



Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

PHYSICAL SCIENCES P1
MEMORANDUM
COMMON TEST
MARCH 2017

NATIONAL
SENIOR CERTIFICATE

GRADE 11

N.B. This memorandum consists of 4 pages.

4 x 2 = [8]

QUESTION 1

- 1.1 A✓✓
- 1.2 C✓✓
- 1.3 D✓✓
- 1.4 C✓✓

QUESTION 2

2.1 A physical quantity that has magnitude and direction. ✓✓ (2)

2.2.1 resultant✓ (1)

$$2.2.2 \begin{aligned} R &= F_g = mg \checkmark \\ &= (44,65)(9,8) \checkmark \\ &= 437,57 \text{ N} \checkmark \end{aligned}$$

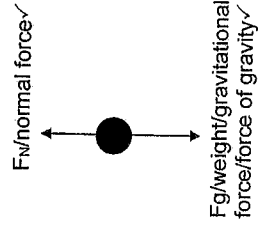
$$2.3 \begin{aligned} F_{1y} &= 437,57 \checkmark \\ 262,54 \checkmark &+ F_{2y} = 437,57 \checkmark \\ &+ F_{2y} = 437,57 \checkmark \\ &F_{2y} = 175,03 \text{ N} \checkmark \end{aligned}$$

$$\begin{aligned} \cos 60^\circ &= \frac{F_{2y}}{F_2} \checkmark \\ &= \frac{175,03}{F_2} \checkmark \\ F_2 &= 350,06 \text{ N} \checkmark \end{aligned}$$

QUESTION 3

3.1 When a resultant/net force acts on an object, the object will accelerate in the direction of the force at an acceleration directly proportional to the force ✓ and inversely proportional to the mass of the object. ✓ (2 or 0) (5) [11]

3.2.1



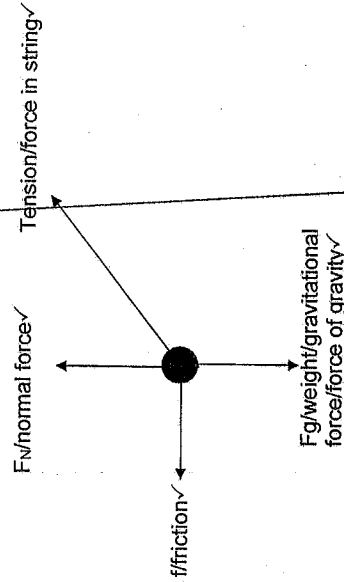
(2)

3.2.2 For the 8 kg block.

F_g	+	$(-T)$	$=$	ma	} any one ✓
mg	+	$(-T)$	$=$	0	
T	$=$	$(8)(9,8)$	\checkmark		
T	$=$	$78,40$	N		

(2)

3.2.3



3.2.4 0 N ✓

3.2.5 force that opposes the motion of an object ✓ and which acts parallel to the surface. ✓ (2 or 0)

3.2.6 FOR THE 12 KG BLOCK: (POSITIVE MARKING FROM QUESTION 3.3.2)

F_{net}	$=$	ma	} any one ✓
T	+	0	
$(-f_k)$	$=$	T	
$\mu_k N$	$=$	T	
$\mu_k mg$	$=$	$78,4$	
$\mu_k (12)(9,8)$	\checkmark		
μ_k	$=$	$0,67$	

(4)

3.2.7 Remains the same. ✓

The co-efficient of kinetic friction is independent of the surface areas in contact. ✓

OR

The co-efficient of kinetic friction depends only on the type of materials used. ✓

(2)

(2)

[19]

QUESTION 4

4.1 Every body in the universe attracts every other body with a gravitational force that is directly proportional to the product of their masses ✓ and inversely proportional to the square of the distance between their centres. ✓ (2 or 0)

4.2 can be applied anywhere in the universe. ✓ (1)

4.3.1 $2,30 \times 10^{-8} \text{ N}$ ✓

According to Newton's third Law of motion ✓ the force that the 16 kg body exerts on the 48 kg body is equal in magnitude to the force that the 48 kg body exerts on the 16 kg body. (3)

4.3.2

$$F = \frac{Gm_1m_2}{r^2} \checkmark$$

$$2,30 \times 10^{-8} \checkmark = \frac{(6,67 \times 10^{-11})(16)(48)}{r^2} \checkmark$$

$$r = 1,49 \text{ m}$$

$$x = 1,49 \checkmark - (0,10 + 0,15) \checkmark$$

$$= 1,24 \text{ m} \checkmark$$

(6)

[12]

TOTAL 50