

Diesel Engine Fundamentals Quiz



SAVRREE
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Diesel Engine Fundamentals Quiz

CHAPTER 3 – INTRODUCTION

QUESTION 1

Which engine is heavier due to the higher combustion pressures at which it operates?

- a) Diesel engine.
- b) Gasoline engine.

QUESTION 2

Which engine operates at higher compression ratios?

- a) Gasoline engine.
- b) Diesel engine.
- c) Both engines have compression ratios of *less* than 10:1.
- d) Both engines have compression ratios of *more* than 10:1.

QUESTION 3

In terms of speed control, diesel engines are:

- a) Self-limiting.
- b) Not self-limiting.

CHAPTER 4 – ENGINE COMPONENTS

QUESTION 4

What material are cylinder blocks usually manufactured from?

- a) Copper.
- b) Cast-iron.
- c) Aluminium.
- d) Stainless steel.

QUESTION 5

With reference to the crankcase, select all true statements:

- a) The crankcase is usually located on the bottom of the cylinder block.
- b) The crankcase is usually located on top of the cylinder block and encloses the valves.
- c) The crankcase encloses the crankshaft and crank webs.

QUESTION 6

Concerning the oil pan, which of the following statements are true? There may be more than one correct answer.

- a) The oil pan collects and stores the engine's supply of lubrication oil.
- b) The oil pan is located at the top of the crankcase.
- c) The oil pan is installed on the side of the engine.
- d) The oil pan may be divided into several parts to reduce the free surface effect.

QUESTION 7

What are the reasons for choosing a dry sump? There may be more than one correct answer.

- a) To keep the engine clean by reducing the likelihood of oil spillages and leaks.
- b) To reduce wear on the crankshaft.
- c) To obtain a lower centre of gravity.
- d) To avoid storing a large volume of oil directly beneath the engine.

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QUESTION 8

The space enclosed by the sleeve or bore is called the combustion chamber. The combustion chamber is where fuel is burnt.

- a) True.
- b) False.

QUESTION 9

Which engine sleeve design comes into direct contact with the engine's cooling water system?

- a) Dry sleeve.
- b) Wet sleeve.

QUESTION 10

Identify the engine design shown in the image.

- a) In-line.
- b) V.



QUESTION 11

With reference to pistons, which of the given statements is NOT true?

- a) Pistons convert energy from the expanding gases into mechanical energy.
- b) Pistons move linearly within the cylinder liner.
- c) Pistons are commonly made of aluminium or cast-iron alloy.
- d) To prevent combustion gases bypassing the piston, each piston has several rubber O-rings wrapped around it.

QUESTION 12

What is the function of the top piston ring?

- a) It acts primarily as a pressure seal.
- b) It acts as a wiper ring to regulate the oil film on the cylinder walls.
- c) It ensures that a supply of lubrication oil is evenly spread on the cylinder walls.

QUESTION 13

What is the function of the bottom piston ring(s)?

- a) To act primarily as a pressure seal(s).
- b) To regulate the cooling water in the cylinder.
- c) To ensure that a supply of lubrication oil is evenly spread on the cylinder walls.

QUESTION 14

Pistons convert the energy of the expanding gases into mechanical energy.

- a) True.
- b) False.

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QUESTION 15

In V-type engines, connecting rods of two opposing cylinders share the same main journal bearing on the crankshaft.

- a) True.
- b) False.

QUESTION 16

Concerning connecting rods, which of the following statements is NOT true?

- a) The connecting rod connects the piston to the crankshaft.
- b) Conrods are made from drop-forged, heat-treated steel, to provide the required strength they need to operate.
- c) The smaller diameter top bore of the conrod connects to the piston pin.
- d) The smaller diameter top bore of the conrod connects to the crankshaft.

QUESTION 17

What is the purpose of the piston pin?

- a) The piston pin connects the piston to the connecting rod.
- b) The piston pin connects the piston skirt to the piston crown.
- c) Both these options.

QUESTION 18

Which engine component transforms the linear motion of the piston(s) into rotational motion?

- a) Connecting rod.
- b) Crankshaft.
- c) Flywheel.
- d) Camshaft.

QUESTION 19

What material are crankshafts usually made from?

- a) Aluminium or cast-iron alloys.
- b) Forged steel.
- c) Drop-forged, heat-treated steel.
- d) Drop-forged bronze.

QUESTION 20

Most diesel engine pistons have only one piston ring.

- a) True.
- b) False.

QUESTION 21

What is the purpose of the crankshaft? There may be more than one correct answer.

- a) The crankshaft transforms the linear motion of the piston(s) into rotational motion.
- b) The crankshaft's unique shape helps balance the forces generated during engine operation.
- c) The crankshaft opens the intake and exhaust valves by means of push rods.
- d) The crankshaft is responsible for engine timing (valve opening times, fuel injection, etc.).

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QUESTION 22

What does the crankshaft of a four-stroke engine rotate upon?

- a) Cast iron supports.
- b) Steel supports.
- c) Ball bearings (oil lubricated).
- d) Plain bearings (oil lubricated).

QUESTION 23

What helps ensure an even balance of forces during engine operation?

- a) Counterweights (crank webs).
- b) Babbitt bearings.
- c) Plain bearings.
- d) Crankshaft deflections.

QUESTION 24

Why do crankshaft's have drilled oil passages?

- a) To allow cooling of the crankshaft's internal surfaces.
- b) To allow oil flow to journal bearings and con rod bearings.
- c) To allow for lubrication of the crankshaft's internal surfaces.
- d) To prevent galling between two similar metals.

QUESTION 25

Which engine component helps reduce vibration and smooth the motion of the crankshaft as it rotates?

- a) Push rod.
- b) Connecting rod.
- c) Camshaft.
- d) Flywheel.

QUESTION 26

Why do flywheels have gear teeth around their outer periphery?

- a) To allow for the connecting of external loads.
- b) To allow the gear teeth to be used as part of a gearing assembly.
- c) To allow a starter motor to engage and start the engine.

QUESTION 27

A flywheel's diameter is usually large, this allows it to rotate further from the crankshaft's centre axis of rotation.

- a) True.
- b) False.

QUESTION 28

What are the functions of the cylinder head? There may be more than one correct answer.

- a) The cylinder head provides the top sealing area for the cylinder bore or sleeve.
- b) The cylinder head houses the rocker arms.
- c) The cylinder head provides the structure for holding the exhaust gas valves, intake valves (if fitted) and fuel injectors.
- d) The cylinder head seals the combustion space on two sides.

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QUESTION 29

What methods may be used for admitting and exhausting gases from the cylinder? Select all possible options.

- a) Ports.
- b) Valves.
- c) Hatches.
- d) Combination of ports and valves.

QUESTION 30

The area a valve presses against when closed, is known as:

- a) Valve mushroom.
- b) Valve poppet.
- c) Valve lid.
- d) Valve seat.

QUESTION 31

Regarding inlet and exhaust valves, which of the given statements is correct? There may be more than one correct answer.

- a) They are usually mechanically actuated.
- b) They are located at the bottom of the engine, near the crankcase.
- c) The point at which the valve seals against the cylinder head, is called the valve seat.
- d) They are usually of the butterfly valve design.

QUESTION 32

Which engine component is responsible for engine timing i.e. when valves open/close, when fuel is injected, etc.?

- a) Rocker arm.
- b) Crankshaft.
- c) Camshaft.
- d) Cylinder head.

QUESTION 33

The pushrods and rocker arms transfer the reciprocating motion of the camshaft lobes to the valves and injectors, opening and closing them as needed.

- a) True.
- b) False.

QUESTION 34

What is the name of the gear that drives the camshaft?

- a) Planetary gear.
- b) Parasitic gear.
- c) Unemployed gear.
- d) Timing gear.

QUESTION 35

Gears or a chain (very large engines) connect the crankshaft to the camshaft and ensure that the rotation of one is proportional to the rotation of the other.

- a) True.
- b) False.

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QUESTION 36

What are common means of fuel injection control?

- a) Fuel injection can be controlled mechanically from the camshaft, by means of cam lobes and push rods.
- b) Fuel injection can be controlled electronically, by means of solenoid valves; this setup is referred to as 'common rail'.
- c) Both answers are correct.

QUESTION 37

What does the term 'valve lash' refer to?

- a) The clearance in the valve train before the valve actually begins to open.
- b) Also known as backlash clearance, measured at the camshaft.
- c) When a valve has seized in the open position due to lack of lubrication.
- d) When a valve has seized in the closed position due to lack of lubrication.

QUESTION 38

What is the function of a diesel engine's blower?

- a) To provide the structure for holding the exhaust gas valves, intake valves (if fitted) and fuel injectors.
- b) To compress air prior to it entering the combustion chamber.
- c) To compress air prior to it being discharged to the exhaust port.
- d) All these answers are correct.

QUESTION 39

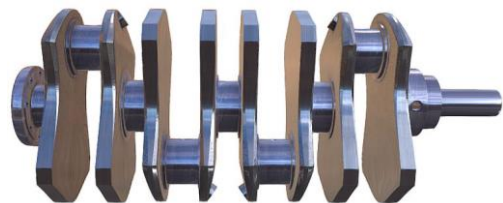
An engine's exhaust gas colour is an indicator of its operating condition. Which of the following statements is correct? There may be more than one correct answer.

- a) White exhaust gas indicates too much fuel and too little air is being burnt.
- b) Black exhaust gas indicates lubrication oil is being burnt.
- c) Black exhaust gas indicates too much fuel and too little air is being burnt.
- d) White exhaust gas indicates too much air and too little fuel is being burnt.
- e) Blue exhaust gas indicates water is being burnt.
- f) Blue exhaust gas indicates lubrication oil is being burnt.

QUESTION 40

Identify the component shown in the image:

- a) Hamshaft.
- b) Camshaft.
- c) Crankshaft.
- d) Rotary Shaft.



QUESTION 41

Identify the component shown in the image:

- a) Camshaft.
- b) Crankshaft.
- c) Hamshaft.
- d) Rampshaft.



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QUESTION 42

Identify the component shown in the image:

- a) Connector.
- b) Rocker arm.
- c) Valve.
- d) Injector.



QUESTION 43

Starter motors engage with the flywheel when the engine starts, and stay engaged with the flywheel whilst the engine is in operation.

- a) True.
- b) False.

QUESTION 44

Identify the component shown in the image:

- a) Plain Bearing.
- b) Anti-Friction Bearing.
- c) Ball bearing.
- d) Cone bearing.



QUESTION 45

The engine design shown in the image, is a...:

- a) Straight 6.
- b) Straight 4.
- c) V6.
- d) V4.



QUESTION 46

The engine design shown in the image, is a...:

- a) Straight 6.
- b) Straight 4.
- c) V6.
- d) V4.



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QUESTION 47

Identify the component shown in the image:

- a) Cam.
- b) Piston.
- c) Valve (poppet valve).
- d) Engine Cylinder.



QUESTION 48

Identify the component shown in the image:

- a) Rocker arm.
- b) Valve.
- c) Piston.
- d) Cam.



QUESTION 49

Identify the component shown in the image:

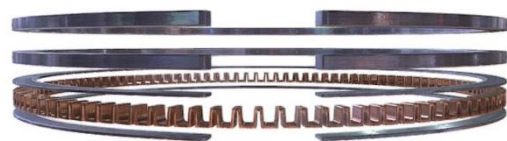
- a) Bugwheel.
- b) Flywheel.
- c) Insectwheel.
- d) Wheel.



QUESTION 50

Identify the component shown in the image:

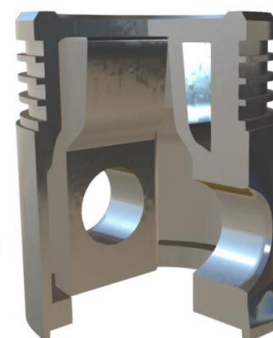
- a) Piston rings.
- b) Piston things.
- c) Camshaft rings.
- d) Crankshaft rings.



QUESTION 51

Identify the component shown in the image:

- a) Injector.
- b) Piston tail.
- c) Piston head.
- d) Crankshaft head.



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QUESTION 52

Identify the component shown in the image:

- a) Piston crown.
- b) Piston tail.
- c) Piston assembly.
- d) Piston shaft.



QUESTION 53

Identify the component shown in the image:

- a) Spark rod.
- b) Spark hub.
- c) Spark hug.
- d) Spark plug.



QUESTION 54

What component does the starter motor engage with when starting the engine?

- a) Flywheel.
- b) Crankshaft.
- c) Camshaft.
- d) Fuel Injector.

QUESTION 55

Select ALL terms that share a common meaning.

- a) Oil pan.
- b) Oil area.
- c) Oil reservoir.
- d) Oil sump.
- e) Oil pancake.
- f) Oil jump.

QUESTION 56

For engine designs of equal horsepower, diesel engines weigh less than petrol engines.

- a) True.
- b) False.

QUESTION 57

Four-stroke engines have more parts than two-stroke engines.

- a) True.
- b) False.

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QUESTION 58

Two-stroke engines have a higher power to weight ratio than four-stroke engines.

- a) True.
- b) False.

QUESTION 59

Two-stroke engines are more efficient than four-stroke engines.

- a) True.
- b) False.

CHAPTER 5 – DIESEL ENGINE SYSTEMS

QUESTION 60

Select ONE answer. A turbocharger must be connected to which two systems in order to operate.

- a) Fuel and lubrication oil.
- b) Air and exhaust.
- c) Electrical and lubrication oil.
- d) Air and fuel.

QUESTION 61

Which of the shown systems is NOT associated with any internal combustion engine design?

- a) Cooling water system.
- b) Electrical system.
- c) Fuel system.
- d) Lubrication oil system.
- e) Hydrogen system.
- f) Air system.
- g) Exhaust system.

QUESTION 62

Identify the systems shown in the image.

- a) Air and cooling water.
- b) Fuel and electrical.
- c) Air and exhaust.
- d) Cooling water and lubrication oil.



QUESTION 63

Which of the given options is NOT a component of a cooling water system?

- a) Water pump.
- b) Radiator.
- c) Thermostat.
- d) Injector.

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QUESTION 64

A 'cooling water system' is also known as a...

- a) Jumper water system.
- b) T-shirt water system.
- c) Jacket water system.
- d) Trouser water system.

QUESTION 65

Why does the oil in a lubrication oil filter not drain when the engine is stopped?

- a) An anti-drain valve prevents oil flowing out of the filter.
- b) A pipe u-bend prevents oil draining out of the filter.
- c) A water column prevents oil draining out of the oil filter.

QUESTION 66

What is the purpose of a lubrication oil system?

- a) To reduce friction between engine components.
- b) To cool engine components.
- c) To remove foreign particles and impurities from the engine (by means of a filter).
- d) All these options.

QUESTION 67

Once lubrication oil has passed through an engine, it flows back to an oil pan due to gravity.

- a) True.
- b) False.

QUESTION 68

Why does more diesel flow through an engine's fuel system than is required for combustion?

- a) The additional fuel is used to cool the engine rocker arms.
- b) The additional fuel is used to cool the engine injectors.
- c) The additional fuel is used to cool the camshaft.
- d) The additional fuel is used to cool the water pump.

QUESTION 69

Select the true statement.

- a) A turbocharger has a turbine driven by the engine's exhaust gases. A supercharger is driven via gears from the crankshaft.
- b) A supercharger has a turbine driven by the engine's exhaust gases. A turbocharger is driven via gears from the crankshaft.

QUESTION 70

The process of admitting air into the combustion space is known as...:

- a) Scavenging.
- b) Pressing.
- c) Charging.
- d) Cooling.

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QUESTION 71

What does the term 'scavenging' mean?

- a) To admit air into the combustion space and expel exhaust gas.
- b) To allow exhaust gas to bypass the turbocharger.
- c) To direct incoming air to multiple cylinders.
- d) To gather unburnt fuel from the combustion space and recycle it into the fuel system.

QUESTION 72

Concerning charge air, which statement is true?

- a) The temperature of charge air is irrelevant.
- b) Charge air should not be cooled below its dew point.
- c) Charge air should always be cooled below its dew point.

QUESTION 73

What is the reason for compressing air prior to it entering the combustion space?

- a) Compressed air contains more oxygen, which means more fuel can be burnt efficiently per stroke; this yields a correspondingly higher engine power output.
- b) Compressed air yields a higher charge air pressure, which increases the efficiency of the scavenging process.
- c) Both these options.

CHAPTER 6 – ENGINE TERMINOLOGY

QUESTION 74

Which of the given statements best describes the term 'bore'?

- a) The internal diameter of an engine's cylinder.
- b) The length of an engine's cylinder.
- c) The distance between TDC and BDC.

QUESTION 75

Which of the given statements best describes the term 'stroke'?

- a) The internal diameter of an engine's cylinder.
- b) The length of an engine's cylinder.
- c) The distance between TDC and BDC.

QUESTION 76

A crankshaft must rotate 360 degrees to move the piston from TDC and BDC.

- a) True.
- b) False.

QUESTION 77

What is meant by the term 'engine displacement'?

- a) The combined cross-sectional area of all cylinders.
- b) The cross-sectional area of a single cylinder.
- c) The combined volume of all engine cylinders.
- d) The volume of one engine cylinder.

Diesel Engine Fundamentals Quiz

QUESTION 78

The combustion cycle for each engine cylinder occurs in a specific order, what is the term used to describe this order?

- a) Firing order.
- b) Stroke order.
- c) Working order.
- d) Sparking order.

QUESTION 79

Which of the shown equations can be used to calculate an engine's compression ratio?

- a) $\text{Compression Ratio} = (\text{Displacement Volume} - \text{Clearance Volume}) \times \text{Clearance Volume}.$
- b) $\text{Compression Ratio} = (\text{Displacement Volume} + \text{Clearance Volume}) / \text{Clearance Volume}.$
- c) $\text{Compression Ratio} = (\text{Displacement Volume} + \text{Clearance Volume}) / \text{Displacement Volume}.$

QUESTION 80

The mechanical efficiency of a four-stroke diesel engine is approximately:

- a) 90 to 100 percent.
- b) 65 to 80 percent.
- c) 80 to 90 percent.

QUESTION 81

Which of the given statements best describe the term 'brake horsepower'?

- a) The amount of usable power delivered to the crankshaft.
- b) The amount of power transferred to the pistons via the process of combustion.
- c) The amount of work done per unit time.
- d) The total power produced by the engine.

QUESTION 82

Engines are rated in horsepower only, never in units of torque or kW's.

- a) True.
- b) False.

CHAPTER 7 – INTERNAL COMBUSTION ENGINE

QUESTION 83

Concerning the two-stroke engine cycle, which of the given statements is correct?

- a) A two-stroke engine requires one full stroke to complete a full combustion cycle.
- b) A two-stroke engine crankshaft requires 180 degrees of rotation to complete one full combustion cycle.
- c) A two-stroke engine requires four strokes to complete a full combustion cycle.
- d) A two-stroke engine requires two-strokes to complete a full combustion cycle.

QUESTION 84

A diesel engine converts the chemical energy of the fuel into mechanical energy.

- a) True.
- b) False.

Diesel Engine Fundamentals Quiz

QUESTION 85

Diesel engines require spark plugs whilst petrol engines do not.

- a) True.
- b) False.

QUESTION 86

Which of the given statements are essential stages for all combustion cycles? Select all correct answers.

- a) Suction.
- b) Compression.
- c) Expulsion.
- d) Exhaust.
- e) Distillation.
- f) Ignition (Power).

Diesel Engine Fundamentals Quiz

ANSWERS

1. a
2. b
3. b
4. b
5. a/c
6. a/d
7. c/d
8. a
9. b
10. b
11. d
12. a
13. c
14. a
15. a
16. d
17. a
18. b
19. b
20. b
21. a/b
22. d
23. a
24. b
25. d
26. c
27. a
28. a/c
29. a/b/d
30. d
31. a/c
32. c
33. a
34. d
35. a
36. c
37. a
38. b
39. c/d/f
40. c
41. a
42. d
43. b
44. a
45. c
46. b
47. c
48. a
49. b
50. a
51. c
52. c
53. d
54. a
55. a/c/d
56. b
57. a
58. a
59. b
60. b
61. e
62. c
63. d
64. c
65. a
66. d
67. a
68. b
69. a
70. c
71. a
72. b
73. c
74. a
75. c
76. b
77. c
78. a
79. b
80. c
81. a
82. b
83. d
84. a
85. b
86. a/b/d