



Province of the  
EASTERN CAPE  
EDUCATION

**DIRECTORATE SENIOR CURRICULUM MANAGEMENT (SEN-FET)**

**HOME SCHOOLING SELF-STUDY WORKSHEET ANSWER SHEET**

|                |                           |                            |     |                           |                |
|----------------|---------------------------|----------------------------|-----|---------------------------|----------------|
| <b>SUBJECT</b> | <b>AUTOMOTIVE</b>         | <b>GRADE</b>               | 11  | <b>DATE</b>               | AUGUST<br>2020 |
| <b>TOPIC</b>   | <b>ENGINES (SPECIFIC)</b> | <b>TERM 1<br/>REVISION</b> | (√) | <b>TERM 2<br/>CONTENT</b> | ()             |

Question 1

1.1 Function of a glow plug

Heat up the cylinder in order to vaporize and ignite the injected fuel in cold start (when the engine is cold)



## 2.4 Valve overlap.

$$16 + 12 = 28^\circ$$

## QUESTION 3

### 3.1 Valve Lead.

A valve lead is when the valve opens before the piston reaches the TDC or BDC.

### 3.2 Valve Lag.

A valve lag is when the valve closes after the piston has reached the TDC or BDC.

### 3.3 Disadvantageous effect of excessive valve clearance.

Noisy engine operation

Excessive wear in the valve mechanism components.

Loss of power. (Any 1)

## QUESTION 4

**Valve-timing diagram for a four-stroke engine using the following:**

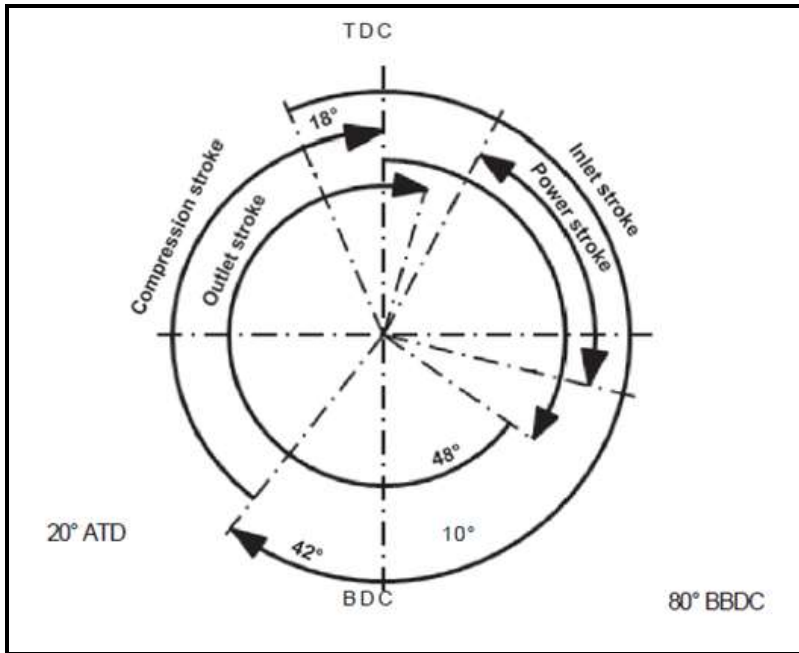
Inlet valve opens:  $18^\circ$  BTDC

Inlet valve closes:  $42^\circ$  ABDC

Exhaust valve opens:  $48^\circ$  BBDC

Exhaust valve closes:  $10^\circ$  ATDC

Injection:  $20^\circ$  ATDC



4.2.1 Inlet-valve period:

$$= 18^\circ + 180^\circ + 42^\circ$$

$$= 240^\circ$$

4.2.2 Exhaust-valve period:

$$= 180^\circ + 48^\circ + 10^\circ$$

$$= 238^\circ$$

4.2.3 Power period:

$$= 180^\circ - 48^\circ$$

$$= 132^\circ$$

4.2.4 Valve overlap:

$$= 18^\circ + 12^\circ$$

$$= 30^\circ$$

4.3 Valve timing of the valves is in relation to the position of the crankshaft, camshaft rotate at half the speed of the crankshaft.

4.4 Tensioners are always fitted to the slack side of the belt or chain in order to take up the slack in the belt or chain due to stretching or wear to prevent the belt or chain from jumping a tooth or two which could lead to bent valves.

4.5 Reliable

Cost effective

Physically smaller

QUESTION 5

5.1 An indirect combustion chamber.

5.2 Fuel efficiency and Increased power output.