

Diesel Engine Fundamentals Part II

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PDHLibrary Course No 2020055
3 PDH HOURS

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This document contains the course quiz so that you can answer various questions as you watch and listen to the course. I recommend printing out the quiz and circling your answers as you go.

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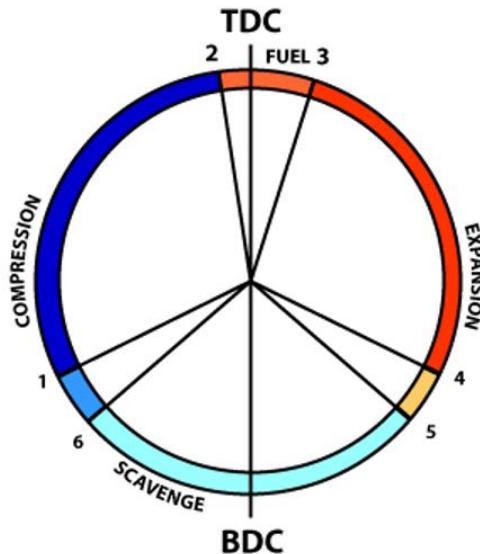
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Diesel Engine Fundamentals (Part II) – Quiz

Updated 4-7-2020

Chapter 3 – Engine Cycles

- 1) A timing diagram of a diesel engine is shown in the image. What does it represent?



- a) It represents the angle of rotation of the crankshaft, the duration of the processes that occur, and the specific points of the combustion cycle i.e. the opening and closing of valves and ports, Top Dead Centre (TDC) and Bottom Dead Centre (BDC).
- b) It represents the service time which the engine will operate within a single calendar year.
- c) It represents the angle of rotation of the camshaft, the duration of the processes that occur, and the specific points of the combustion cycle i.e. the opening and closing of valves and ports, Top Dead Centre (TDC) and Bottom Dead Centre (BDC).
- 2) Select the option that best describes valve overlap.
- a) Valve overlap occurs when the valve lid seals tightly against the valve seat.
- b) Valve overlap is the period during which both the intake and exhaust valves are open.
- c) Valve overlap is when a valve has worn-out and needs to be renewed.
- d) Valve overlap refers to when two valves physically connect with each other when closed.

3) Injecting fuel into the combustion space too early may cause a symptom known as 'knocking'.

- a) True
- b) False

4) Four-stroke engines are more efficient than two-stroke engines because the timing of the valve opening and closing cycles, and fuel injection timing, can be better controlled.

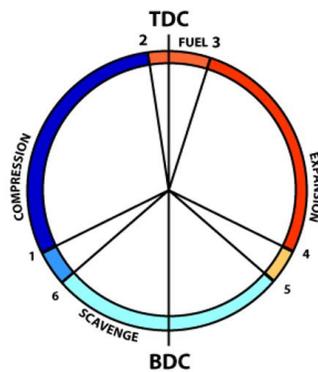
- a) True
- b) False

5) In a four-stroke engine, the camshaft is geared with the crankshaft and rotates:

- a) At the same speed as the crankshaft (1:1)
- b) At half the speed of the crankshaft (1:2)
- c) At twice the speed of the crankshaft (2:1)

Chapter 4 - Detailed Two-Stroke Engine Cycle

6) A timing diagram of a diesel engine is shown. Is the image based upon a two-stroke engine, or a four-stroke engine?



- a) Four-stroke engine.
- b) Two-stroke engine.

- 7) Which statement, or statements, best describe a four-stroke engine's exhaust stroke?
- a) The piston travels towards BDC, the inlet ports are opened, and air enters the cylinder.
 - b) The piston travels towards TDC and the exhaust gases are expelled.
 - c) The cylinder pressure increases as the piston travels from BDC to TDC.
 - d) The piston travels from TDC to BDC.
- 8) How many crankshaft rotations does a two-stroke engine require to complete one combustion cycle?
- a) Two.
 - b) One.
 - c) Four.

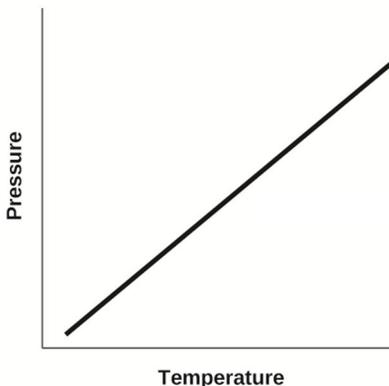
Chapter 5 - Maintenance Strategies

- 9) Which of the statements best describes a reactive maintenance strategy?
- a) Maintenance actions performed based upon a schedule (time, service hours, or km/mile based etc.).
 - b) The 'run it until it breaks' maintenance strategy. No actions or efforts are taken to maintain equipment.
- 10) Which of the statements best describes a preventive maintenance strategy?
- a) Preventive maintenance is the 'run it until it breaks' maintenance strategy. No actions or efforts are taken to maintain equipment.
 - b) Actions performed are based upon a schedule. Performed actions should detect, preclude, or mitigate degradation of a component or system.
 - c) Measuring equipment is used to continually condition monitor equipment until such time as maintenance intervention is required.
- 11) Which of the statements best describes a predictive maintenance strategy?
- a) Predictive maintenance is the 'run it until it breaks' maintenance strategy. No actions or efforts are taken to maintain equipment.
 - b) Predictive maintenance occurs based upon the actual condition of a machine rather than on a pre-set schedule.

- 12) Which of the statements best describes a reliability centred maintenance (RCM) strategy?
- a) A maintenance strategy used to determine the maintenance requirements of any asset within a system, and its criticality.
 - b) Reliability centred maintenance (RCM) is the 'run it until it breaks' maintenance strategy. No actions or efforts are taken to maintain equipment.
 - c) Measuring equipment is used to continually condition monitor equipment until such time as maintenance intervention is required. The criticality of the equipment is irrelevant.

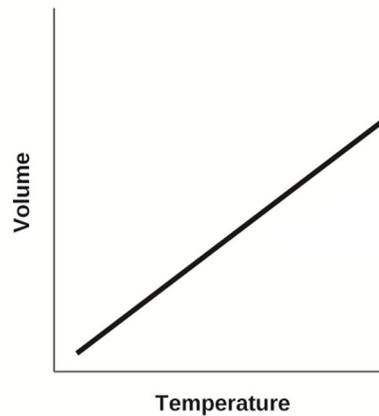
Chapter 6 - Thermodynamic Cycles

- 13) Amonton's law describes the linear relationship between pressure and temperature when volume is held constant. Select the option that best describes Amonton's law.



- a) At constant volume, an increase in temperature will cause an increase in pressure, and vice versa.
- b) At constant volume, an increase in temperature will cause a decrease in pressure, and vice versa.

14) Charles' Law describes the relationship between volume and temperature when pressure is held constant. Select the option that best describes Charles' law.



- a) At constant pressure, an increase in temperature will cause a decrease in volume, and vice versa.
- b) At constant pressure, an increase in temperature will cause an increase in volume, and vice versa.

15) Which of the shown options are thermodynamic cycles (gas cycles)? There may be more than one correct answer to this question.

- a) Otto Cycle (petrol engines).
- b) Bryton Cycle (combustion turbines).
- c) Diesel Cycle (diesel engines).
- d) All these options.

Chapter 7 - Engine Protection

- 16) With reference to high crankcase pressure, which of the shown statements is true?
- a) High crankcase pressure is often caused by blow-by (combustion gases passing the piston rings and entering the crankcase).
 - b) A high crankcase pressure alarm is fitted to most medium to large sized diesel engines.
 - c) High crankcase pressure often indicates that the engine is in poor condition.
 - d) All these options.
- 17) With reference to low lubrication oil pressure, which of the shown statements is true?
- a) Low lubrication oil pressure, or a complete loss of oil pressure, can render an engine totally inoperable within a very short space of time.
 - b) Loss of oil pressure can result in the engine seizing (stopping) due to lack of lubrication.
 - c) A very low lubrication oil pressure event will shut down the engine.
 - d) All these options.
- 18) With reference to engine overspeed, which of the shown options are true?
- a) An overspeed device will stop/isolate fuel to the engine if a pre-defined rpm setpoint is exceeded.
 - b) An overspeed condition is extremely dangerous because engine failure is usually catastrophic.
 - c) Because diesel engines are not self-speed limiting, a failure in the governor, injection system, or sudden loss of load, can cause the engine to overspeed.
 - d) All these options.

Chapter 8 - Engine Starting Circuits

- 19) Diesel engines can be started pneumatically, electrically, hydraulically or manually. How is a diesel engine initially started?
- a) A force is applied to the engine so that the crankshaft is rotating prior to fuel injection.
 - b) Fuel is injected when the engine is stationary, it combusts, and the engine crankshaft begins to rotate.
 - c) All these options.

Chapter 9 - Engine Control

20) Control of a diesel engine is accomplished through several components. Together, these components ensure that the engine operates at the desired speed. These components are:

- a) Camshaft (for valve and fuel injection timing).
- b) Fuel injector (for metering and injecting the fuel).
- c) Governor (for varying the amount of fuel sent to the injectors).
- d) All these options.