

GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

MOTOR MECHANICS SG

NOTE: Any other correct answer not mentioned in this memorandum may be accepted as correct.

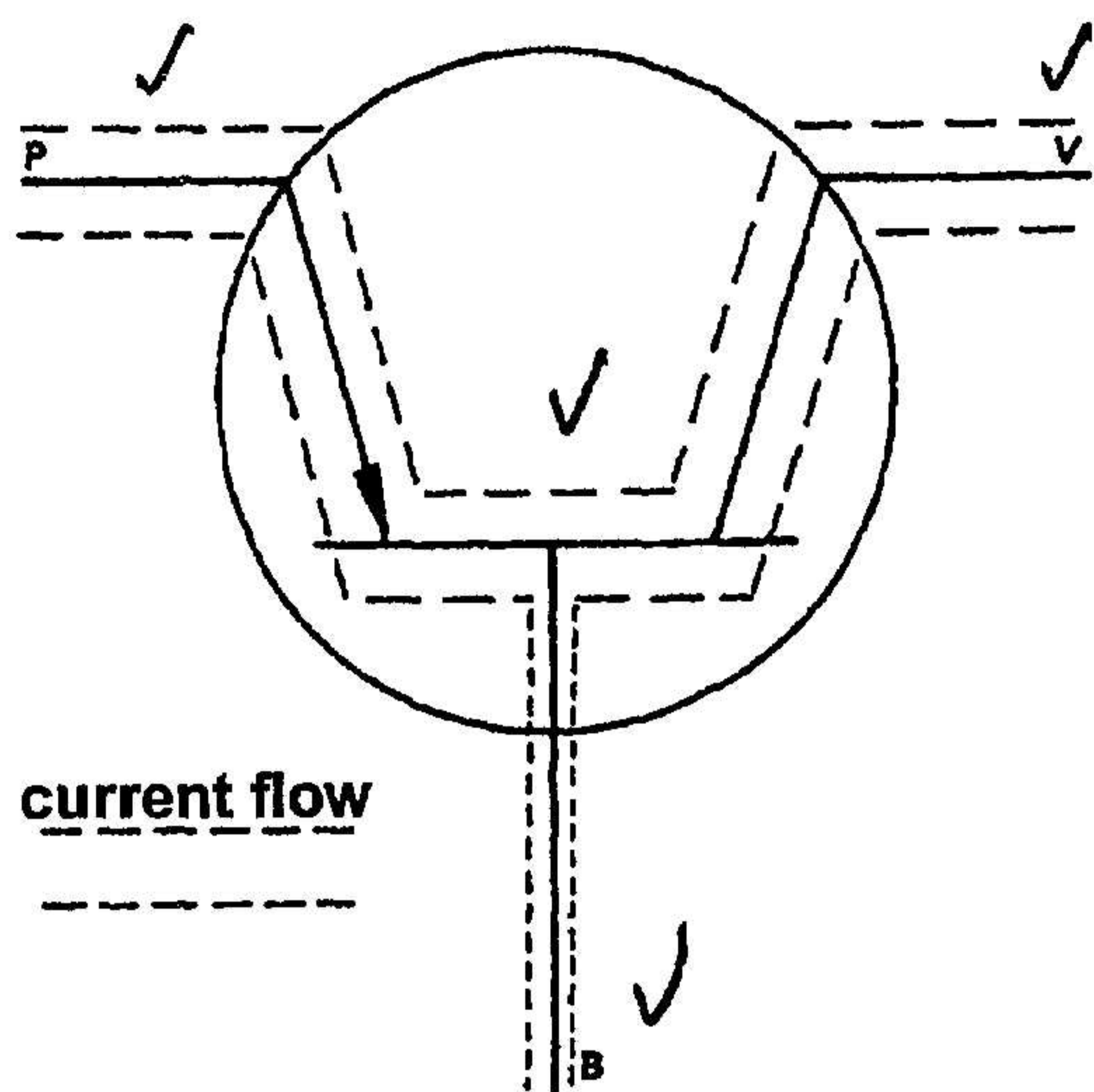
QUESTION 1

1.1	B	(2)
1.2	C	(2)
1.3	B	(2)
1.4	C	(2)
1.5	A	(2)
1.6	B	(2)
1.7	A	(2)
1.8	A	(2)
1.9	B	(2)
1.10	B	(2)
1.11	A	(2)
1.12	C	(2)
1.13	B	(2)
1.14	C	(2)
1.15	A	(2)
1.16	A	(2)
1.17	B	(2)
1.18	A	(2)
1.19	B	(2)
1.20	C	(2)
		[40]

QUESTION 2

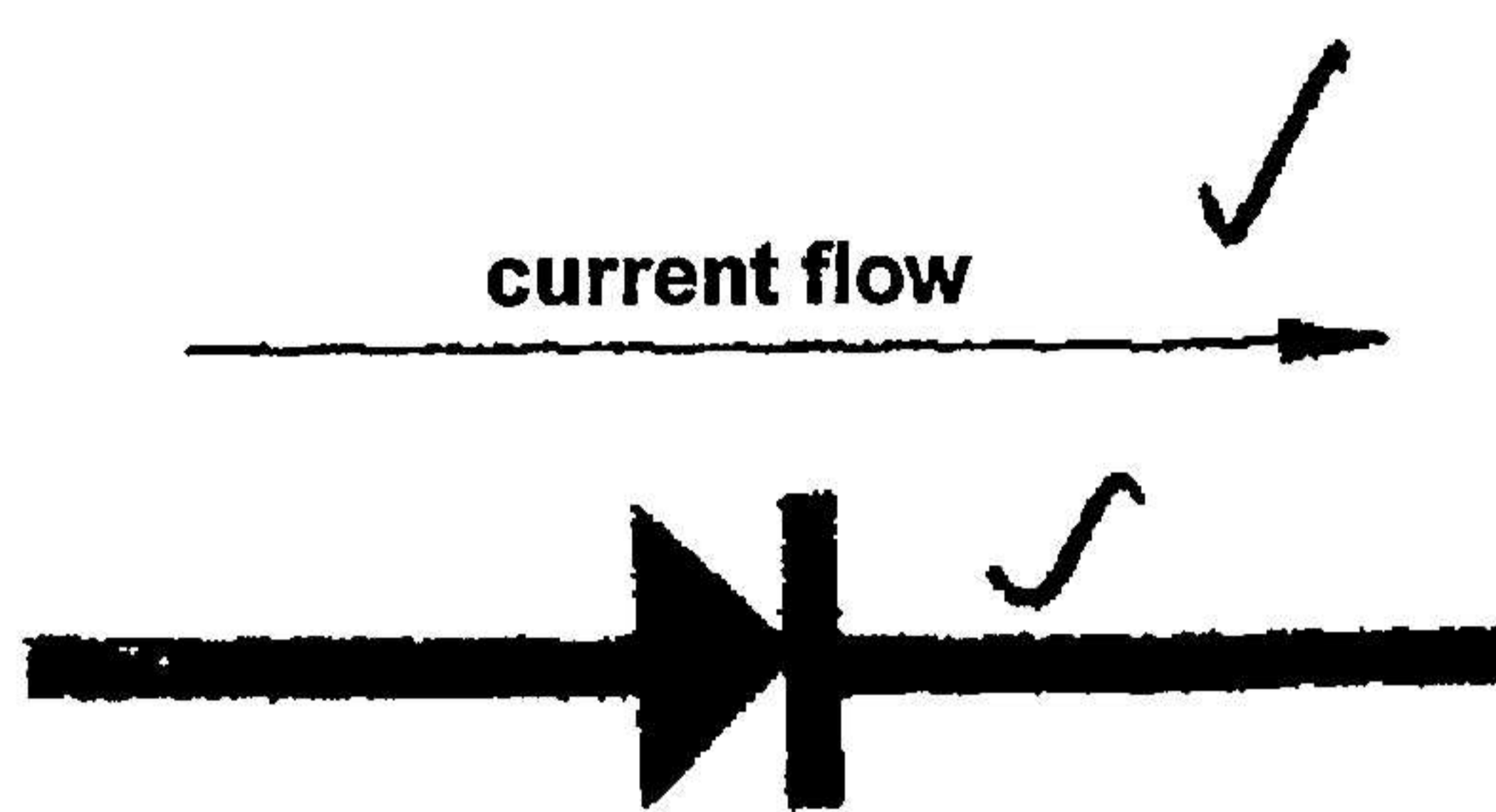
2.1

2.1.1



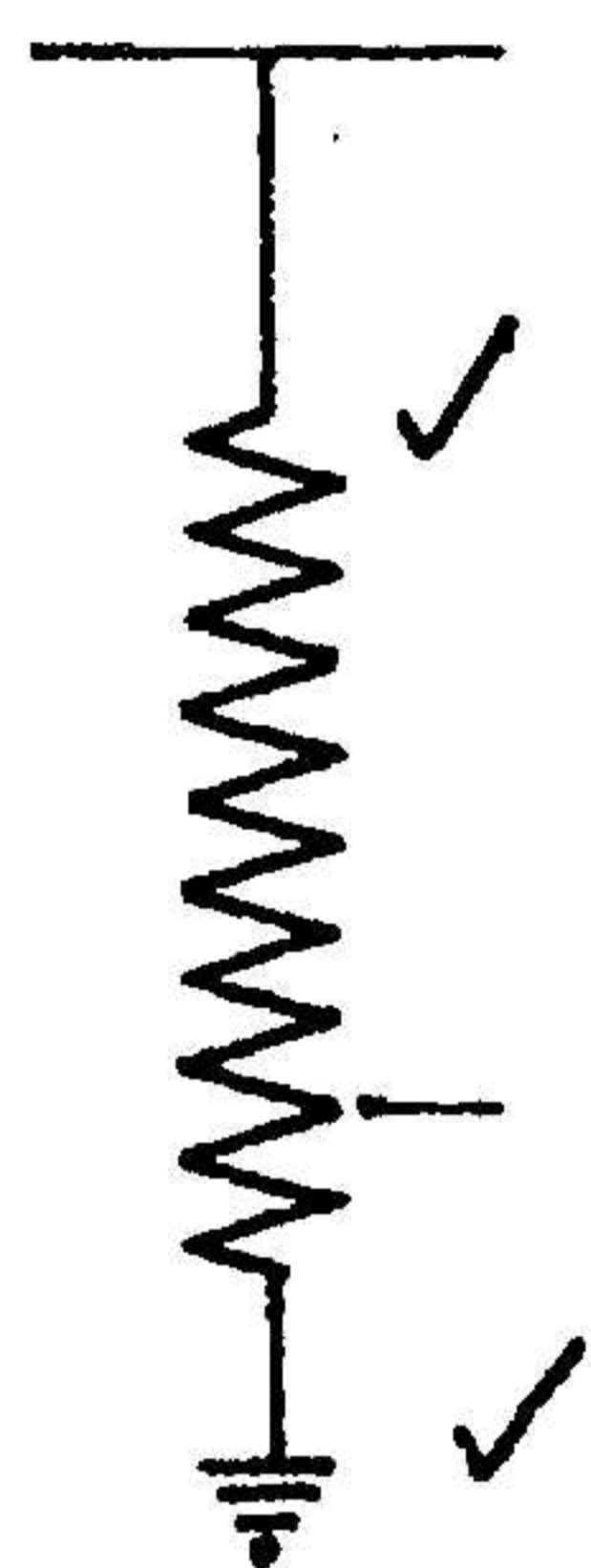
(4)

2.1.2



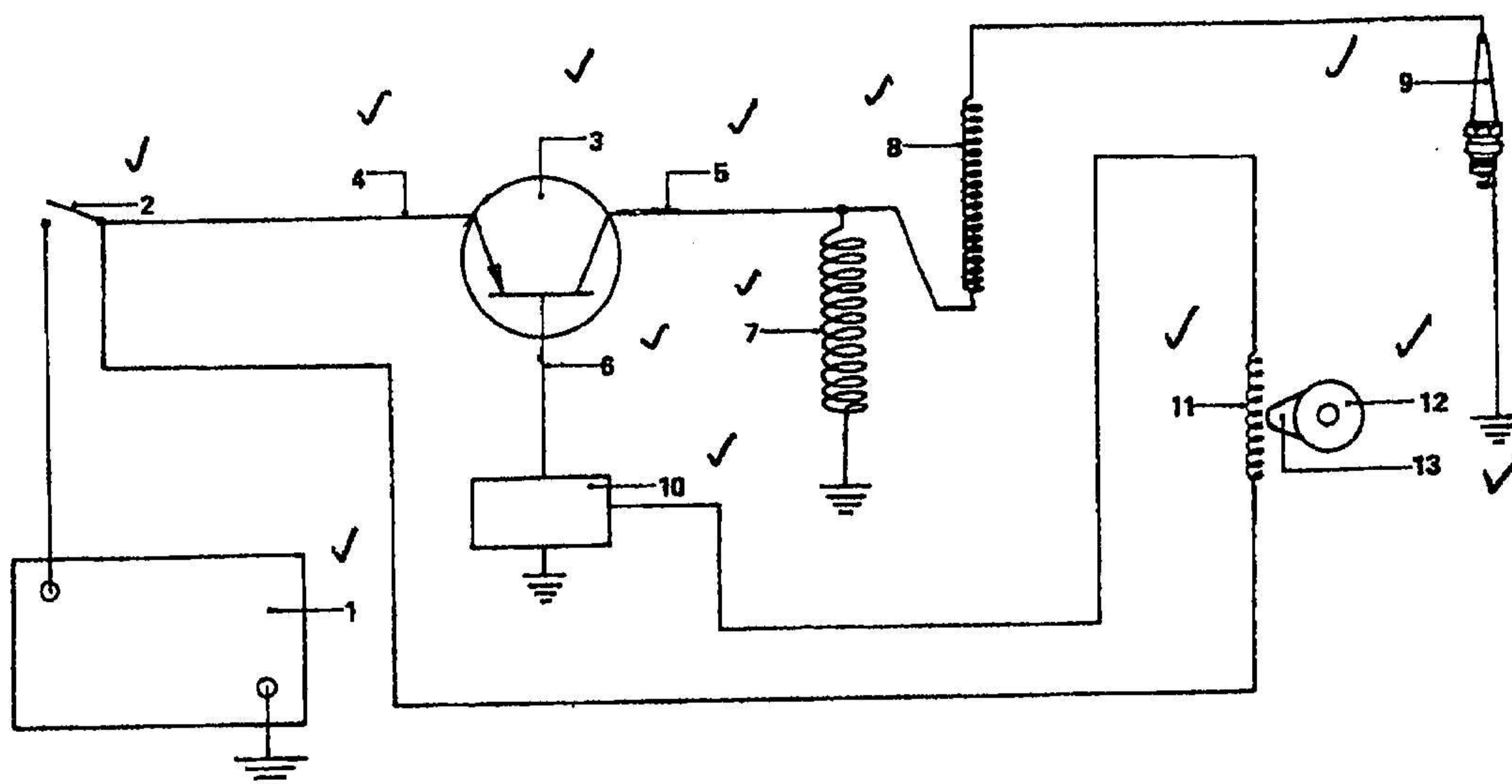
(2)

2.1.3



(2)

2.2



(13)

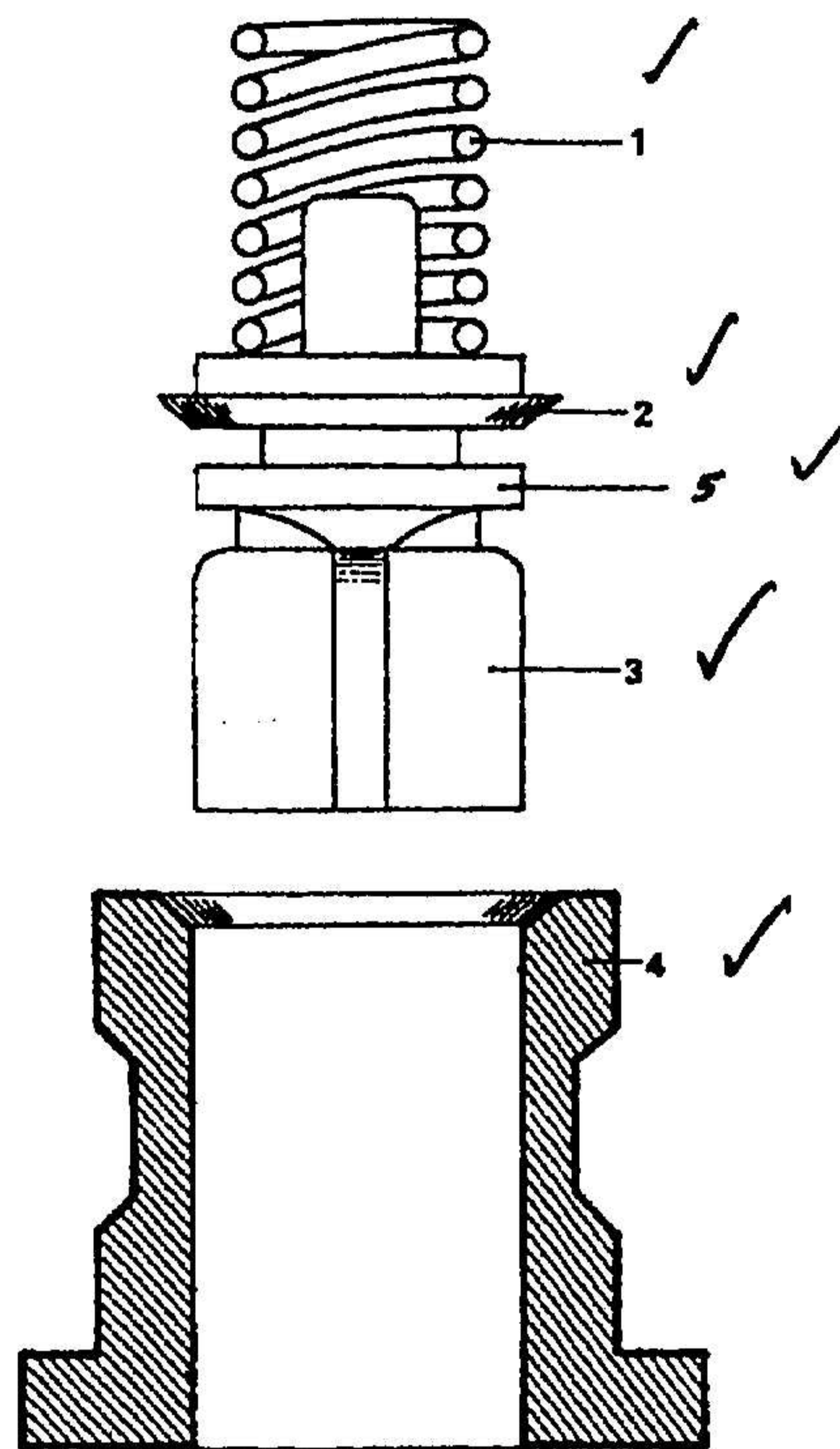
- 2.3 Electromagnetic induction takes place as a result of the cutting through of magnetic lines of force. 2x1=(2)
- 2.4 Emitter
Collector
Base 3x1=(3)
- 2.5 Y-connected
Delta connected 2x1=(2)
- 2.6 Diode (2)
- 2.7 Increase current
Speed of conductor cutting through the magnetic lines of force
Number of windings 2x1=(2)
- [32]**

QUESTION 3

- 3.1.1 Flash point: This is the temperature at which sufficient flammable vapour is given off to produce a momentary flash when an open flame is brought to the surface of the fuel. 4x1=(4)
- 3.1.2 Pre-ignition: It occurs when the air / fuel mixture is ignited by any means other than the spark from the spark plug. 2x1=(2)
- 3.1.3 Heat value: This is the amount of heat released during the total combustion of 1 kg of fuel in the presence of an adequate supply of oxygen. 4x1=(4)
- 3.1.4 Effective pumpstroke: The distance covered by the plunger from covering the inlet port to uncovering the spill port 4x1=(4)

- 3.2 Fractionating tower (1)
- 3.3 Lowers production costs
High-quality fuel is produced
Gum substances are minimised
Reduces sulphur content
Uniform octane value
Suitable for treatment with tetraethyl lead 4x1=(4)
- 3.4 Needle and seat
Float 2x1=(2)
- 3.5.1 Tapered needle (2)
- 3.5.2 Damper piston (2)
- 3.6 Remove dust particles
Remove water
Remove solid matter
Minimum resistance against fuel flow 2x1=(2)

3.7



(5)
[32]

QUESTION 4

4.1 Data

$P = 800 \text{ kPa}$

$D = 80 = \frac{80}{1000} = 0,08 \text{ m}$

$L = 70 = \frac{70}{1000} = 0,07 \text{ m}$

$N = 5\ 400 = \frac{5400}{60 \times 2} = 45 \text{ R.P.M.}$

$n = 4$

Calculate IP

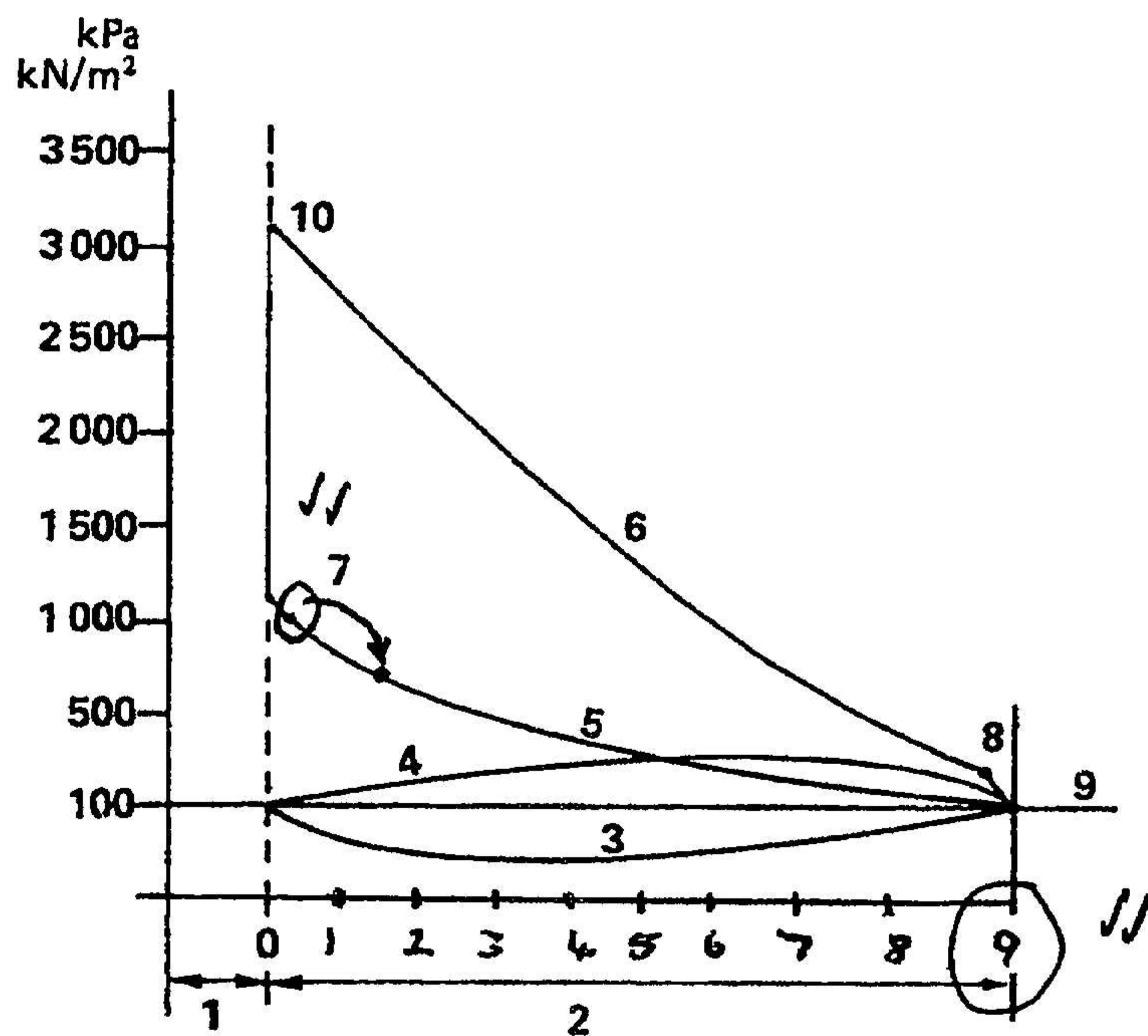
$IP = PLANn$
 $= 800 \times 0,07 \times 45 \times 4 \times 0,005$
 $= 50,4 \text{ kW}$

$A = \frac{\pi}{4} D^2$
 $= \frac{\pi}{4} \times (0,08) \times (0,08)$
 $= 0,005 \text{ m}^2 \quad (8)$

4.2 $CR = \frac{SV + CV}{CV}$
 $= \frac{308 + 30}{30}$
 $= 11:1$

$SV = \frac{\pi}{4} D^2 \times L$
 $= \frac{\pi}{4} \times 7 \times 7 \times 8$
 $= 308 \text{ cm}^3 \quad (6)$

4.3

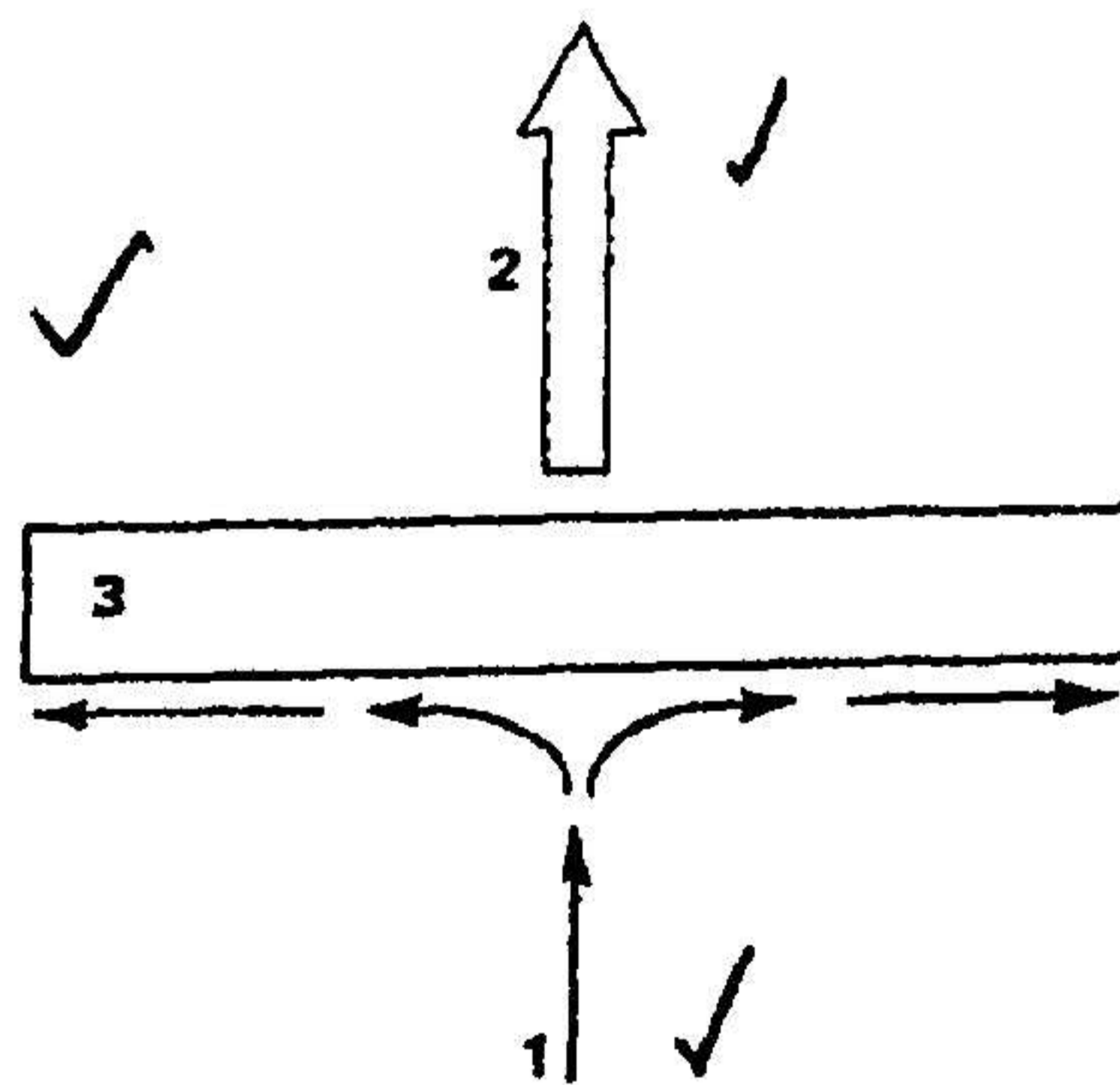


Redraw = (4)
 Changes = (4) (8)

- 4.4.1 Indicated Power:
Is the theoretical or calculated power that the engine should generate without considering any mechanical or other losses 3x1=(3)
- 4.4.2 Brake power:
Is the actual power generated by an engine and is measured at the flywheel 3x1=(3)
- 4.4.3 Mechanical efficiency:
Is the ratio of brake power to indicated power 2x1=(2)
- 4.5 Pröny brake (2)
[32]

QUESTION 5

- 5.1 Heavy vehicles (1)
Tractors (1)
- 5.2 planet-gear carrier (2)
- 5.2.1 planet-gear carrier (2)
- 5.2.2 planet-gear carrier (2)
- 5.2.3 None (2)
- 5.2.4 Secondary sun gear (2)
- 5.3

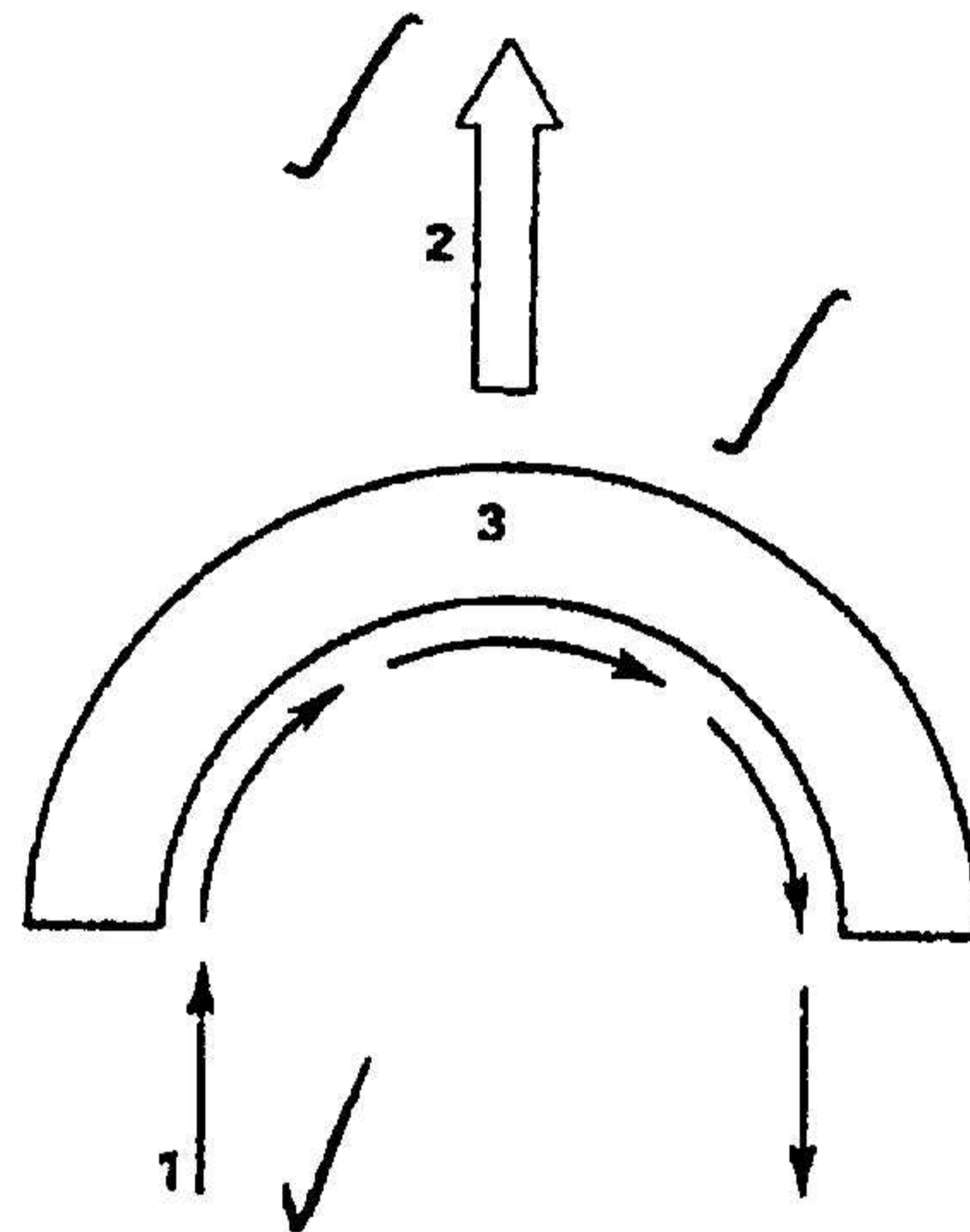


(3)

Fluid coupling

- Fluid hits flat vanes at high velocity.
- Vanes move forward.
- Energy of fluid is lost after the push action.
- Movement of vanes are equal to forward force only.

4x1=(4)



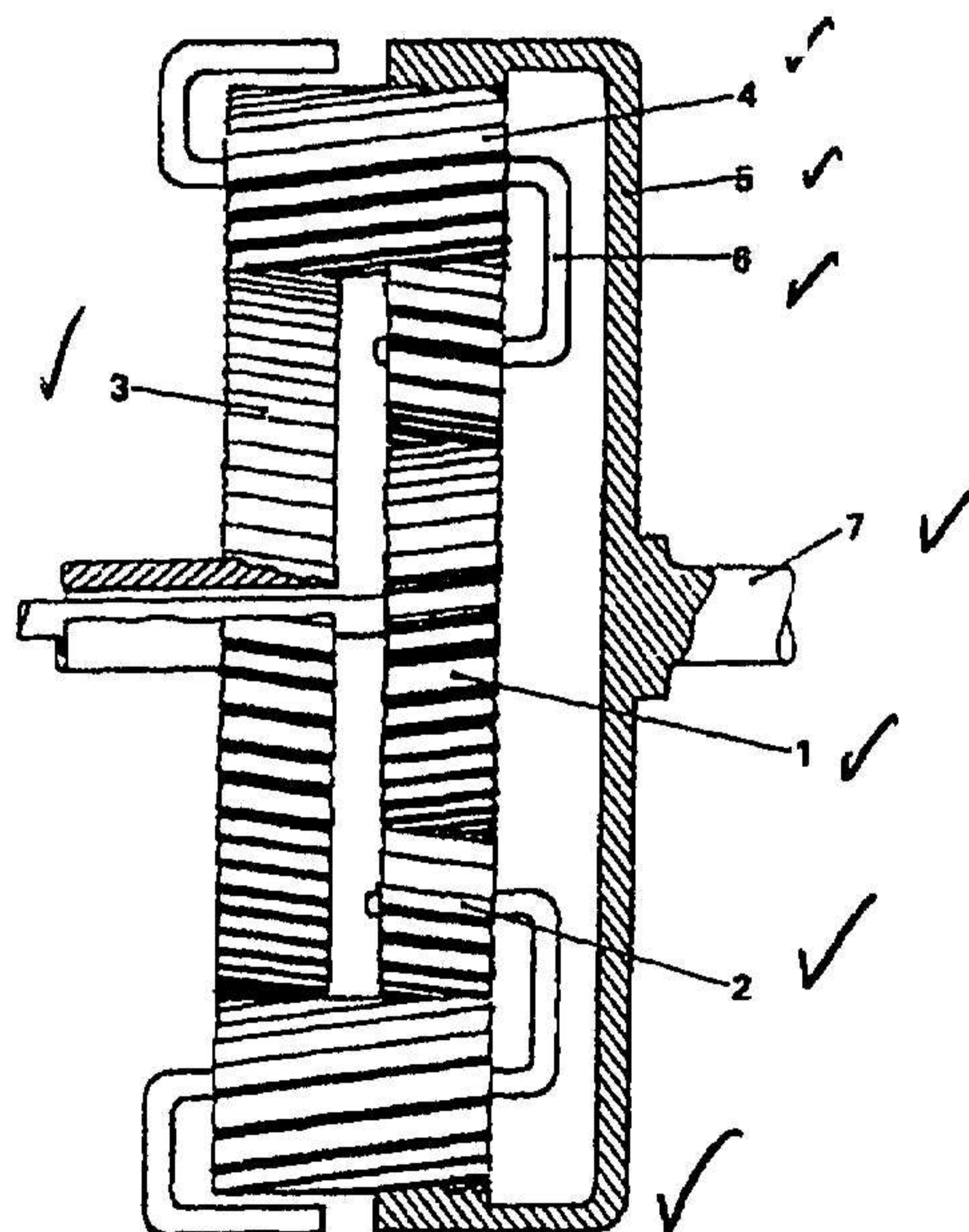
(3)

Torque convertor:

- Fluid hits curved vanes at high velocity.
- Force on vanes is doubled.
- All forward movement of fluid is stopped.
- Fluid is guided in one direction.
- Movement of vanes equals the force which changes the flow of fluid.

4x1=(4)

5.4

(8)
[32]

QUESTION 6

6.1

6.1.1 Rolling point

Is the theoretic point around which the mass of the vehicle will rotate.

2x1=(2)

6.1.2

Understeer

When the sliding angle of the front wheels is larger than the sliding angle of the rear wheels.

2x1=(2)

6.2

6.2.1 Steering layout with relay rod

(2)

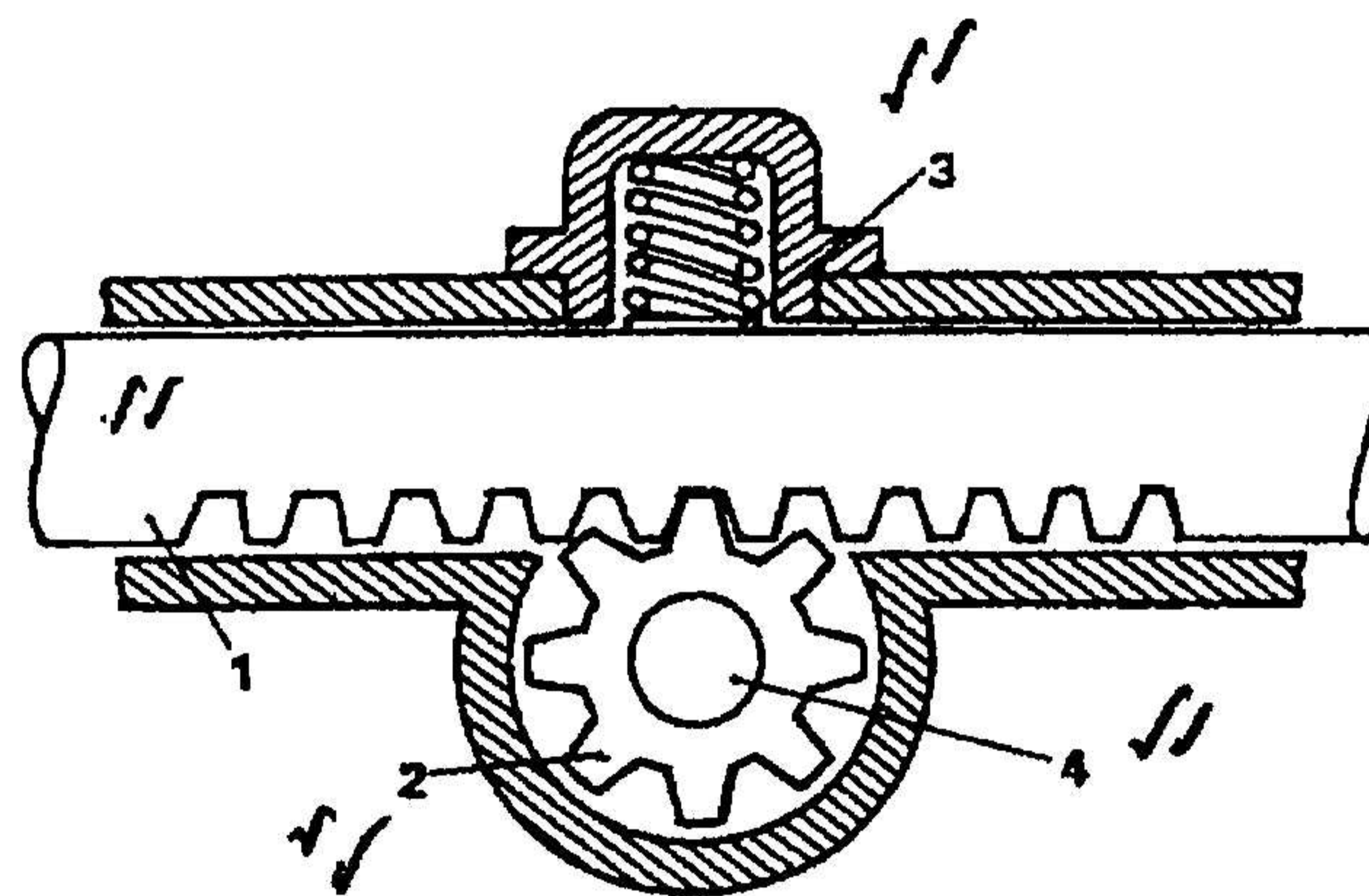
6.2.2 Adjustment for toe-in and toe-out

(2)

6.2.3 Ackerman principle

(2)

6.3



(8)

6.4

- Convert the rotary motion of the steering wheel into a reciprocating motion of the front wheels
- Provide the necessary leverage
- Absorb road shocks

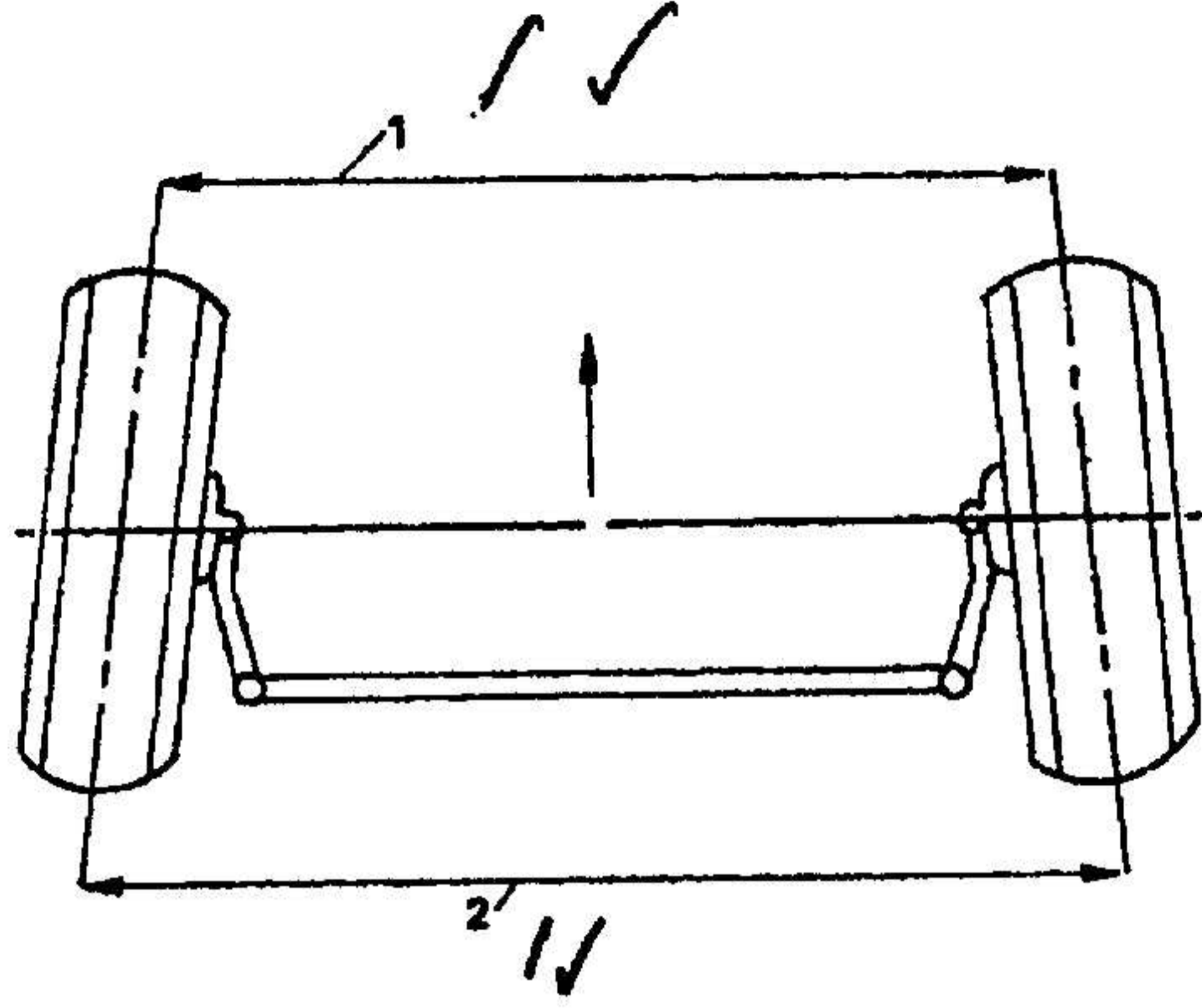
3x2=(6)

6.5

- Absorb engine power
- Road feeling is lost.
- More wear on moving parts
- Manufacturing costs are high.

2x1=(2)

6.6



(4)

6.7

- Condition of tyres
- Tyres should be same size.
- Cross-ply should not be used with radial-ply tyres.
- Tyre pressure should be the same.
- Tyres should be round.
- Check tyres for run-out.

2x1=(2)
[32]

TOTAL: 200

GAUTENGSE DEPARTEMENT VAN ONDERWYS

SENIORSERTIFIKAAT-EKSAMEN

MOTORWERKTUIGKUNDE SG

LET WEL: Enige korrekte antwoord wat nie in hierdie memorandum genoem word nie, kan as korrek aanvaar word.

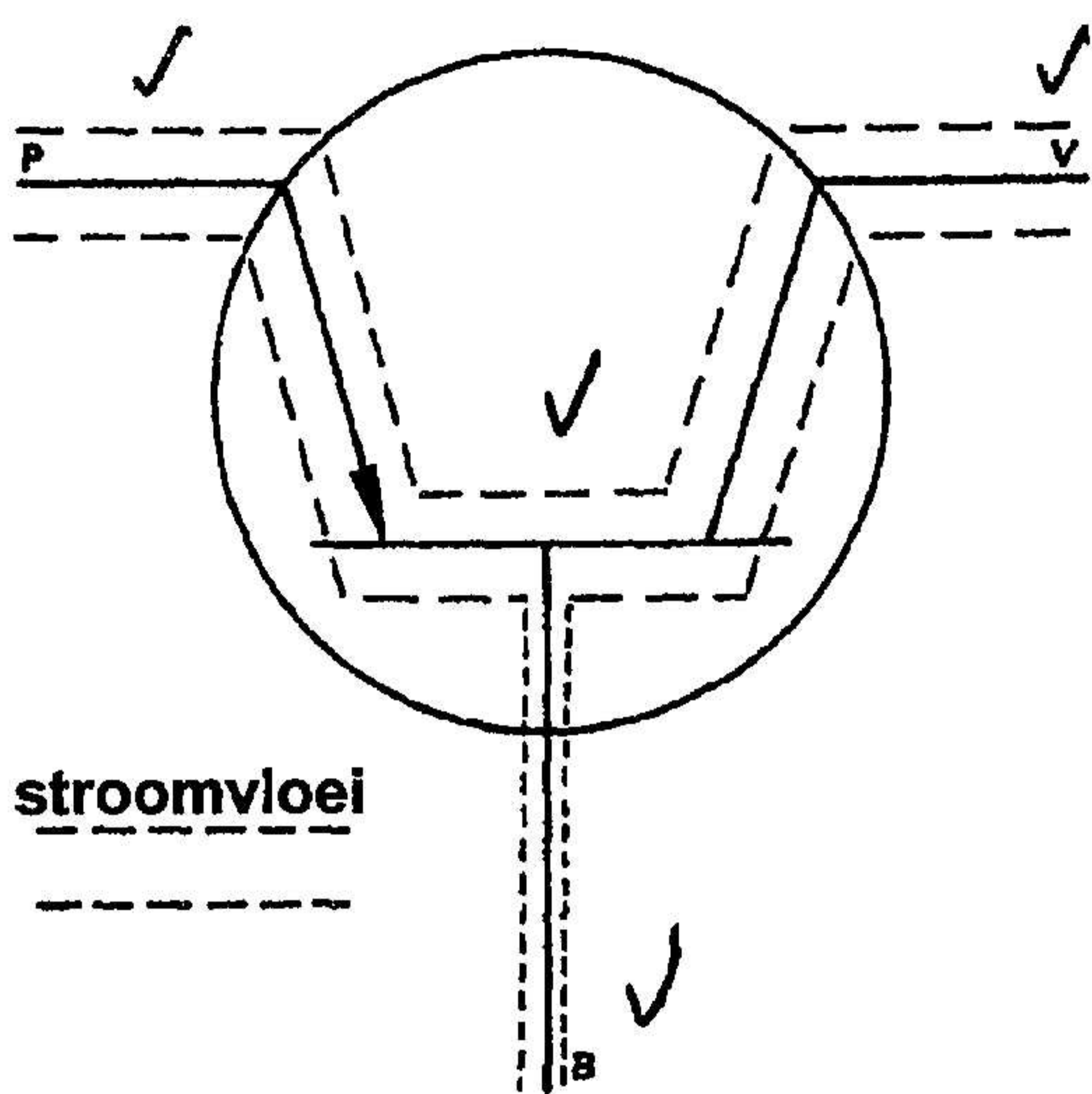
VRAAG 1

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1.20	C	(2)
		[40]

VRAAG 2

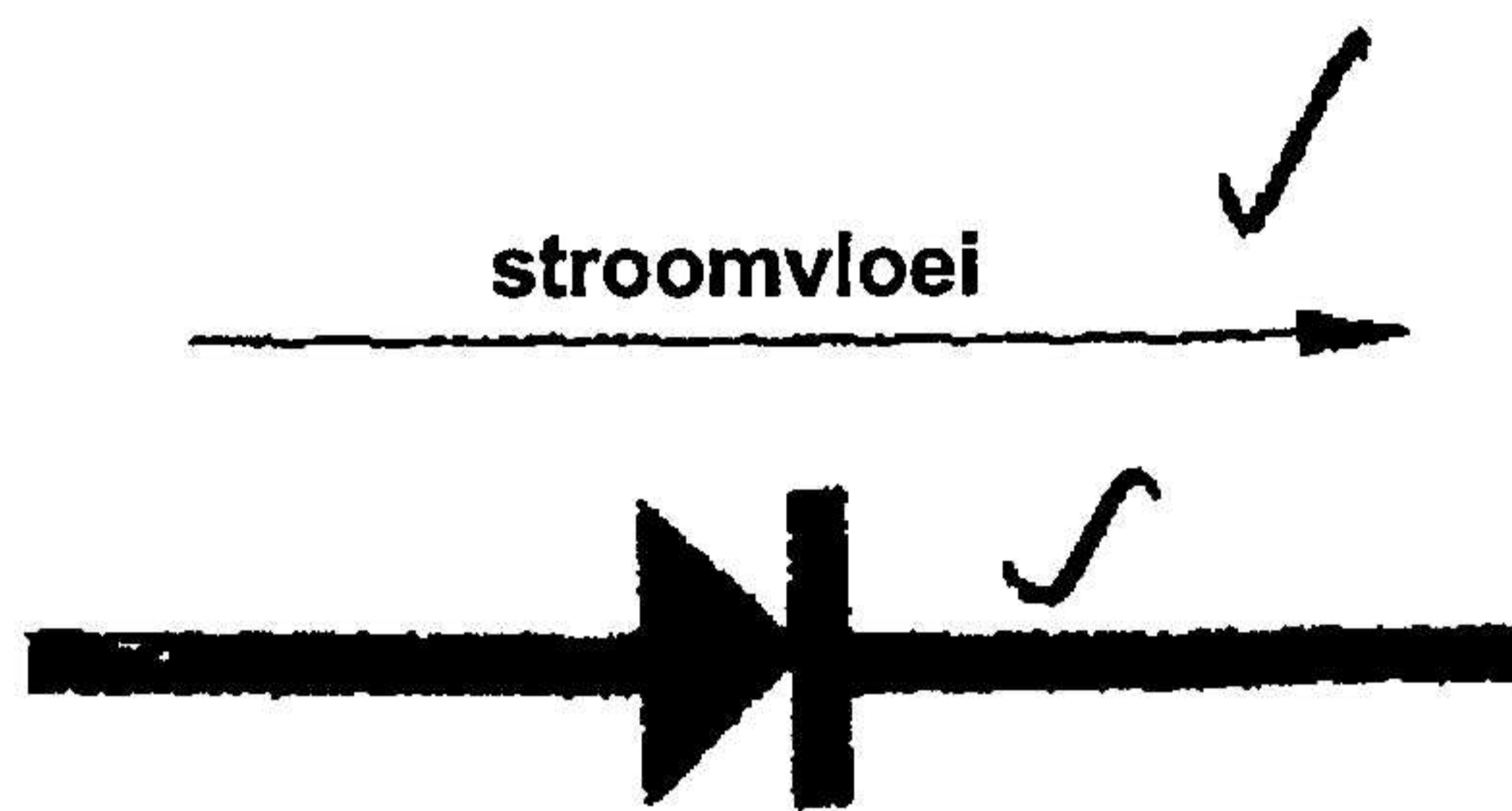
2.1

2.1.1



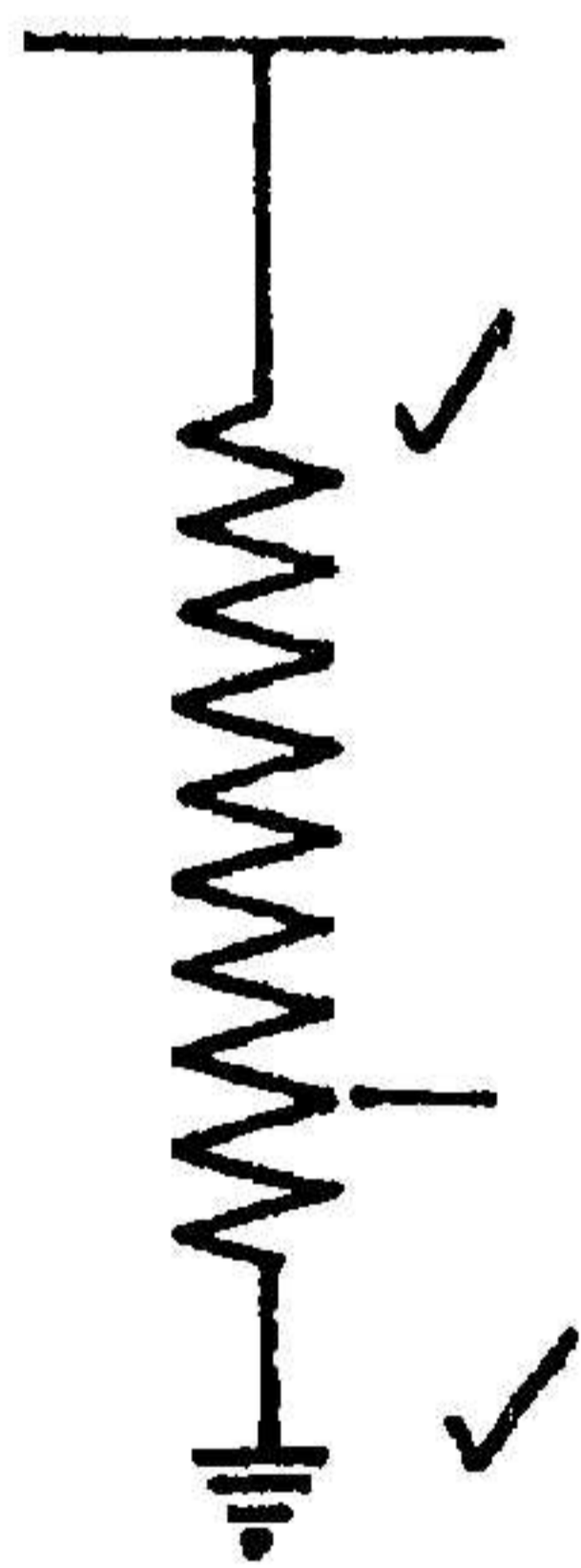
(4)

2.1.2



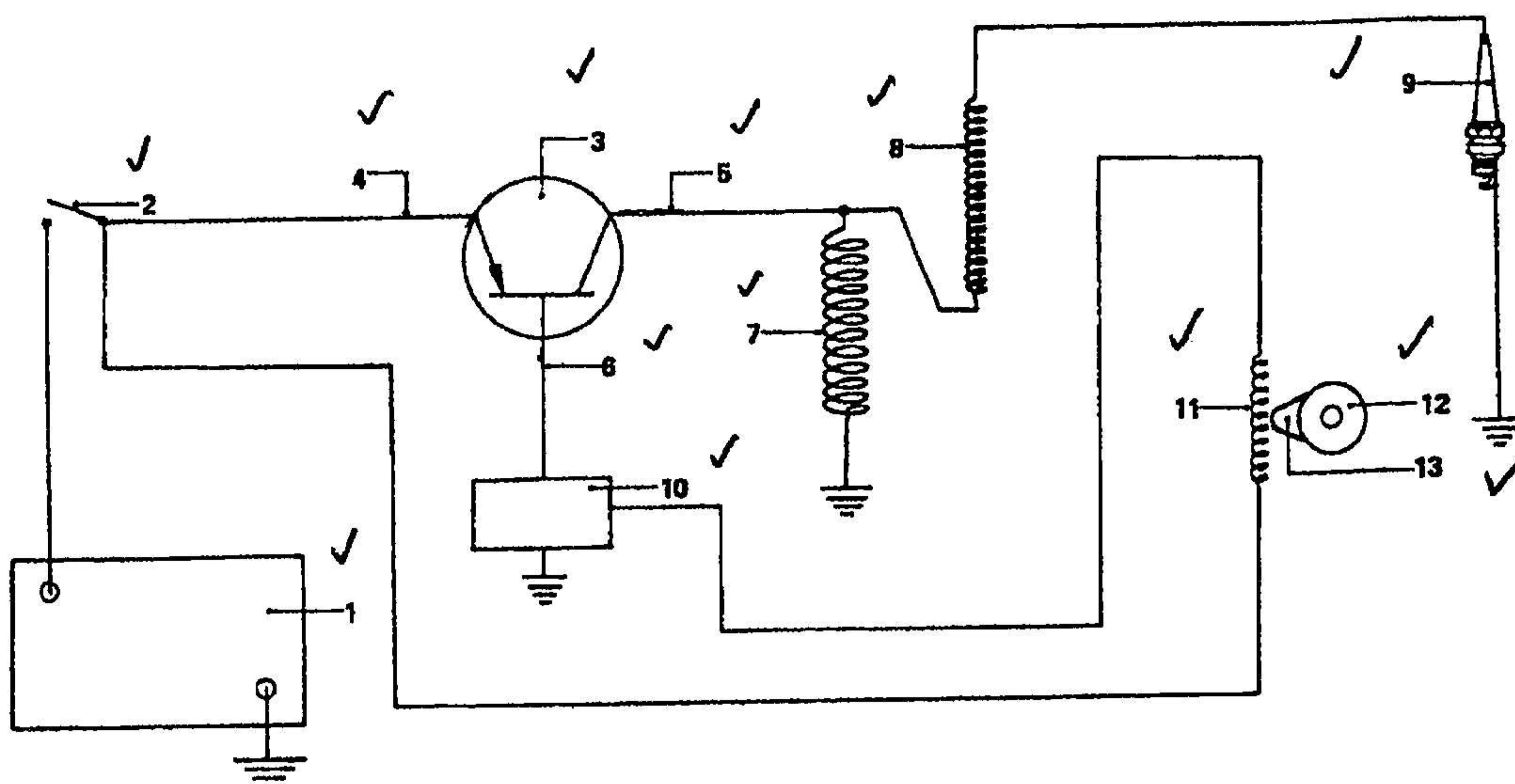
(2)

2.1.3



(2)

2.2



(13)

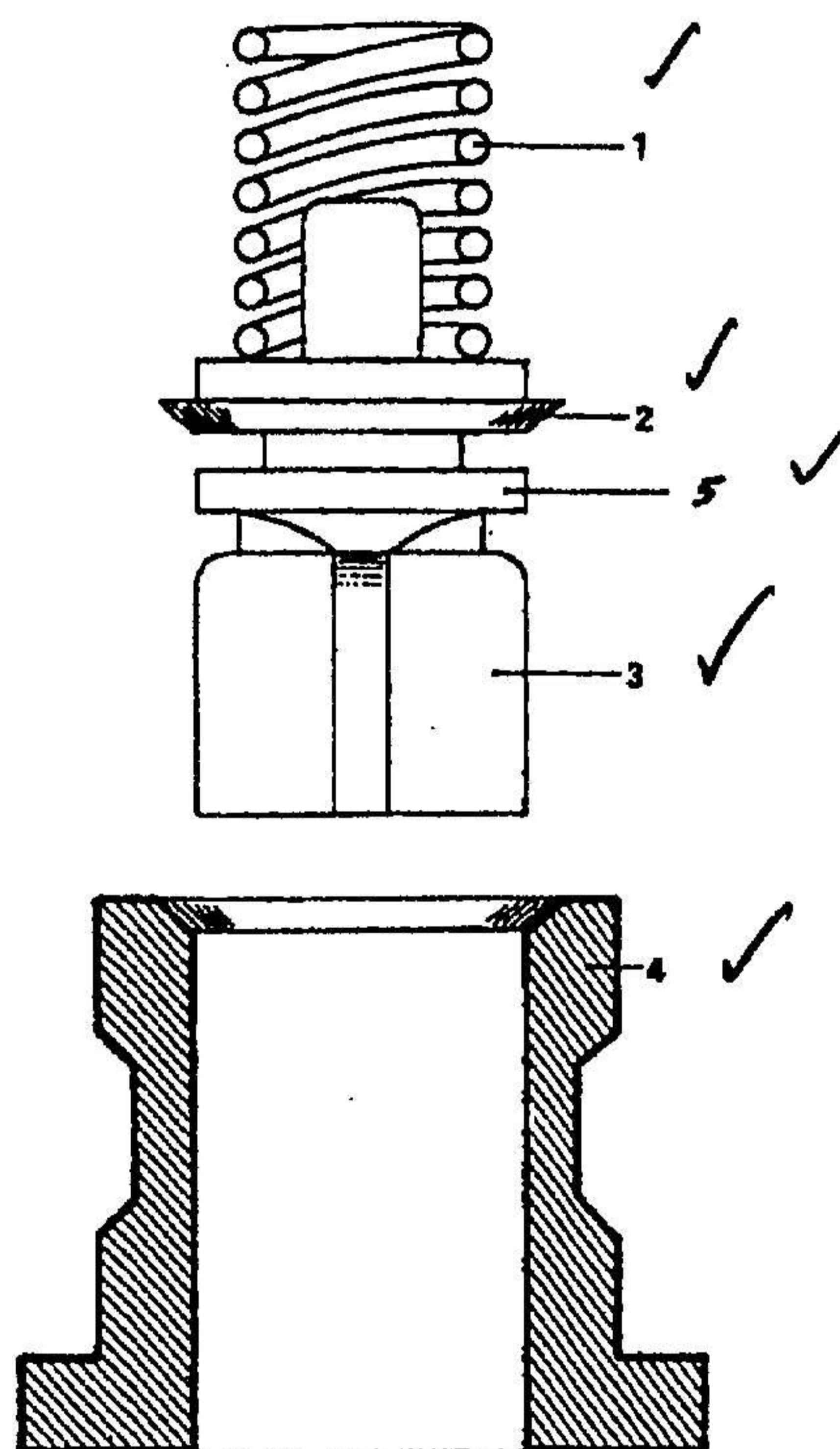
- 2.3 Elektromagnetiese induksie vind plaas as gevolg van die snyding van die magnetiese kraglyne. 2x1=(2)
- 2.4 Pulssender
Versamelaar
Basis 3x1=(3)
- 2.5 Y-vormig
Driehoekig 2x1=(2)
- 2.6 Diode (2)
- 2.7 Verhoog stroom
Spoed waarteen geleier deur die magnetiese kraglyne sny
Getal windings 2x1=(2)
[32]

VRAAG 3

- 3.1.1 Vlampunt: Is die temperatuur waarby dit genoegsame brandbare damp afgee om 'n kortstondige flits te gee wanneer 'n oop vlam na aan die brandstof-oppervlak gebring word. 4x1=(4)
- 3.1.2 Voorontsteking: Wanneer die lug/brandstof-mengsel op enige ander manier ontsteek word, buiten deur die vonk tussen die vonkpropelektrodes. 2x1=(2)
- 3.1.3 Hittewaarde: Is die hoeveelheid hitte wat vrygestel word tydens die algehele verbranding van 1 kg brandstof in die aanwesigheid van genoegsame suurstof. 4x1=(4)
- 3.1.4 Effektiewe pompslag: Die afstand wat die plunjer beweeg vandat dit die inlaatpoortafsluit tot dit die stortpoort ontsluit. 4x1=(4)

- 3.2 Borreltoring of fraksioneringstoring (1)
- 3.3 Verlaag produksiekoste
Hoëgehalte-brandstof word verkry
Verminder gomagtigheid
Laer swawelinhoud
Eenvormige oktaanwaarde
Gesik vir behandeling met tetraetiellood 4x1=(4)
- 3.4 Naald en bedding
Vlotter 2x1=(2)
- 3.5.1 Tapse naald (2)
- 3.5.2 Demperklep (2)
- 3.6 Verwyder stofdeeltjies uit brandstof
Verwyder water
Verwyder vaste stowwe
Bied minimum weerstand teen vloeï van brandstof 2x1=(2)

3.7

(5)
[32]

4.4.1 Aangeduide drywing:

Is die teoretiese of berekende drywing wat 'n enjin behoort te ontwikkel, sonder inagneming van meganiese en ander verliese.

3x1=(3)

4.4.2 Remdrywing

Is die werklike drywing wat 'n enjin ontwikkel en word by die vliegwiel gemeet.

3x1=(3)

4.4.3 Meganiese doeltreffendheid:

Is die verhouding van remdrywing tot die aangeduide drywing.

2x1=(2)

4.5 Pröny-rem

(2)
[32]

VRAAG 5

5.1 Swaarvoertuie
Trekke(1)
(1)

5.2

5.2.1 Planeetrat-raam

(2)

5.2.2 Planeetrat-raam

(2)

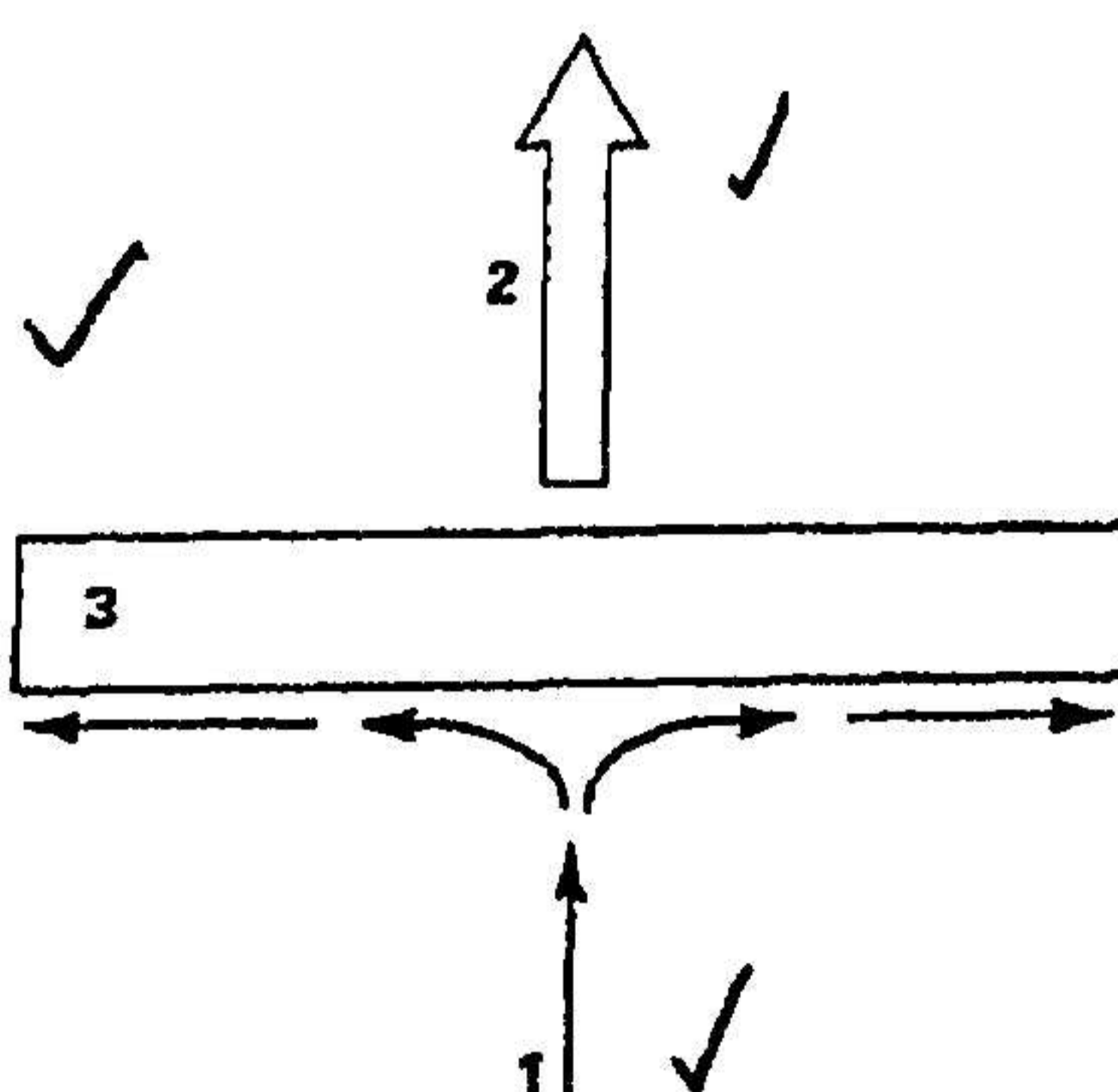
5.2.3 Geen

(2)

5.2.4 Sekondêre naafrat

(2)

5.3

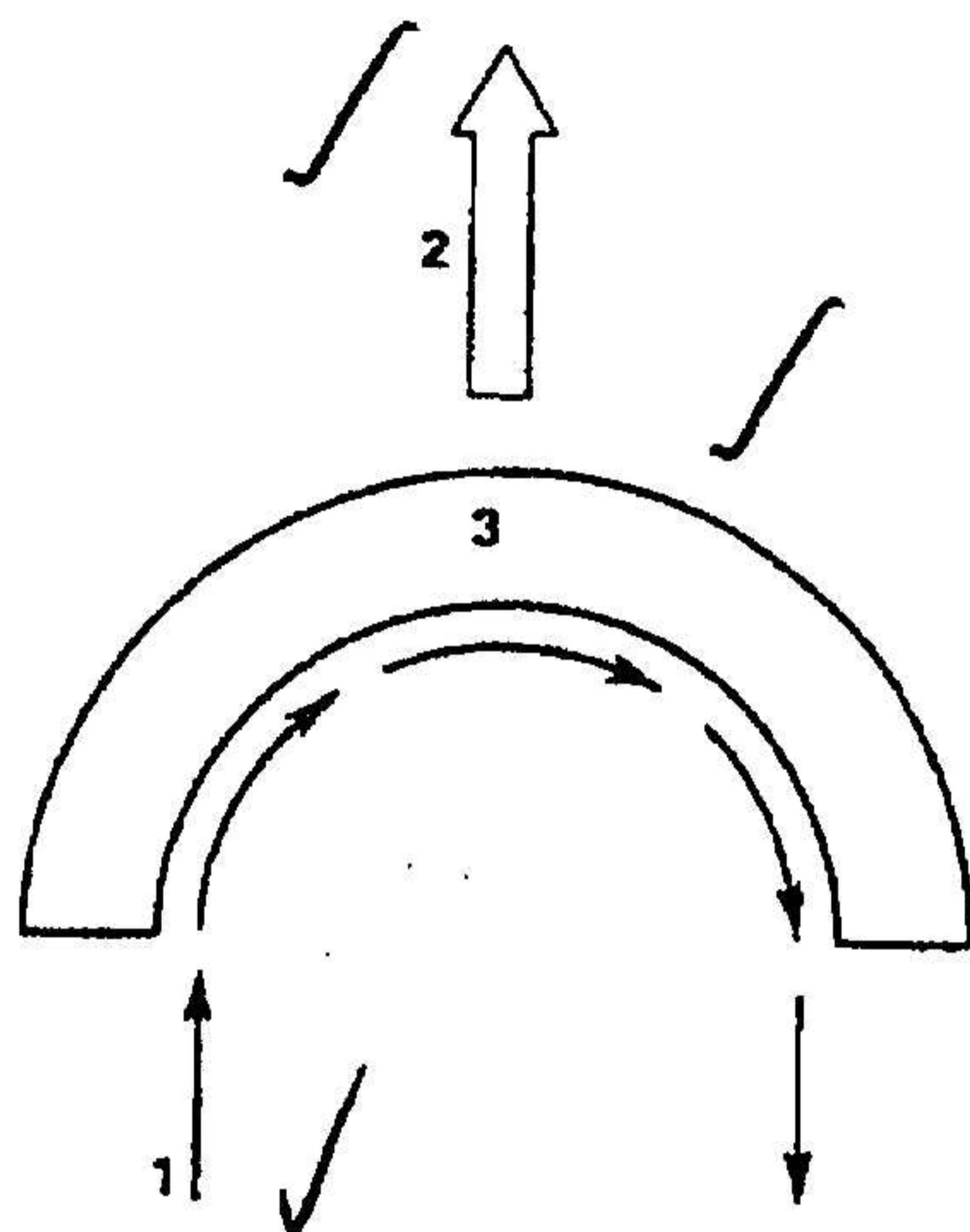


(3)

5.3 Hidrouliese koppeling

- Vloeistof tref reguit wieke teen hoë snelheid.
- Wieke beweeg na vore.
- Energie van vloeistof gaan verlore na stoot-aksie.
- Beweging van wieke slegs gelyk aan stoot-aksie.

4x1=(4)



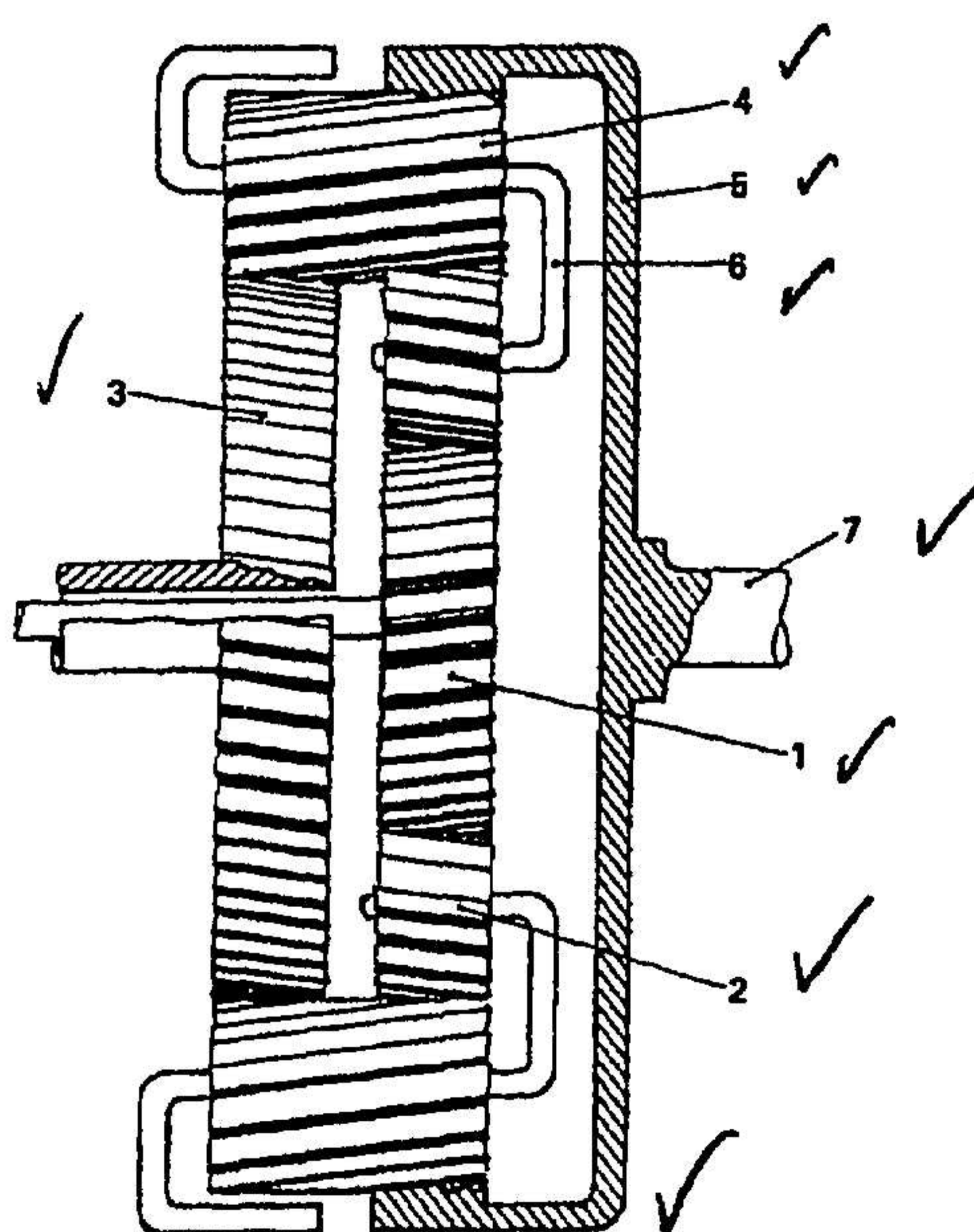
(3)

Koppelomsitter:

- Vloeistof tref geboë wieke teen hoë snelheid.
- Krag op wieke word verdubbel.
- Alle voorwaartse beweging van vloeistof word gestop.
- Vloeistof word in een rigting gestuur.
- Beweging van wieke gelyk aan krag wat vloeistof van rigting laat verander.

4x1=(4)

5.4

(8)
[32]

VRAAG 6

6.1

6.1.1 Rolpunt

Die teoretiese punt waarom die massa van die voertuig sal draai.

2x1=(2)

6.1.2

Onderstuur

Indien die glyhoek van die voorwiele groter is as die glyhoek van die agterwiele.

2x1=(2)

6.2

6.2.1 Stuurwerk-uitleg met oordragstang

(2)

6.2.2

Vir die verstelling van toesporing en uitsporing

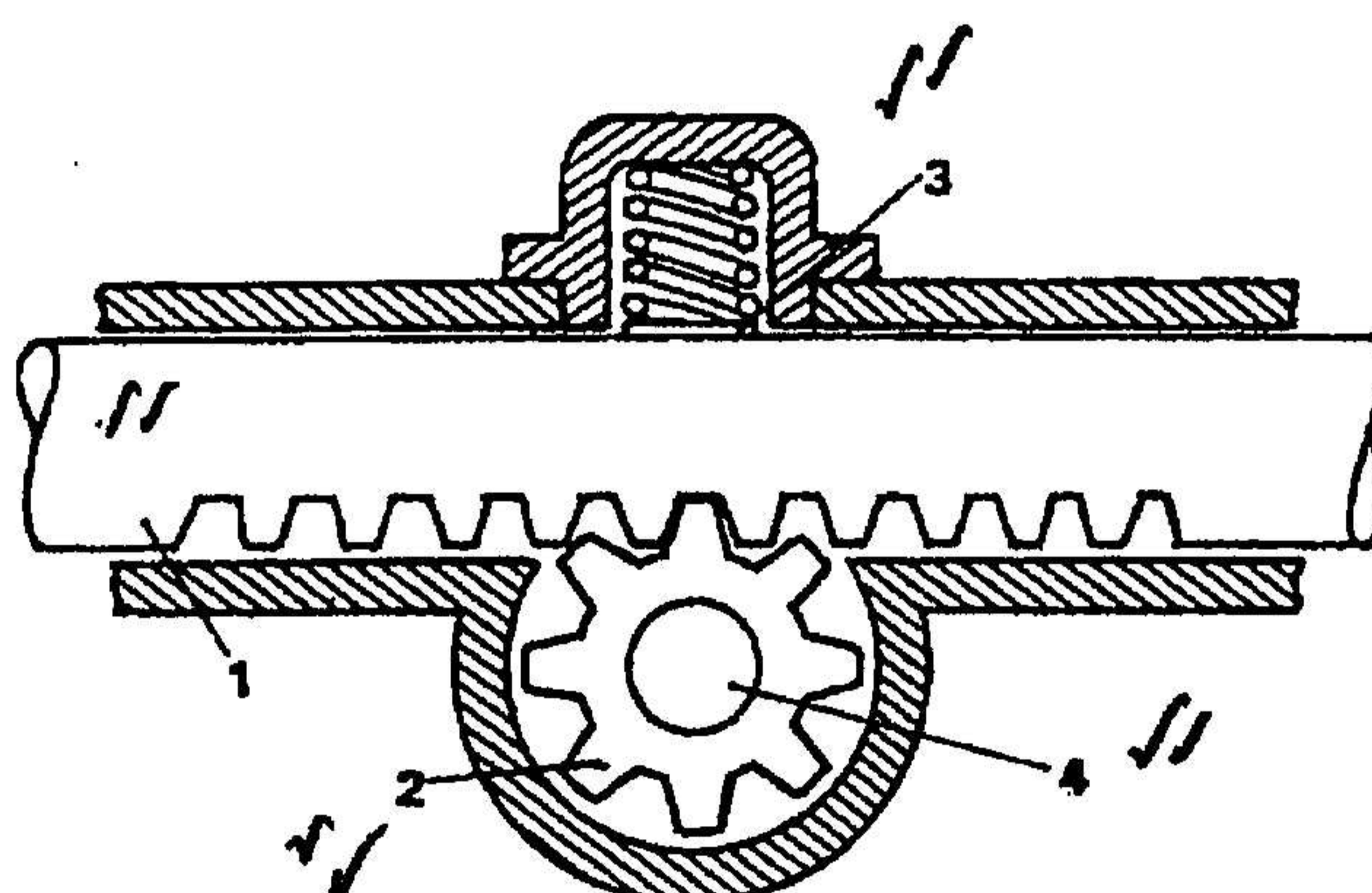
(2)

6.2.3

Ackerman-beginsel

(2)

6.3



(8)

6.4

- Om die draaibeweging van die stuurwiel te omskep in 'n soortgelyke beweging van die voorwiele.
- Verskaf die nodige hefkrag
- Absorbeer padskokke

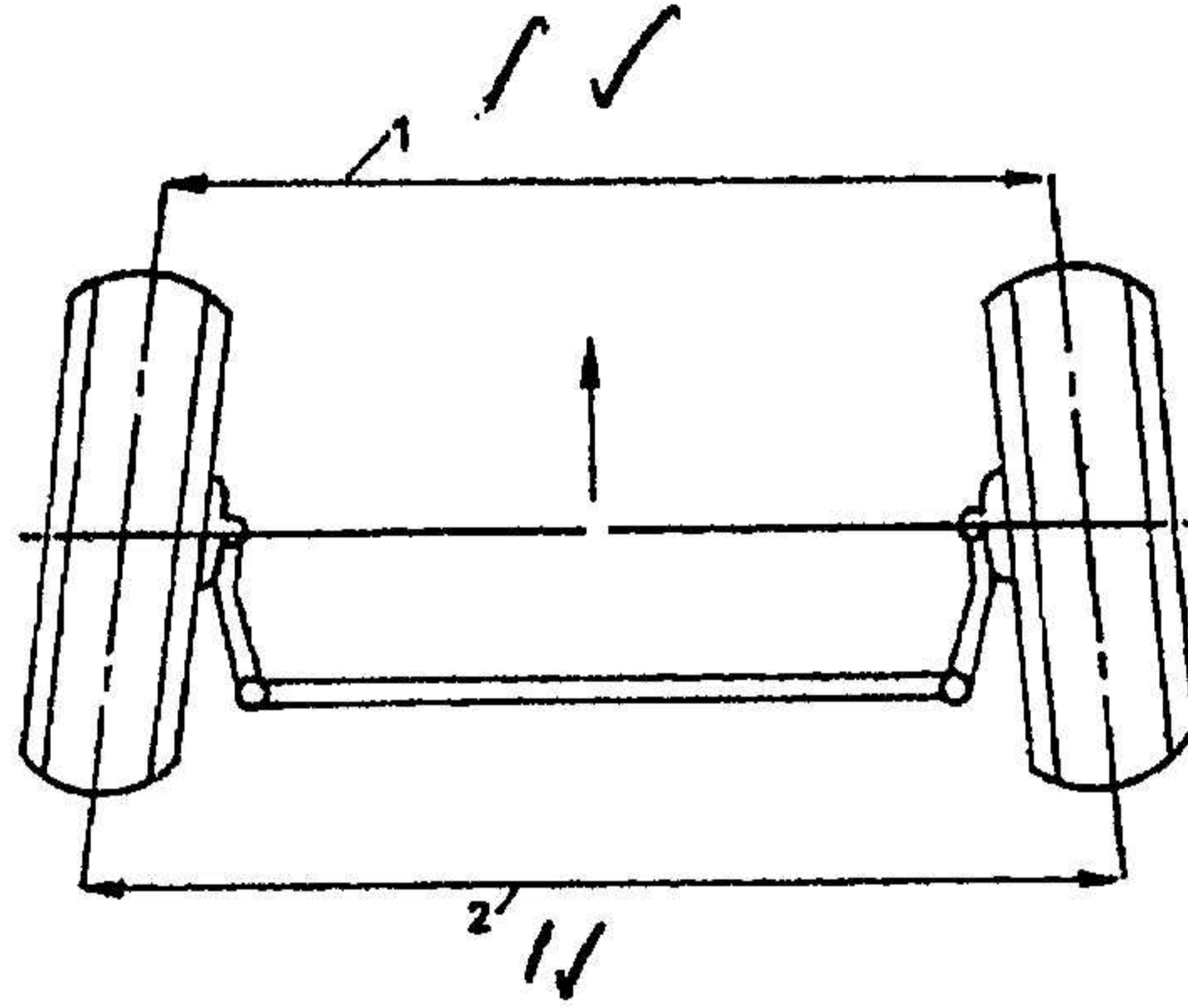
3x2=(6)

6.5

- Absorbeer enjinkrag
- Verloor grootliks padgevoel
- Meer bewegende onderdele wat kan slyt
- Vervaardigingskoste hoog

2x1=(2)

6.6



(4)

6.7

- Toestand van bande
- Bande moet dieselfde grootte wees.
- Kruislaag-bande mag nie saam met straallaag-bande gebruik word nie.
- Banddruk moet dieselfde wees.
- Bande moet rond wees.
- Wiele moet ondersoek word vir wielslingering.

2x1=(2)
[32]

TOTAAL: 200