



BREVET DE TECHNICIEN SUPÉRIEUR / SESSION 2017 (BTS BLANC)

FILIERE : Moteur et Mécanique Automobile

ÉPREUVE : Anglais Technique

Durée de l'épreuve : 2 Heures

Coefficient de l'épreuve : 2

HOW CAR ENGINES WORK

We all get into our car, turn the key in the ignition, step on the gas and off we go. But have you ever wondered how a car engine works? The principle behind how the engine works is that if you put a little bit of high-energy fuel, such as gasoline, into a small, enclosed space and add a spark, a huge amount of energy will be released in the form of expanding gas. When a cycle of hundreds of these reactions happens every minute, this energy can be used to run a car. Currently, most cars on the market use the four-stroke combustion cycle (invented by Nikolaus Otto in 1867, so sometimes it's referred to as the Otto cycle)

A four-stroke engine (also known as four cycle) is an internal combustion (IC) engine in which the **piston** completes four separate strokes while turning a **crankshaft**. A stroke refers to the full travel of the piston along the cylinder, in either direction. The four separate strokes are termed:

Intake: also known as induction or suction: This stroke of the piston begins at top dead center (T.D.C.) and ends at bottom dead center (B.D.C.). In this stroke the intake valve must be in the open position while the piston pulls an air-fuel mixture into the cylinder by producing vacuum pressure into the cylinder through its downward motion.

Compression: This stroke begins at B.D.C, or just at the end of the suction stroke, and ends at T.D.C. In this stroke the piston compresses the air-fuel mixture in preparation for ignition during the power stroke (below). Both the intake and exhaust valves are closed during this stage.

Combustion: also known as power or ignition This is the start of the second revolution of the four stroke cycle. At this point the crankshaft has completed a full 360 degree revolution. While the piston is at T.D.C. (the end of the compression stroke) the compressed air-fuel mixture is ignited by a spark plug (in a gasoline engine) or by heat generated by high compression (diesel engines), forcefully returning the piston to B.D.C. This stroke produces mechanical work from the engine to turn the crankshaft.

Exhaust: also known as outlet. During the exhaust stroke, the piston once again returns from B.D.C. to T.D.C. while the exhaust valve is open. This action expels the spent air-fuel mixture through the exhaust valve.

Adapted from internet

I- Comprehension check: read the text and provide accurate answers to the following question (5 points)

- 1- What are the two main elements needed in the car running cycle?
- 2- What is a stroke?
- 3- Explain top dead center (T.D.C.) and bottom dead center (B.D.C.)
- 4- How is the vacuum pressure produced in the intake stroke
- 5- Locate the piston of the piston at the beginning of each stroke

II- Translation (6 points)

- 1- Translate the following passage from the text in French

From “Intake: also knowndown to cylinder through its downward motion.”

- 2- Translate the following passage into English

Le moteur à 4T présente de nombreux inconvénients par rapport au 2T : il est plus cher, assez complexe, lourd et beaucoup moins puissant. Le cycle met en mouvement le piston, le vilebrequin, la bielle etc. et finit toujours par un échappement de gaz

III- Writing (5 points)

As an automotive expert, give simple short and understandable explanation about four stroke combustion engine (introduction development and conclusion- 12 lines max)

IV- label the picture with the following names (4 points)

Combustion chamber, connecting rod, Intake valve open, spark plug, air fuel-mixture, piston, crankshaft,

