GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

MOTOR MECHANICS SG

POSSIBLE ANSWERS / MOONTLIKE ANTWOORDE   SUPP 2007

Note: Any correct answer not mentioned in the memorandum may be accepted as correct.

QUESTION 1
MULTIPLE-CHOICE QUESTIONS

1.1	B	1.6	C	1.11	B
1.2	C	1.7	C	1.12	A
1.3	B	1.8	C	1.13	B
1.4	B	1.9	B	1.14	B
1.5	A	1.10	B	1.15	B

15x2=**[30]**

QUESTION 2
AUTOMATIC GEARBOX / DRIVES

2.1   Means that two rear axles are used to drive the vehicle. (2)

2.2   Larger profit loads transported, better traction is obtained. Used on earth moving vehicles and trucks. (2)

2.3   Double-reduction final drive. (2)

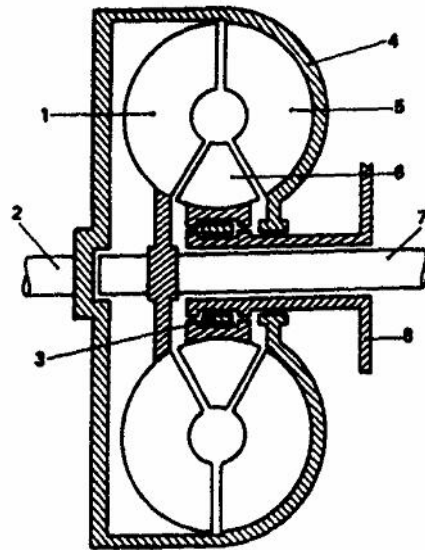2.4
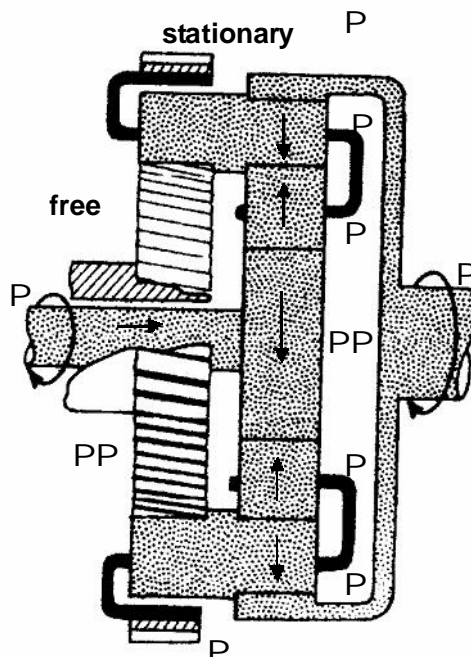
(12)

2.5   Secondary sun gear   (2)

2.6

(1) turbine
(2) crankshaft
(3) one-way clutch
(4) housing
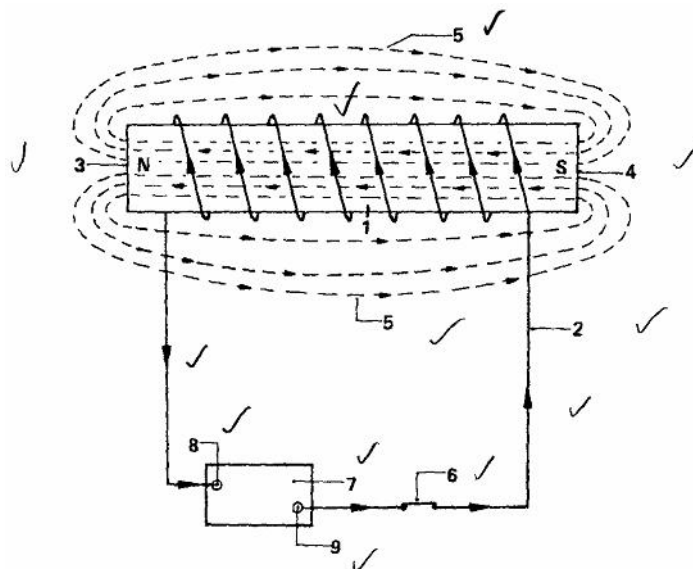(5) pump
(6) stator
(7) turbine shaft
(8) gearbox housing

Sketch = 12
Question = 2

One-way clutch No. 3 Responsible for stator to rotate in one direction only.PP   (14)

[34]

QUESTION 3
ELECTRICITY / INSTRUMENTS
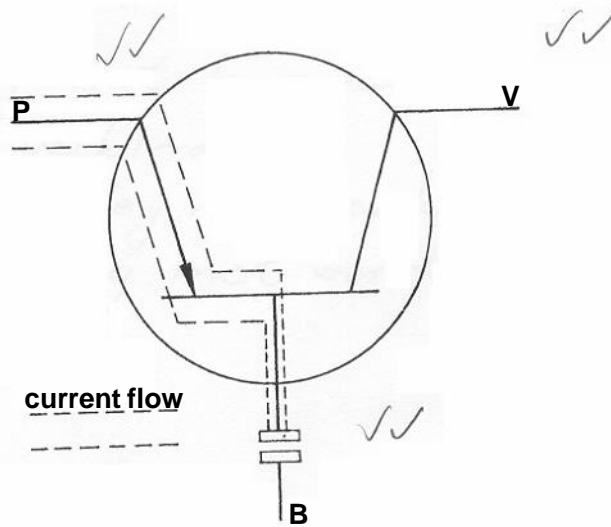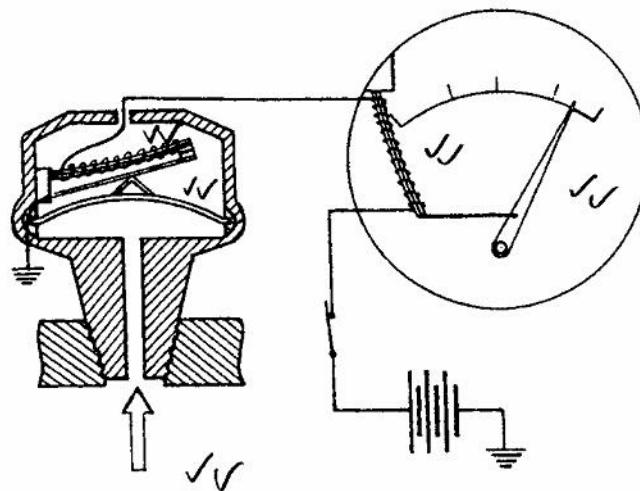
3.1

(12)

3.2   Strength of the magnetic field
Speed at which the magnetic field is intersected
Number of conductors cutting through the magnetic field   3x2=(6)

3.3

current flow

B

(6)

3.4

(10)
[34]

QUESTION 4
STEERING / WHEEL ALIGNMENT

4.1

4.1.1   Centrally controlled steering layout.   (2)

4.1.2   No. 6 steering arms   (2)

4.2   Steering layout with long and short tie rod direct connected.
Steering layout with long and short tie rod.
Steering layout with single tie rod.
Steering layout with relay rod   (Any 2)   2x2=(4)

4.3
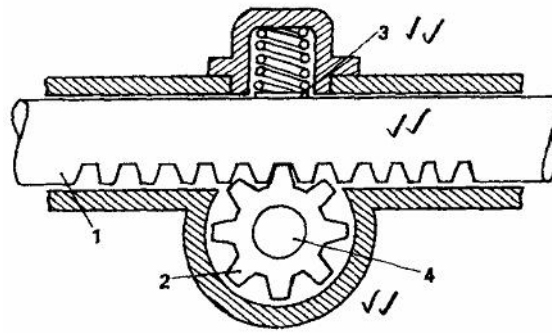
(6)

4.4   Absorbs road shocks
              Cranking of front wheels
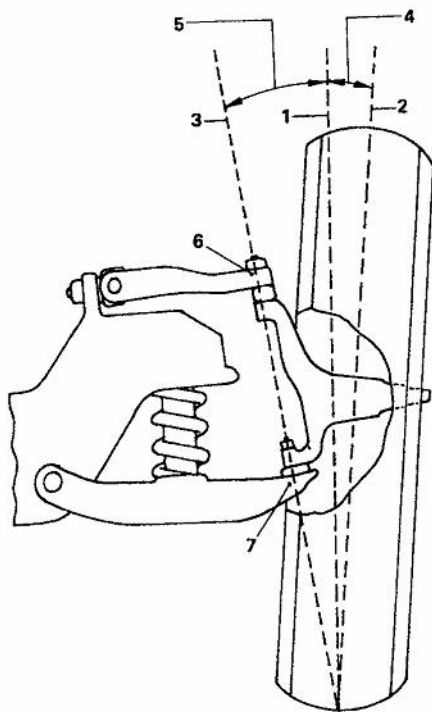   Increase leverage   (Any 2)   2x2=(4)

4.5   Wear on outer part of both front tyres' tread.   (2)

4.6
4.6.1   4.6.2

             (6)   (4)
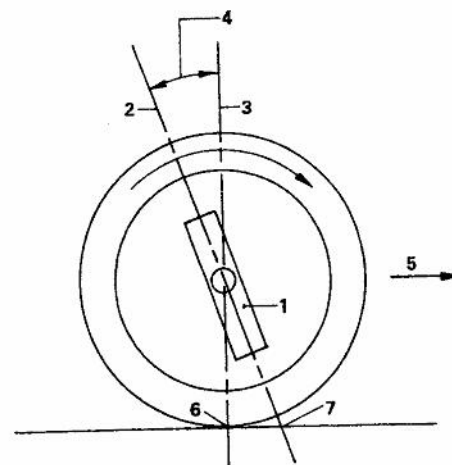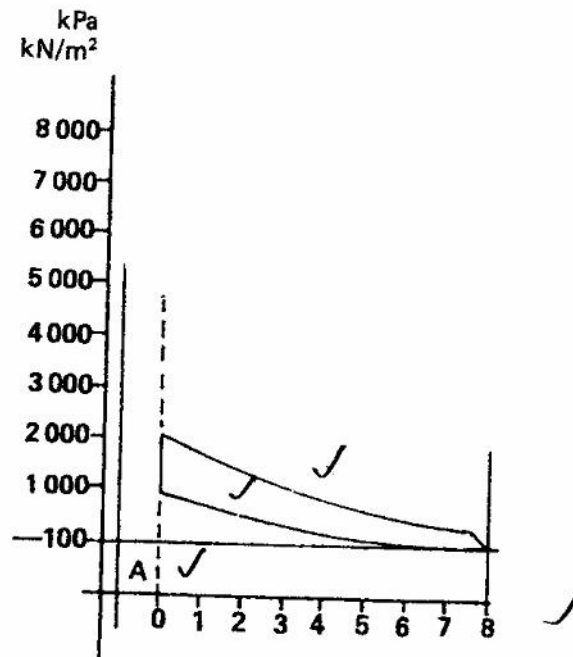
4.7   Equal distribution of all weight around the axis of rotation in all rotation planes.   (4)
                                                                                           [34]

QUESTION 5
CALCULATIONS

5.1

(6)

5.2   The rate at which work is done in seconds.   (3)

5.3   Data

M.E.P.   =   950 x 1 000 = 950 000 N/m^2

Stroke length   = $\dfrac{70}{1\,000}$ = 0,07 m

Boring diameter   = $\dfrac{85}{1\,000}$ = 0,085 m

R.P.M.   = $\dfrac{5\,400}{60}$ x $\dfrac{1}{2}$ = 45 r.s

Number of cylinders =   5   (12)

Area of piston crown = $\dfrac{?\,D^2}{4}$

A   = $\dfrac{3,142 \times (0,085)^2}{4}$

     =   0,00567 m^2

$$IP = PLAN_N$$

$$IP = 950\ 000 \times 0{,}07 \times 0{,}00567 \times 45 \times 5$$

$$= 84\ 837{,}3\ W$$

$$= 84{,}8\ kW$$

5.4   Data

$$D = 80 = \frac{80}{100} = 8$$

$$L = 90 = \frac{90}{100} = 9$$

$$CV = 40$$

$$CR = \frac{SV + CV}{CV} \qquad\qquad SV = \frac{?}{4}D^2 \times L$$

$$= \frac{452{,}4 + 40}{40} \qquad\qquad = \frac{?}{4}(8)^2 \times 9$$

$$= 12{,}3:1 \qquad\qquad\qquad = 452{,}4\ cm^3 \qquad\qquad (6)$$

5.5
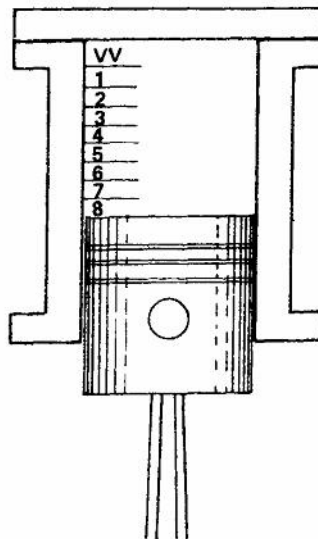
(7)
[34]

QUESTION 6
FUELS / CI ENGINES

6.1
6.1.1   Complete combustion   (2)

6.1.2   Combustion heat fuel mixture ahead of spark.
         Fuel in remote area heats up, pressure increases.
         Compressed gasses ignite.
         Impact of burning gasses causes a ping noise.   (4)

6.1.3   Overheating
Advanced ignition tuning
Lean fuel mixture overheats combustion chamber.   (4)

6.2   Engine cranking speed low.
Air flow through carburettor low.
Fuel does not vaporise readily in a cold engine.
More fuel delivered to air charge.
Light fractions that vaporise at lower temperature.
Additional heat required for rapid warm-up is supplied.   (6)

6.3   Chemically correct air / fuel mixture   (2)

6.4   Remove:
dust, water   (2 are used)   (4)

6.5   Mechanical engine-speed governor
Vacuum engine-speed governor.   2x1=(2)

6.6   Controls engine speed   (1)

6.7
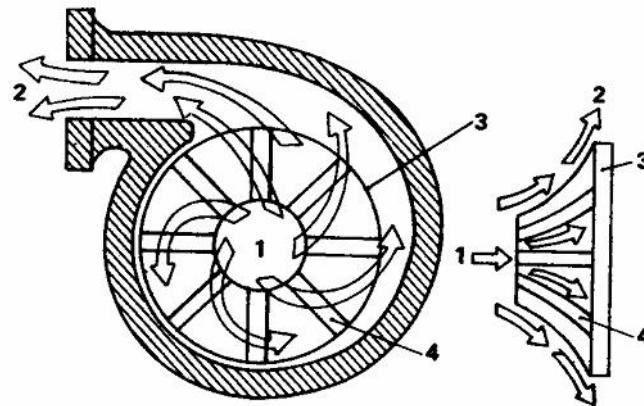
Centrifugal blower or supercharger
1. air inlet; 2. air outlet; 3. impeller; 4. fins or blades

(7)

6.8   More power is obtained.
More economical.
Less fuel is used.
Effect of height above sea level on engine power is eliminated.   (Any 2)   (2)

[34]

TOTAL: 200