b) Give one example of how to dynamically time a CI engine.

**The following questions are about the testing of engines.**

12. Outline the procedure for performing a compression test on an engine.

13. Construct a graph (chart) showing typical curves of both power & torque for an engine. On your graph indicate where "engine rated speed" may be found and hence max power.

**The following questions are about measuring engines.**

14. Describe the procedure for gapping piston rings. Include how you would determine the correct gap required.

15. State what instrument you would use to determine cylinder liner taper and ovality.

16. State how you would determine cylinder liner protrusion/piston to head clearance.

17. Describe the “Rule of Nine” and explain the procedure for setting valve clearances.

18. Describe a procedure for measuring distortion in a cylinder head and how you would determine whether the head could be made serviceable or not.