



# basic education

Department  
Basic Education  
REPUBLIC OF SOUTH AFRICA

## SENIOR CERTIFICATE EXAMINATIONS NATIONAL SENIOR CERTIFICATE EXAMINATIONS

### MATHEMATICS P1

2021

MARKS: 100

TIME: 1 hour

This question paper consists of 10 pages and 1 information sheet.

01/000

1906/2021

### QUESTION 1

- 1.1 Solve for  $x$ :  
  - 1.1.1  $x^2 + 3x + 2 = 0$  (5)
  - 1.1.2  $3x^2 + x - 4 = 0$  (Show partial solution in TWO distinct parts) (10)
  - 1.1.3  $x^2 = 49$  (5)
- 1.2 Given  $y = \frac{3x^2 + 5}{x}$ :  
  - 1.2.1 Solve for  $x$  (5)
  - 1.2.2 Hence solve for  $x$ :  $2x^2 + 22x = 49$  (5)
- 1.3 Without using a calculator, calculate the value of  $\sqrt{\frac{36x^2 + 25}{121x^2}}$  (5)
- 1.4 Solve for  $x$  and  $y$  simultaneously:  
 $(x + y + 1)^2 = 4$  and  $\frac{1}{x} + \frac{1}{y} = 1$  (10)

### QUESTION 2

- 2.1 The first term of an arithmetic sequence is 2 and the 17th term is 38.  
 Determine:  
  - 2.1.1  $d$ , the common difference of the sequence (5)
  - 2.1.2 The number of terms in the sequence if the last term of the sequence is 47 (5)
  - 2.1.3 The sum of the first 40 terms in the sequence (5)
- 2.2  $16, 25, 36, 49, \dots$  is a quadratic number pattern.  
  - 2.2.1 Write down the 100th term of the number pattern (5)
  - 2.2.2 Determine the  $n^{\text{th}}$  term of the number pattern (5)
  - 2.2.3 Determine the maximum value of the following number pattern:  
 $-12, -\frac{1}{2}, \frac{1}{2}, 1, \frac{3}{2}, 2, \dots$  (5)

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**LP Steffe**



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titik berat dan momen inersia iv titik berat dan momen inersia 4 1 titik berat penampang momen pertama suatu luasan elemen terhadap suatu sumbu di dalam bidang luasan diberikan dengan produk luasan elemen dan jarak tegak lurus antara elemen dengan sumbu

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rumus momen inersia diatas dapat digunakan jika besarnya momen inersia i didalam suatu benda bermassa yg mempunyai titik putar didalam sumbunya  $i = m r^2$  i  $m_1 r_1^2$   $m_2 r_2^2$   $m_3 r_3^2$   $m_n r_n^2$  diketahui i adalah momen inersia  $\text{kg m}^2$  m adalah massa  $\text{kg}$  r adalah jarak kr dari titik poros atau jari jari m

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jan 30 2023 secara matematis rumus momen inersia benda tegar dinyatakan sebagai berikut dengan  $m_1$  massa partikel ke 1  $m_2$  massa partikel ke 2  $m_3$  massa partikel ke 3  $m_n$  massa partikel ke n  $r_1$  jarak partikel ke 1 ke sumbu rotasi  $r_2$  jarak partikel ke 2 ke sumbu rotasi  $r_3$  jarak partikel ke 3 ke sumbu rotasi

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nov 24 2017 momen inersia polar yaitu momen inersia terhadap suatu titik perpotongan dua garis lurus atau sumbu dengan kata lain bahwa inersia polar adalah jumlah momen inersia linier terhadap sumbu x dan sumbu y

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jun 17 2022 i  $m r^2$  penjelasan m adalah massa partikel  $\text{kg}$  r merupakan jarak partikel ke sumbu putar m satuan momen

inersia adalah  $\text{kg m}^2$  pada benda pejal besar momen inersia dapat dihitung sebagai distribusi massa benda dikalikan dengan jarak sumbu putar sedangkan untuk rumus momen inersia benda tegar adalah sebagai berikut

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nov 28 2017 jadi momen inersia yang terhubung oleh seutas tali berjarak 50 cm dengan berat 100 gram adalah 0 05 kg m<sup>2</sup> baca juga contoh hukum newton 3 dan penjelasannya i Σ m n r n 2 rumus 2 rumus 2 digunakan jika terdapat beberapa benda atau partikel yang berotasi terhadap sumbu rotasi contoh soal rumus 2

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besar momen inersia dihitung dengan rumus untuk benda berupa partikel tunggal titik massa  $i$   $mr^2$  untuk beberapa partikel titik massa  $i$   $\Sigma mr^2$

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aug 30 2016 y cy 2 71 cm ada rumus umum mencari titik berat gabungan penampang berlaku juga untuk sumbu y hitung momen inersia ix gabungan dengan persamaan dimana adalah jarak titik berat masing masing penampang tunggal ke titik berat penampang gabungan untuk kasus di atas sehingga untuk sumbu y dimana karena titik berat

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momen inersia terhadap sumbu x y yang melalui titik berat penampang z adalah  $I_{xz}$  atau  $I_{x12} + b^2 h^3$  dan  $I_{yz}$  atau  $I_{y12} + b^2 h^3$  momen inersia terhadap sumbu x adalah  $I_{xx} = I_{x12} + b^2 h^3$  dan  $I_{yy} = I_{y12} + b^2 h^3$  momen inersia terhadap sumbu y adalah  $I_{yy} = I_{y12} + b^2 h^3$  dan  $I_{zz} = I_{z12} + b^2 h^3$

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jun 26 2009 adalah momen inersia terhadap sumbu x tertentu adalah momen inersia terhadap sumbu netral garis berat adalah luas bangun penampang adalah jarak dari titik berat ke sumbu momen inersia yang dicari catatan untuk tinjauan sumbu y tinggal ditukar aja kok x jadi y y jadi x

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membuat titik berat pita menentukan momen terhadap sumbu x  $m_x$  dan sumbu y  $m_y$  selanjutnya menghitung titik berat tersebut dengan integral 4 untuk menghitung momen inersia langkahnya dimulai dengan membuat pita sejajar dengan garis l sumbu x dan titik berat pita kemudian dibentuk hasil kali luas

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sep 7 2023 x 100 8 2 104 mm 10 4 cm sementara untuk sumbu y karena masing masing elemen siku l100x100x10 posisi

titik berat  $y$  nya berjarak sama dari sumbu dasar maka titik berat gabungannya juga akan sama  $y$   $y_{cy} = 27.1 \text{ cm}$  ada rumus umum mencari titik berat gabungan penampang berlaku juga untuk sumbu  $y$

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145 contoh soal dan pembahasan 1 sebuah partikel bermassa  $0.5 \text{ gram}$  melakukan gerak melingkar dengan kecepatan sudut tetap  $2 \text{ rad/s}$  jika jari-jari lintasan partikel  $10 \text{ cm}$  maka momentum sudut partikel itu adalah pembahasan momentum sudut partikel  $l = 0.5 \times 10^{-5} \text{ kg m}^2 \times 2 \text{ rad/s} = 1 \times 10^{-5} \text{ kg m}^2 \text{ s}^{-2}$

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aug 26 2017 sedangkan bola pejal berjari-jari  $5 \text{ cm}$  dan massa  $4 \text{ kg}$  jika kedua benda tadi berotasi dengan poros melalui pusatnya maka tentukan perbandingan momen inersia silinder dan bola jawab  $m = 2 \text{ kg}$   $r = 8 \text{ cm}$   $8 \times 10^{-2} \text{ m}$   $m = 4 \text{ kg}$   $r = 5 \text{ cm}$   $5 \times 10^{-2} \text{ m}$  momen inersia silinder pejal adalah  $I = \frac{1}{2} m r^2 = \frac{1}{2} \times 2 \times (8 \times 10^{-2})^2 = 6.4 \times 10^{-4} \text{ kg m}^2$

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besarnya momen inersia suatu benda bergantung terhadap beberapa faktor yaitu massa benda atau partikel geometri benda bentuk letak sumbu putar benda jarak ke sumbu putar benda lengan momen rumus momen inersia besarnya momen inersia  $I$  suatu benda bermassa yang memiliki titik putar pada sumbu yang diketahui dirumuskan sebagai berikut

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menentukan titik berat penampang berhubung momen inersia yang diinginkan akan dipergunakan dalam perhitungan lenturan maka momen inersia ini haruslah diperhitungkan terhadap sumbu yang melalui titik berat penampang keterangan luas  $A = 40 \times 60 = 2400 \text{ mm}^2$  jarak titik berat thd garis bawah  $y = 40 \times 30 = 1200 \text{ mm}$  luas total  $40 \times 60 = 2400 \text{ mm}^2$   $30 \times 40 = 1200 \text{ mm}^2$  luas total  $40 \times 60 = 2400 \text{ mm}^2$   $30 \times 40 = 1200 \text{ mm}^2$

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