higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

DIESE TRADE THEORY N3

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This marking guideline consists of 5 pages.

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SECTION A

QUESTION 1

1.1 B
1.2 A
1.3 B
1.4 B
1.5 A
1.6 A
1.7 B
1.8 C
1.9 C
1.10 B

(10 × 1) **[10]**

QUESTION 2

2.1 False
2.2 False
2.3 True
2.4 True
2.5 True

(5 × 1) **[5]**

QUESTION 3

3.1 L
3.2 E
3.3 H
3.4 F
3.5 K
3.6 G
3.7 B
3.8 D
3.9 J
3.10 A

(10 × 1) **[10]**

QUESTION 4

4.1 Check valve
4.2 Clearance
4.3 Rotates
4.4 Leakage
4.5 Expands

(5 × 1) **[5]**

TOTAL SECTION A: 30

SECTION B

QUESTION 5

5.1 5.1.1
- Reduces the possibility of carbon being trap between the valve seat and face
- Valve tends to dish slightly when hot and forms a tight seal
- Provides proper face to seat contact
- Equalises the running temperature between face and seat (4)

5.1.2
- Keeps the valve seat and stem from carbon build-up
- Maintains even valve temperature
- Extends the life of the valve face and seat
- Reduces the tendency of the valve to burn (4)

5.2
- Valve will not close properly
- Loss of pressure in the cylinder
- Valves will burn away as a result of high temperature
- Engine will overheat
- High fuel consumption
- Low thermal efficiency (Any 4 × 1) (4)

5.3
- Noisy engine
- Excessive wear
- Inadequate valve opening
- Valve timing will be affected (Any 3 × 1) (3)

[15]

QUESTION 6

6.1
- Allows for the maximum delivery of fuel for cold start
- Controls the engine maximum speed to prevent engine over revving
- Allows engine to idle smoothly
- Controls the delivery of fuel according to engine load and speed (4)

6.2
- Reduces driver fatigue
- Uses a torque convertor to reduce tyre wear
- Provides great reduction of wheel spin under bad conditions
- Supplies the exact amount of torque required by the road wheels
- Prevents the engine from over revving (5)

6.3
- Delivery pressure
- Transfer pressure
- Metering pressure
- Injection pressure
- Unloading pressure (5)

6.4
- Valve response is quicker
- Higher engine speeds are possible
- A hemispherical I- head can be used for a higher compression ratio
- Injector can be fit in the middle of the combustion chamber
- A high volumetric efficiency is obtained because four valves per cylinder can be used (5)

6.5
- Reduces driver fatigue
- Reduces the number of steering wheel turns
- Lessens the kick-back at the steering wheel
- Provide safety during sudden swerving
- Allows for heavy loads on steered wheels
- Impose safety by resisting any sudden swerving (6)

[25]

TOTAL SECTION A: 40

QUESTION 7

7.1
7.1.1 Move pinion gear towards the centre of crown wheel
7.1.2 Move pinion gear away from the centre of crown wheel
7.1.3 Move crown wheel away from the pinion gear
7.1.4 Move crown wheel towards the pinion gear

(3 × 4) (12)

7.2.1 **Advantages**
- Can be made slightly shorter
- Better cooling can be provided for exhaust valves
- Provides good volumetric efficiency

7.2.2 **Disadvantages**
- Tappet covers develop oil leaks
- Extra provision required for valve mechanism lubrication
- Injector can only be fitted on the side of the combustion chamber

(3 × 2) (6)

7.3
7.3.1 18,17 CR
7.3.2 7,99 CR
7.3.3 61,81%
7.3.4 65,30%
7.3.5 5,99 CR
7.3.6 71,24%

(6 × 1) (6)

7.4 Vs = Vc(CR-1)

Vs = 32,50(15,55-1)

Vs = 472,875 cm^3✓

Vc = $\left[\frac{472,875}{15,55-1}\right]$ = 32,50 cm^3✓

New h = $\left[\frac{32,50 \text{ x}4}{\pi(7,555)^2}\right]$

= 0,725 cm –0,055 = 0,67 cm✓

c = $\left[\frac{\pi(7,555)^2}{4}\right] \times 0,67$ ✓

= 30,035 cm^3✓

New CR = $\frac{472,875 + 30,035}{30,035}$

= 16,74:1✓ (6)

[30]

TOTAL SECTION C: 30
GRAND TOTAL: 100

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