SENIOR CERTIFICATE EXAMINATION
SENIORSERTIFIKAAT-EKSAMEN

OCTOBER / NOVEMBER
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2004

TECHNIKA (MECHANICAL)

TECHNIKA (MEGANIES)

HG **715-1/0**

13 pages
13 bladsye

715 1 0 HG

GAUTENGSE DEPARTEMENT VAN ONDERWYS

SENIORSERTIFIKAAT-EKSAMEN

TECHNIKA (MEGANIES) HG

TYD: 3 uur

PUNTE: 300

BENODIGHEDE:

- 'n Sakrekenaar en tekeninstrumente

INSTRUKSIES:

- Beantwoord AL die vrae.
- Bylaag A en 'n inligtingsblad (bladsye 9 tot 13) is agter aan die vraestel geheg.

VRAAG 1

1.1 Verander 7,38 rad/s na r/min. (2)

1.2 'n Krag van 200 N word op die punt van 'n moersleutel toegepas. Die loodregte afstand tussen die werklyn van die krag en die hartlyn van die moer is 0,5 m.

Bereken die

1.2.1 draaimoment. (2)

1.2.2 arbeid verrig indien die moer deur 'n hoek van 30° gedraai word. (4)

1.3 Definieer **Boyle se wet**. (4)

1.4 Omskryf die begrip **termodinamika** as vertakking van fisika. (2)

1.5 Omskryf die begrip **Ergonomie**. (4)

1.6 Bereken die ingeslote hoek van 'n M50 V-skroefdraad met 'n steek van 6 mm. Die afstand oor die twee drade toon 'n totale verskil van 9 mm.

Gegee:
Maksimum diameter van meetdrade 1,01 P
Minimum diameter van meetdrade 0,5 P (8)

1.7 Beskryf die Brinnell-hardheidstoets kortliks en illustreer jou antwoord met behulp van eenvoudige sketse. (8)

1.8 Beskryf hoe die indeksplaat gebruik kan word om meergangskroefdraad te sny. (6)

1.9 Noem DRIE eienskappe van 'n ideale gas. (3)

1.10 Noem DRIE voorwaardes voordat arbeid verrig kan word. (3)

1.11 Wat is die funksie van die drukontlasklep in 'n hidrouliese stelsel? (1)

1.12 Noem die komponente waaruit 'n krageenheid bestaan. (3)

[50]

GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

TECHNIKA (MECHANICAL) HG

TIME: 3 hours

MARKS: 300

REQUIREMENTS:

- A calculator and drawing instruments

INSTRUCTIONS:

- Answer ALL questions.
- Annexure A and an information sheet (pages 9 to 13) appear at the back of this question paper.

QUESTION 1

1.1 Convert 7,38 rad/s to r/min. (2)

1.2 A force of 200 N is applied to the end of a spanner. The perpendicular distance between the centre line of the nut and the working line for the force is 0,5 m.

Calculate the

1.2.1 torque. (2)

1.2.2 work done when the nut is turned through an angle of 30°. (4)

1.3 Define **Boyle's law**. (4)

1.4 Describe the concept of **thermodynamics** as a branch of physics. (2)

1.5 Define the concept of **Ergonomics**. (4)

1.6 Calculate the included angle of an M50 V screw thread with a pitch of 6 mm. The measurement across the two sets of wires shows a difference of 9 mm.

Given:
Maximum diameter of test wires 1,01 P
Minimum diameter of test wires 0,5 P (8)

1.7 Briefly describe the Brinell hardness test and illustrate your answer with the aid of simple sketches. (8)

1.8 Describe how the index plate is used to cut multi-start screw thread. (6)

1.9 Name THREE characteristics of an ideal gas. (3)

1.10 Name THREE conditions before work can be done. (3)

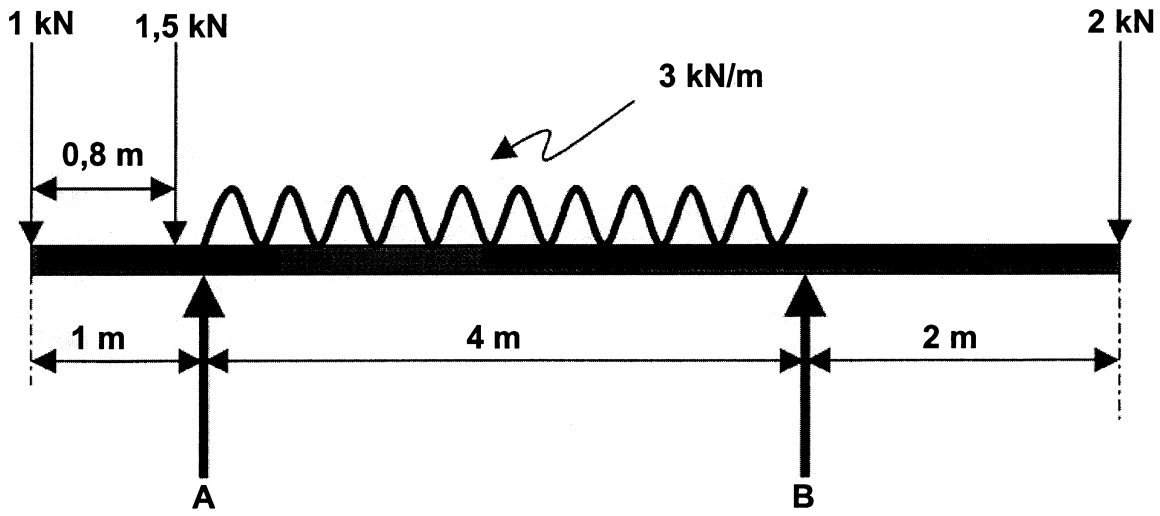
1.11 What is the function of a pressure-relief valve in a hydraulic system? (1)

1.12 Name the components that make up a power unit. (3)

[50]

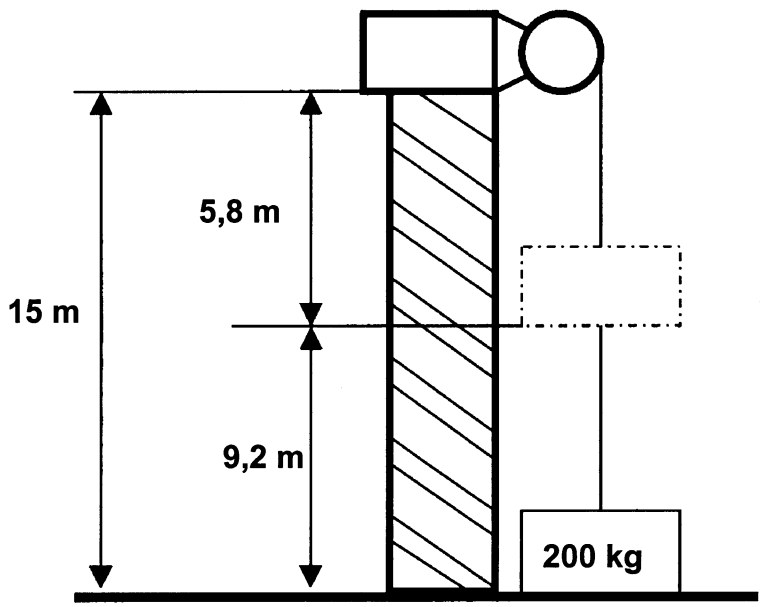
VRAAG 2

2.1 'n Balk, 7 m lank, rus op twee stutte 4 m van mekaar af. Die regterkantste stut steek 2 m oor die regterkant. Die balk dra 'n eenvormig verspreide belasting van 3 kN per meter tussen die stutte. Verder dra dit puntbelastings van 1 kN by die linkerkantste punt, 1,5 kN by 'n punt 0,8 m vanaf die linkerkantste punt en 2 kN aan die regterkantste punt, soos in die figuur voorgestel. Bereken die reaksies van die steunpunte en **toets** jou antwoord.



(12)

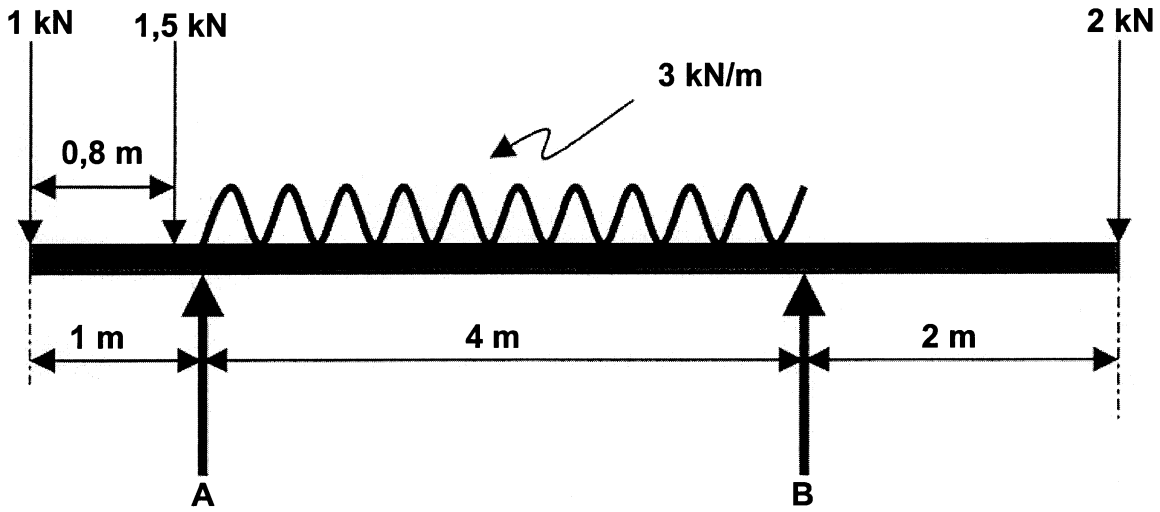
2.2 'n Hysbak het 'n massa van 200 kg en die kabel 'n massa van 15 kg/m. Bereken die arbeid verrig om die hysbak vanaf die grondvloer (hoogte 15 m) op te hys tot die 3de vloer (hoogte 9,2 m).



(8)

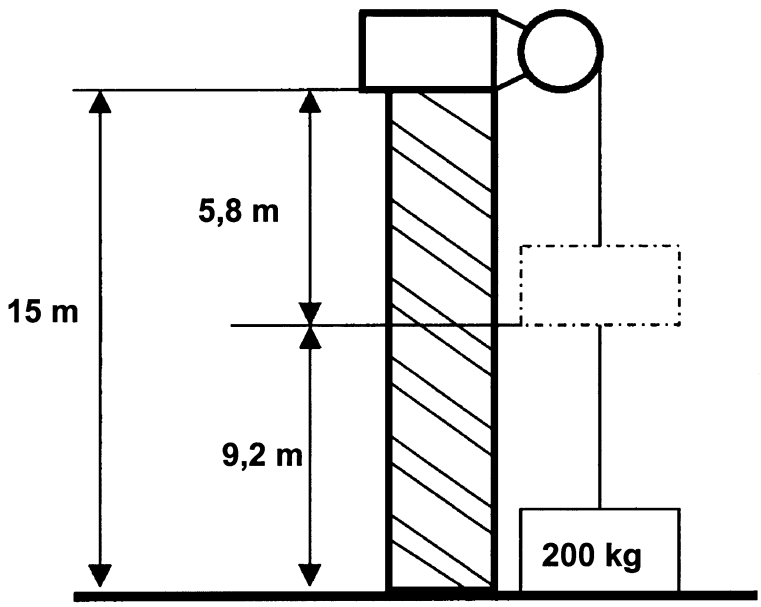
QUESTION 2

2.1 A beam, 7 m long, rests on two supports 4 m apart. The righthand support is 2 m from the right end. The beam carries a uniformly distributed load of 3 kN per metre between the supports. It also carries concentrated loads of 1 kN at the left end, 1,5 kN at a point 0,8 m from the left end, and 2 kN at the right end, as shown in the figure. Calculate the reactions at the supports and **test** your answer.



(12)

2.2 A lift has a mass of 200 kg and the cable a mass of 15 kg/m. Calculate the work done to hoist the lift from the ground floor (height 15 m) to the 3rd floor (height 9,2 m).



(8)

2.3 Die volgende uitslae is verkry in 'n trektoets wat op 'n ronde staaf met 'n dwarsdeursnee-oppervlakte van 160 mm² uitgevoer is.

Krag word gegee in Newton (N)
Verlenging word gegee in millimeter (mm)

Krag	1 330	4 230	6 670	8 450	10 010	11 120	12 680	14 010
Verlenging	0,0152	0,0488	0,0732	0,0975	0,1097	0,1219	0,1504	0,1788

Die afstand tussen die twee meetpunte op die toetsstuk was 200 mm. Die staaf het by 'n krag van 14 010 N die elastisiteitsgrens bereik.

2.3.1 Bereken, aan die hand van die gegewe data, die spanning/vervormingswaardes en gee die resultate in tabelvorm. Gebruik die waardes om die spanning/vervormingsgrafiek te trek. [Voltooi albei antwoorde op die gegewe vorm: Aanhangsel A.] (20)

2.3.2 Bereken die elastisiteitsmodulus vir hierdie staaf. (5)

2.3.3 Bereken die maksimum trekspanning teen die elastisiteitsgrens. (5)
[50]

VRAAG 3

3.1 Definieer 'n **radiaal**. (4)

3.2 Die minuutwyser van 'n toringklok is 1,2 m lank en beweeg vanaf die 12 tot by die 4 in 20 minute. Bepaal die

3.2.1 hoekverplasing (θ) van die wyser. (4)

3.2.2 verplasing(s) van die punt van die wyser. (4)

3.2.3 hoeksnelheid (ω) van die wyser. (4)

3.2.4 lineêre snelheid (v) van die wyser se punt. (3)

3.3 Noem VIER eienskappe van 'n goeie bedryfsleier. (4)

3.4 Noem VIER fasette wat vir suksesvolle werkstroombeplanning belangrik is. (4)

3.5 Noem VYF belangrike veiligheidsaspekte wat by die ontwerp van 'n fabrieksgebou in ag geneem moet word. (5)

3.6 Noem VYF elemente van 'n skroefdraad. (5)

2.3 The following results were obtained in a tensile test on a round bar with a cross-sectional area of 160 mm².

Force is given in Newton (N)
Change in length is given in millimeters (mm)

Force	1 330	4 230	6 670	8 450	10 010	11 120	12 680	14 010
Extension	0,0152	0,0488	0,0732	0,0975	0,1097	0,1219	0,1504	0,1788

The distance between the two gauge points on the test piece was 200 mm. The bar reached the elastic limit at a load of 14 010 N.

2.3.1 Using the given data, calculate the stress-strain values and tabulate the stress-strain values. Use these values to draw a stress-strain graph. [Complete both answers on Annexure A.] (20)

2.3.2 Calculate the modulus of elasticity for this bar. (5)

2.3.3 Calculate the tensile stress at the elastic limit. (5)
[50]

QUESTION 3

3.1 Define a **radian**. (4)

3.2 The minute-indicator of a tower clock is 1,2 m long and takes 20 minutes to move from the 12 to the 4. Determine the

3.2.1 angular displacement (θ) of the indicator. (4)

3.2.2 displacement(s) of the tip of the indicator. (4)

3.2.3 angular velocity (ω) of the indicator. (4)

3.2.4 linear velocity (v) of the tip of the indicator. (3)

3.3 State FOUR characteristics of a good works manager. (4)

3.4 State FOUR facets which are important for successful work-stream planning. (4)

3.5 State FIVE important safety features which should be taken into consideration when designing a factory building. (5)

3.6 State FIVE elements of a screw thread. (5)

3.7 Sewe-en-sestig (67) tande moet op 'n reguit tandrat gefrees word. Die verdeelkopverhouding is 40:1.

3.7.1 Bereken die indeksering wat nodig is (Kies 70 indelings). (2)

3.7.2 Bereken die wisselratte wat nodig is. (5)

3.7.3 Bepaal die draairigting van die indeksplaat. (2)

3.7.4 Maak 'n eenvoudige skets om die posisie en rangskikking van die wisselratte duidelik aan te toon. (4)
[50]

VRAAG 4

4.1 Waarom is normalisering baie belangrik tydens hittebehandeling? (4)

4.2 Watter meganiese eienskap van staal word deur koudbewerking verswak? (1)

4.3 Skets 'n volledige ysterkoolstof-ewewigsdiagram vir staalsoorte. Die temperatuur moet vanaf 0°C tot 1 000°C en die koolstofinhoud vanaf 0% tot 1,4% aangedui word.

Bepaal met behulp van die diagram tot watter temperatuur staal, met 'n koolstofinhoud van 1%, verhit moet word om die boonste kritieke temperatuur (AC_3) te bereik. (12)

4.4 Noem DRIE basiese kristalvorms van staal. (3)

4.5 'n Spiraalveer is 90 mm lank as dit onuitgerek is. 'n Krag van 8 N is nodig om die veer 10 mm uit te rek. Bereken die arbeid nodig om die veer van 110 mm tot 150 mm uit te rek as die elastisiteitsgrens nie oorskry word nie. (5)

4.6 Die meeste metale kristaliseer tot een van drie soorte ruimtetralierangskikkings. Skryf die naam en atoomgetal van elke tipe neer. (6)

4.7 Die volume van 'n sekere gas is 2,4 m^3 by 'n druk van 125 kPa en 'n temperatuur van 20°C. Bereken die finale temperatuur in °C indien die volume van die gas tot 1,1 m^3 teen 'n druk van 600 kPa verminder word. (5)

4.8 Beskryf **isotermiese samepersing** van 'n gas. (4)

3.7 Sixty-seven (67) teeth must be milled on a spur gear. The dividing head ratio is 40:1.

3.7.1 Calculate the indexing required (Choose 70 divisions). (2)

3.7.2 Calculate the change wheels required. (5)

3.7.3 Determine the direction of rotation of the index plate. (2)

3.7.4 Draw a simple sketch to clearly indicate the position and arrangement of the change wheels. (4)
[50]

QUESTION 4

4.1 Why is normalizing important during heat treatment? (4)

4.2 Which mechanical property of steel is weakened by cold-shaping? (1)

4.3 Sketch a complete iron-carbon equilibrium diagram for steel types. Indicate the temperature between 0°C and 1 000°C, and the carbon content between 0% and 1,4%.

Determine with the aid of the diagram, to what temperature steel with a carbon content of 1% must be heated to reach its upper critical temperature. (AC_3). (12)

4.4 State THREE basic crystal structures of steel. (3)

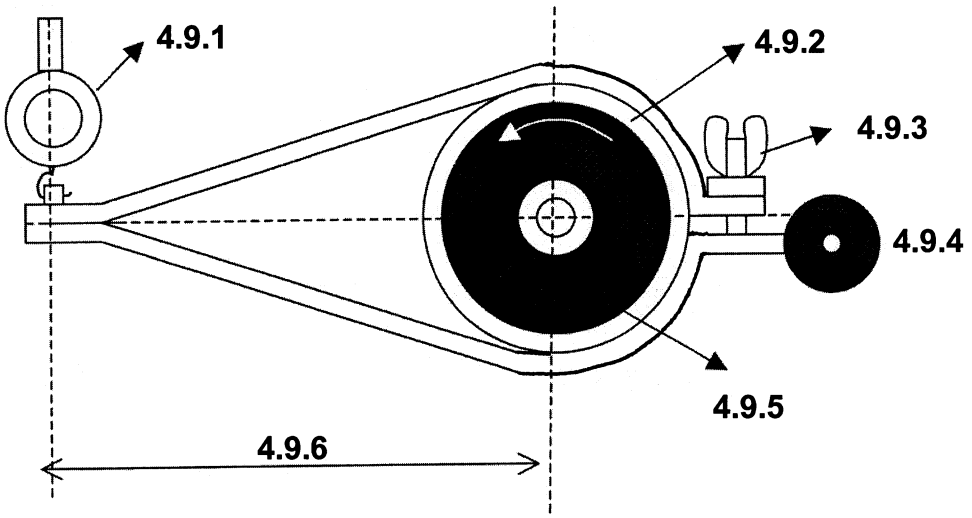
4.5 A spiral spring is 90 mm long when not stretched out. A force of 8 N is needed to stretch the spring by 10 mm. Calculate the work done to stretch the spring from 110 mm to 150 mm, assuming the limits of elasticity are not exceeded. (5)

4.6 Most metals crystallize to one of three space lattice types. State the name and atomic number of each type. (6)

4.7 The volume of a certain gas is 2,4 m^3 at a pressure of 125 kPa and a temperature of 20°C. Calculate the final temperature in °C if the volume of the gas is reduced to 1,1 m^3 by a pressure of 600 kPa. (5)

4.8 Describe **isothermal compression** of a gas. (4)

4.9 Benoem die onderskeie komponente van die Prony-rem wat gebruik word om remdrywing te toets. Skryf die nommers (4.9.1 – 4.9.6) onder mekaar in jou antwoordboek neer en gee die name van die komponente daarnaas.



(6)

Die Prony-rem

4.10 Definieer **Hooke se wet**. (3)
[50]

VRAAG 5

5.1 Maak gebruik van die tabel van primêre passings in die inligtingspamflet, en verstrek die volgende:

5.1.1 Die grense vir 'n 15H7-p6 gat-askombinasie (4)

5.1.2 Die soort passing (1)

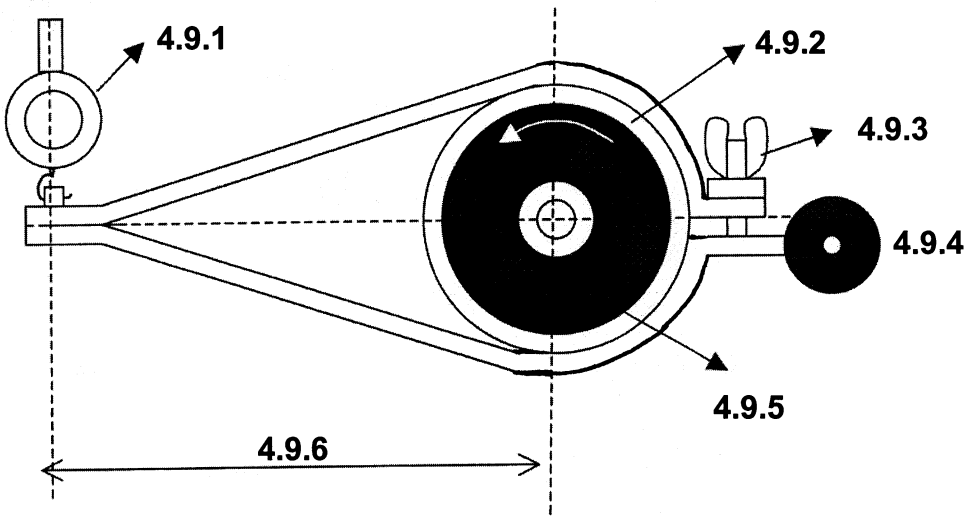
5.1.3 Die toelating vir hierdie passing (3)

5.2 Die volgende komponente is by die ontwerp van 'n hidrouliese sisteem vir 'n motorhystoestel gebruik:

- Elektriese motor
- Hidrouliese ratpomp
- Geventileerde opgaartenk
- Nieverstelbare drukontlasklep
- Verstelbare drukontlasklep
- Afsluitkleppe
- Eenrigtingklep
- Tweerigtingbeheerklep (veerbelaai)
- Maatbak
- Enkelaksie-kragsilinder
- Drukmeter
- Filter

Gebruik I.S.O. 1219-simbole en ontwerp 'n vloeidiagram vir die hystoestel. (12)

4.9 Name the different components of the Prony brake that have been used to test brake power. Write the numbers (4.9.1 – 4.9.6) one below the other in your answer book and supply only the names of the components next to it.



The Prony brake

(6)

4.10 Define **Hooke's law**. (3)

[50]

QUESTION 5

5.1 Use the table of primary fits in the information pamphlet, and state the following:

5.1.1 The limits for a 15H7-p6 hole shaft combination (4)

5.1.2 The type of fit (1)

5.1.3 The allowance for this fit (3)

5.2 The following components were used in the design of a hydraulic system for a car hoist:

- Electric motor
- Hydraulic gear pump
- Ventilated reservoir
- Non-adjustable pressure relief valve
- Adjustable pressure relief valve
- Shut-off valves
- Check valve (one way)
- Two-way control valve (spring loaded)
- Measuring vessel
- Single-acting power cylinder
- Pressure gauge
- Filter

Use I.S.O. 1219 symbols and design a flow diagram for the hoist. (12)

5.3 'n Trein beweeg op 'n sirkelvormige spoor teen 56 km/h. Indien die radius van die spoor 800 m is, bereken die verplasing van die trein in 5 minute (in meter). (5)

5.4 Beskryf hoe die volgende ratverhoudings met behulp van 'n enkel-episikliese ratstelsel verkry word:

5.4.1 Reduksieratverhouding (4)

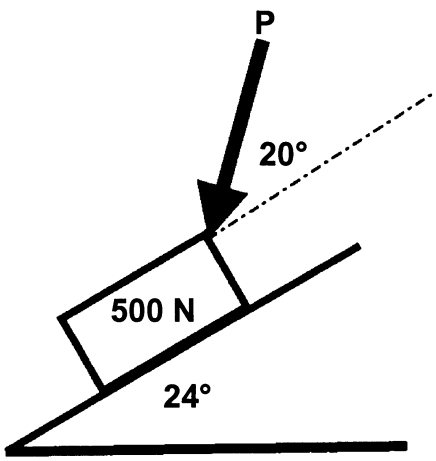
5.4.2 Snelgangratverhouding (3)

5.5 Verklaar die volgende kortliks aan die hand van die kinetiese molekulêre teorie met betrekking tot gasse:

5.5.1 Die toename in druk as die temperatuur toeneem (5)

5.5.2 Die saamdrukbaarheid (saampersbaarheid) van gasse (4)

5.6 'n Liggaam met 'n massa van 500 N word op 'n skuins vlak geplaas wat 'n hoek van 24° met die horison vorm. Die wrywingskoëffisient is 0,4. Bereken die omvang van die kleinste krag **P** wat nodig is om die liggaam teen die vlak af te stoot.



(10)
[50]

VRAAG 6

6.1 Beskryf kortliks die chemiese verbrandingsproses van petrol in die teenwoordigheid van genoegsame suurstof. Dui die produkte van hierdie ontbranding aan. (6)

5.3 A train travels on a circular track at 56 km/h. If the radius of the track is 800 m, calculate the displacement of the train in 5 minutes (in metres). (5)

5.4 Describe how the following gear ratios are obtained by means of a single epicyclic gear train:

5.4.1 Reduction gear ratio (4)

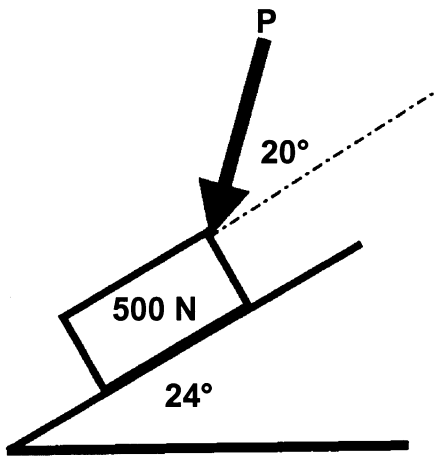
5.4.2 Overdrive ratio (3)

5.5 Explain briefly, according to the kinetic molecular theory of gases, the following:

5.5.1 The increase in pressure when the temperature increases (5)

5.5.2 The compressibility of gases (4)

5.6 A body with a mass of 500 N is placed on an inclined plane making an angle of 24° from the horizontal. The coefficient of friction is 0,4. Calculate the magnitude of the smallest force **P** that will push the object down the incline.

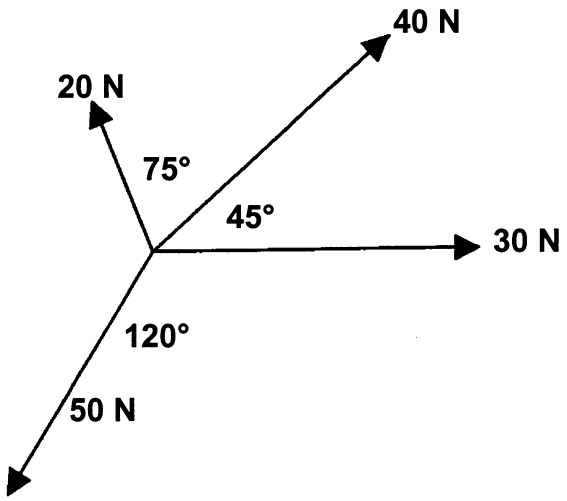


(10)
[50]

QUESTION 6

6.1 Briefly describe the chemical combustion process of petrol in the presence of sufficient oxygen. Name the products of this combustion. (6)

6.2 Die diagram hieronder toon vier kragte wat op 'n punt inwerk. Bereken die grootte en rigting van die ewewigskrag.



(18)

6.3 Die volgende gegewens het betrekking op 'n sessilinder, vierslag binnebrand-enjin:

Silinderdiameter	90 mm
Slaglengte	105 mm
Gemiddelde effektiewe druk op suier	1 200 kPa
Omwentelinge per minuut	3 500 rpm
Effektiewe remarmlengte	1 200 mm
Skaallesing	22 kg

Bereken die volgende:

6.3.1 Die aangeduide drywing in kW (7)

6.3.2 Die arbeid verrig gedurende een kragslag wanneer die suier van B.D.P. na O.D.P. beweeg (3)

6.3.3 Die remdrywing in kW (4)

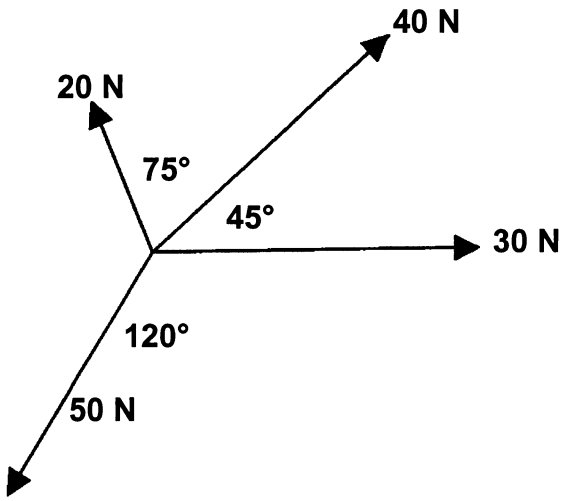
6.3.4 Die meganiese rendement van die enjin (3)

6.4 Beskryf die werking van 'n heliese veer, droë enkelplaatkoppelaar tydens ontkoppeling van die ingangs- en leweringsas. (9)

[50]

TOTAAL: 300

6.2 The diagram below shows four forces acting at a point. Calculate the magnitude and direction of the equilibrium force.



(18)

6.3 The following data is provided for a six cylinder four-stroke internal combustion engine:

Cylinder diameter	90 mm
Stroke	105 mm
Mean effective pressure on piston	1 200 kPa
Revolutions per minute	3 500 rpm
Effective brake arm length	1 200 mm
Reading on scale	22 kg

Calculate the following:

6.3.1 The indicated power in kW (7)

6.3.2 The work done during one power stroke if the piston moves from the TDC to the BDC (3)

6.3.3 The brake power in kW (4)

6.3.4 The mechanical efficiency of the engine (3)

6.4 Describe the operation of a helical-spring single-plate dry clutch during disengagement of the input shaft from the output shaft. (9)

[50]

TOTAL: 300

EXAMINATION NUMBER / *EKSAMENNOMMER*

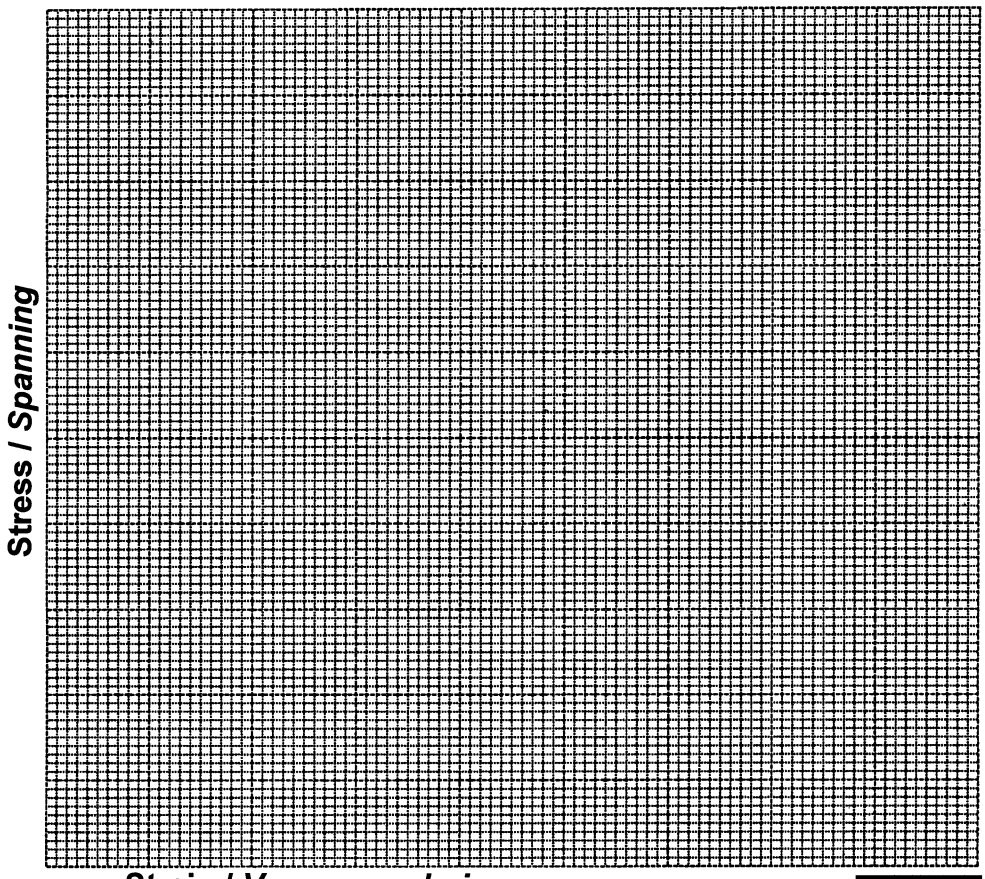
Annexure / *Bylaag A*

Question / *Vraag* 2.3.1

TABLE FOR STRESS AND STRAIN / *TABEL VIR SPANNING - VORMVERANDERING*

Stress / *Spanning* MPa	Strain / *Vormverandering*

8x2=(16)



4

Please detach and place in your answer book when completed.
Maak asseblief los en sit in jou antwoordboek wanneer voltooi.

INFORMATION PAGES / INLIGTINGSBLADSYE

1. **Tooth gears for milling machine / Tandratte vir freesmasjien**
   Standard and special wheels / Standaard en spesiale wiele

   24 (two of these / twee van hierdie); 28; 32; 40; 44; 46; 47; 48; 52; 56; 58; 64; 68; 70; 72; 76; 84; 86 and/en 100 teeth / tande

2. **Index plate for milling machine / Indeksplaat vir freesmasjien**

   Standard Cincinnati index machine / Standaard-Cincinnati-indeksmasjien 24; 25; 28; 30; 34; 37; 38; 39; 41; 42; 43; 46; 47; 49; 51; 53; 54; 57; 58; 59; 62 and/en 66 holes/gate

3. **Take π = 3,14 / Neem π = 3,14**

4. **Take g = 10 m.s^{-2} / Neem g = 10 m.s^{-2}**

5. **Formulae / Formules**

   5.1 Indexing / Indeksering:

   5.1.1 Simple indexing / Eenvoudige indeksering = $\frac{40}{N}$

   [Dr = Drive gear / Dryfrat]
   [Dn / Gd = Driven gear / Gedrewe rat]

   5.1.2 Differential indexing / Differensiaalindeksering = $\frac{Dr}{Gdr} = \frac{(A-N)}{A} \times \frac{40}{1}$

   5.2 Two-wire method of screw-thread measurement / Tweedraadmetode van skroefdraadmeting:

   Calculation of included angle / Berekening van ingeslote hoek:

$$\sin\frac{\theta}{2} = \frac{R-r}{\frac{(M-m)}{2}+r-R}$$

   5.3 Friction: Co-efficient of friction / Wrywing: Wrywingskoëffisiënt μ = $\frac{F}{R}$

   5.4 Stress / Spanning = $\frac{f}{A}$

5.5 Cross-sectional area of solid cylinder / Dwarsdeursnee-area van soliede silinder = $\frac{\pi D^2}{4}$

5.6 Cross-sectional area of hollow cylinder / Dwarsdeursnee-area van hol silinder = $\frac{\pi(D^2 - d^2)}{4}$

5.7 $E = \frac{\text{Stress}}{\text{Strain}} / E = \frac{\text{Spanning}}{\text{Vormverandering}}$

5.8 $\text{Strain} = \frac{\text{Change in length}}{\text{Original length}} / \text{Vormverandering} = \frac{\text{Verandering in lengte}}{\text{Oorspronklike lengte}}$

5.9 $\text{Factor of Safety} = \frac{\text{Ultimate stress}}{\text{Working stress}} / \text{Veiligheidsfaktor} = \frac{\text{Breekspanning}}{\text{Werkspanning}}$

5.10 Angular acceleration / Hoekversnelling = $\frac{\omega_2 - \omega_1}{t}$

5.11 Torque T / Draaimoment T = $mk^2\omega^2$

5.12 Moment of inertia / Traagheidsmoment $I = mk^2$

5.13 Angular velocity / Hoeksnelheid $\omega = \frac{2\pi n}{60}$

5.14 Kinetic energy of a flywheel / Kinetiese energie van 'n vliegwiel

$E_k = \frac{1}{2} mk^2\omega^2$

5.15 Belt drives / Bandaandrywings

5.15.1 Power P / Drywing $P - (T_1 - T_2)\ \pi\ Dn$

5.15.2 $D_{Dr} \times N_{Dr} = D_{DN} \times N_{DN}$ (Dr = Driver pulley)
(Dn = Driven pulley)

$D_{Dr} \times N_{Dr} = D_{Gdr} \times N_{Gdr}$ (Dr = Dryfkatrol)
(Gdr = Gedrewe katrol)

5.16 Gear drives / Rataandrywings

5.16.1 $N_A \times T_A = N_B \times T_B$

5.16.2 $\frac{\text{Revolutions of final driven gear}}{\text{Revolutions of first drive gear}} / \frac{\text{Omwentelinge van finale gedrewe rat}}{\text{Omwentelinge van eerste dryfrat}}$

=

$\frac{\text{Product of number of teeth on all drive gears}}{\text{Product of number of teeth on the driven gears}} / \frac{\text{Produk van getal tande op al die dryfratte}}{\text{Produk van getal tande op die gedrewe ratte}}$

5.16.3 Speed ratio = $\frac{\text{Product of number of teeth on all drive gears}}{\text{Product of number of teeth on all driven gears}}$

Spoedverhouding = $\frac{\text{Produk van getal tande van alle dryfratte}}{\text{Produk van getal tande van alle gedrewe ratte}}$

5.17 Power / Drywing

5.17.1 Indicated power IP = pLANn (N = Number of power strokes per second)
Aangeduide drywing AD = pLANn (N = Getal kragslae per sekonde)

5.17.2 Brake power BP / Remdrywing RD = $\frac{2\pi n\, T}{60}$

5.17.3 Torque T / Draaimoment T = Fr

5.17.4 Mechanical efficiency = $\frac{BP}{IP} x \frac{100}{1}$ /Meganiese rendement $\frac{RD}{AD} x \frac{100}{1}$

5.18 Motion equations / Bewegingsvergelykings

$v = u + at$	$v = at$	$v = u + gt$	$v = gt$
$s = ut + \frac{1}{2} at^2$	$s = \frac{1}{2} at^2$	$s = ut + \frac{1}{2}gt^2$	$s = \frac{1}{2}gt^2$
$v^2 = u^2 + 2as$	$v^2 = 2as$	$v^2 = u^2 + 2gs$	$v^2 = 2gs$

6. Table of primary fits (hole basis system) / *Tabel van primêre passings (gatbasisstelsel)*

Nominal sizes *Nominale groottes*		CLEARANCE FITS *VRY PASSINGS*												TRANSITION FITS *OORGANGPASSINGS*				INTERFERENCE FITS *SLUITPASSINGS*			
		Tolerance *Toleransie*		Tolerance *Toleransie*		Tolerance *Toleransie*		Tolerance *Toleransie*		Tolerance *Toleransie*		Tolerance *Toleransie*		Tolerance *Toleransie*		Tolerance *Toleransie*		Tolerance *Toleransie*		Tolerance *Toleransie*	
Over *Oor* mm	To *Tot* mm	W11	c11	W9	d10	W9	e9	H8	F7	H7	g6	H7	h6	H7	k6	H7	n6	H7	p6	H7	s6
		UNIT / *EENHEID* 0,001 mm																			
10	18	+ 110	- 95	+ 41	- 50	+ 43	- 32	+ 27	- 16	+ 18	- 6	+ 18	- 11	+18	+ 12	+18	+ 23	+ 18	+ 29	+ 18	+ 39
		0	- 205	0	- 120	0	- 75	0	- 34	0	- 17	0	0	0	+ 1	0	+ 12	0	+ 18	0	+ 28
18	30	+ 130	- 110	+ 52	- 65	+ 52	- 40	+ 33	- 20	+ 21	- 7	+ 21	- 13	+ 21	+ 15	+ 21	+ 28	+ 21	+ 35	+ 21	+ 48
		0	- 204	0	- 149	0	- 92	0	- 41	0	- 20	0	0	0	+ 2	0	+ 15	0	+ 22	0	+ 35
30	40	+ 160	- 120																		
		0	- 280	+ 62	- 80	+ 62	- 50	+ 39	- 25	+ 25	- 9	+ 25	- 16	+ 25	+ 18	+ 25	+ 33	+ 25	+ 42	+ 25	+ 59
40	50	+ 160	- 130	0	- 180	0	- 112	0	- 50	0	- 25	0	0	0	+ 2	0	+ 17	0	+ 26	0	+ 43
		0	- 290																		

Selection of Primary Fits (hole basis system)
Seleksie van Primêre Passsings (gatbasisstelsel)

END / *EINDE*