

## Unit Standard **30477**

### **Explain the operation of two and four stroke petrol and diesel engines**

Level 3 Credit 4 v1

**Student Name:**

**School:**

**Date:**

**Marked By:** \_\_\_\_\_ **Mark** \_\_\_\_\_ **%**

**Feedback:**      **Excellent work**

**Good work**

**Please attempt all questions**

**Please resubmit**

## **USEFUL WEBLINKS**

### **Engine Animation**

<http://youtu.be/OXd1PIGur8M?list=PLA6F3352F532A3386>

### **Four Stroke Cycle**

<http://youtu.be/OGj8OneMjek>

### **Diesel Engines**

<http://youtu.be/fTAUq6G9apg>

### **Two and Four Stroke Compared**

<http://youtu.be/hV3LImCslpo>

<http://youtu.be/GwFB3RcVcHI>

### **Compression Ratio**

<http://youtu.be/nveqCMNTth0>

<http://youtu.be/uPYINR16q3k>

### **Engine Capacity**

<http://youtu.be/3-ilzxawUAs>

### **Engine components/Strokes**

[http://youtu.be/zA\\_19bHxEYg](http://youtu.be/zA_19bHxEYg)

<http://youtu.be/uB2cmkWbCMI>

### **Rotary Engines**

<http://youtu.be/ccwTRgXfBig>

### **Turbocharger**

<http://youtu.be/DqWKNuTppmU>

### **Common Rail**

<http://youtu.be/ip-grErbnls>

### **Direct and Indirect Injection**

<http://youtu.be/NSvfdP4urak>

## REVIEW QUESTIONS ONE

Q1 Briefly, explain how a petrol engine turns its fuel into power.

Q2 Identify two stroke engine components A-J .

A

B

C

D

E

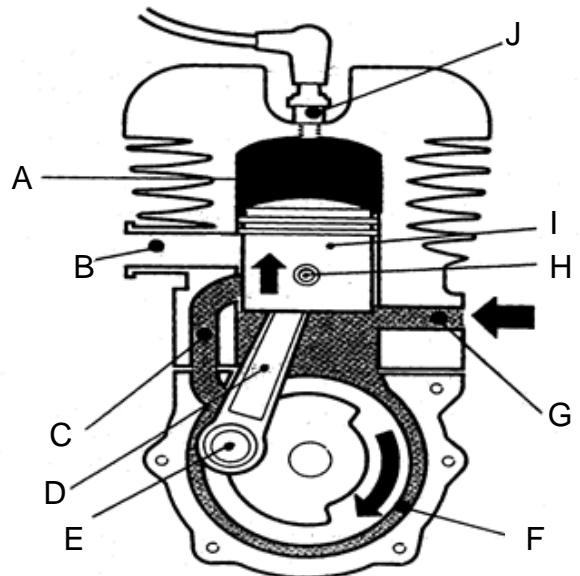
F

G

H

I

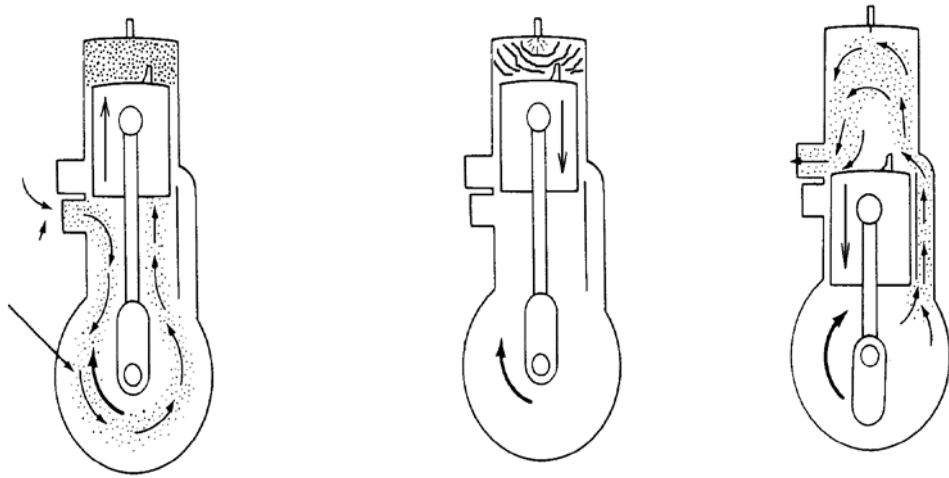
J



Q3 Why must a two-stroke engine have an air tight crankcase?

Q4 Describe how a reed valve improves a two stroke engine's efficiency.

Q5 Describe each cycle for the two stroke cycle engine illustrated.



Intake

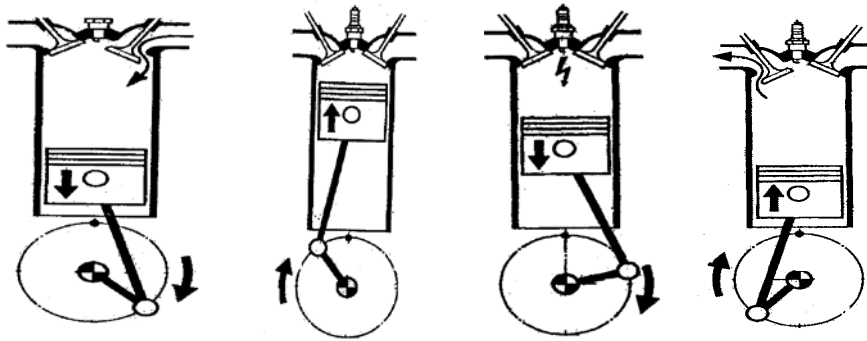
Compression

Power

Exhaust

## REVIEW QUESTIONS TWO

- Q6 For each cycle of a four stroke engine below describe the action taking place in each of the strokes.



Intake

Compression

Power

Exhaust

- Q7 Complete the following sentence:

Camshafts rotate at \_\_\_\_\_ engine speed, therefore an engine with a

crankshaft driving gear with 21 teeth will have a camshaft gear with \_\_\_\_\_ teeth.

Valves are opened by the \_\_\_\_\_ and closed by the \_\_\_\_\_.

Q8 Name the three methods by which a camshaft can be driven?

Q9 What is scavenging?

Q10 What do the terms TDC and BDC mean?

Q11 Why are valve clearances important?

### REVIEW QUESTIONS THREE

Q12 Complete the following sentence:

The engine block contains the cylinder \_\_\_\_\_, the oil ways, and the \_\_\_\_\_ system. The \_\_\_\_\_ is positioned on the top of the block. The engine crankshaft rotates in its own \_\_\_\_\_ and its mean diameter is equal to the piston \_\_\_\_\_.

Q13 The three main functions of a piston are:

Q14 What is the purpose of the flywheel?

Q15 Complete the following sentence:

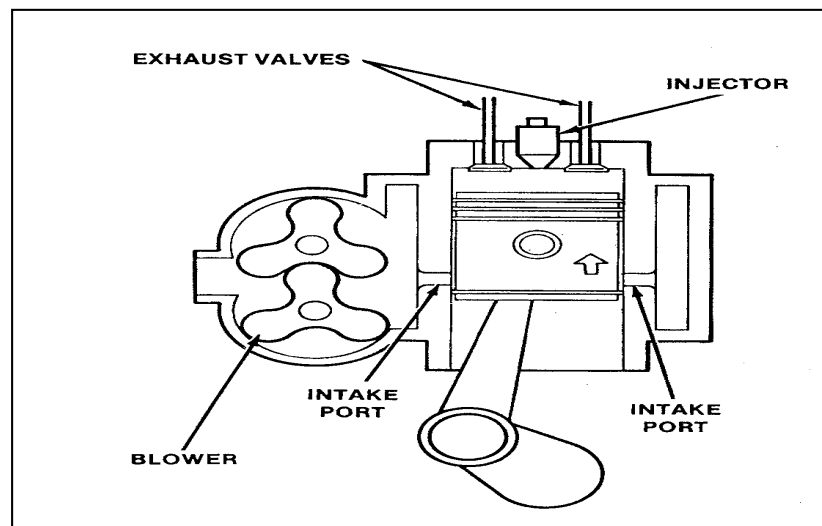
The function of the engine valves is to control the \_\_\_\_\_ of \_\_\_\_\_ in \_\_\_\_\_ or out of the \_\_\_\_\_. The valves are opened by the \_\_\_\_\_ and closed by the \_\_\_\_\_. The fuel system supplies a mixture of \_\_\_\_\_ and \_\_\_\_\_ to the cylinders in a proportion called \_\_\_\_\_.

## REVIEW QUESTIONS FOUR

Q 16 Complete the following sentences:

A diesel engine is a \_\_\_\_\_ ignition engine. The \_\_\_\_\_ inside the cylinder is \_\_\_\_\_ until it reaches a very high \_\_\_\_\_ and then a \_\_\_\_\_ of diesel fuel is injected into it. Compression ratios in a diesel engine range from \_\_\_\_\_ to \_\_\_\_\_ up to \_\_\_\_\_ to \_\_\_\_\_.

Q17 Describe the action of the two-stroke C.I. engine illustrated.





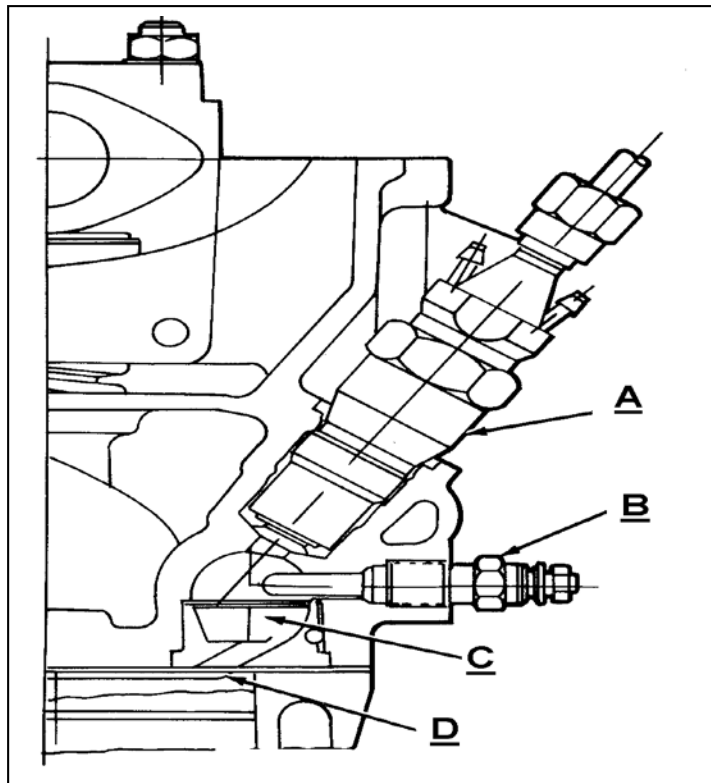
## REVIEW QUESTIONS FIVE

Q18 Complete the following sentence:

Diesel engines can be either \_\_\_\_\_ or \_\_\_\_\_ injection types.

A \_\_\_\_\_ is an exhaust driven air pump, whereas a \_\_\_\_\_ is a mechanically driven air pump.

Q19 Name the components A to D in the diagram.



A

B

C

D

Q20 Explain how the unit B identified in the previous diagram assists cold starting?

Q21 Provide three advantages that common rail fuel systems have over mechanical fuel systems?

Q22 How can a rotary pump be identified?

Q23 Explain the differences between a turbocharger and a supercharger?

Q24 Typically what range of pressures can be found in a common rail diesel fuel system?

## REVIEW QUESTIONS SIX

Q25 A 4 cylinder engine has a bore of 101.6mm and a stroke of 88.9mm. Calculate its capacity.

Q26 An engine has a bore of 8.9cm, a stroke of 7.6cm and a clearance. Volume of 47.2 cc. Calculate the compression ratio?

Q27 Define the following terms:

Torque

Force

Power

Q28 What term is used to indicate the measurement of each of the following?

Torque

Force

Power