KWAZULU-NATAL PROVINCE

EDUCATION

REPUBLIC OF SOUTH AFRICA



PHYSICAL SCIENCES

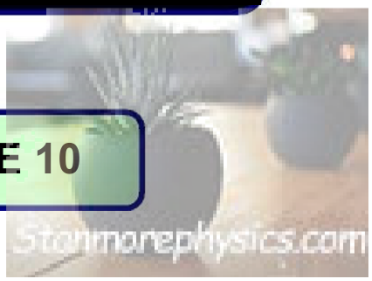
JUNE 2022

COMMON TEST

MARKING GUIDELINE

NATIONAL SENIOR CERTIFICATE

GRADE 10



NB: This marking guideline consists of 5 pages.

Copyright reserved

QUESTION ONE

1.1 C ✓✓
1.2 C ✓✓
1.3 B ✓✓
1.4 D✓✓
1.5 A ✓✓
1.6 C✓✓
1.7 D ✓✓

[14]

Stanmorephysics.com

QUESTION TWO

2.1 Ability of a conductor to reduce the flow of current (2)

2.2 $\frac{1}{Rp} = \frac{1}{R_1} + \frac{1}{R_2}$✓

$R_P = \left(\frac{1}{24} + \frac{1}{12}\right)^{-1}$ ✓

= 8 Ω

R_T = Rp + R_3✓

=8 +4✓

=12 Ω✓ (5)

2.3.1 $V_1 = V - V_3$

= 24 – 8✓

=16V✓ (2)

Stanmorephysics.com

2.3.2 16 V✓ (1)

2.4 A_2✓ Resistance inversely proportional to current✓ (2)

2.5 Q = $I\,\Delta t$✓

= 2A x 120s✓✓

= 240C ✓ (4)

2.6 Positive marking from Q 2.5

$V = \frac{w}{q}$ ✓

$8V = \frac{w}{240C}$✓

w =1920 J✓ (3)

2.7 REMAINS THE SAME✓✓ (2)

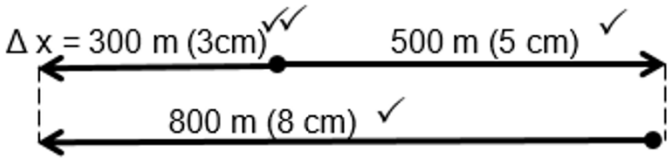
2.8 Increases✓

- R of circuit now decreases ✓ OR: there will be a short-circuit (2)

[23]

QUESTION 3

3.1



(4)

3.2 Single vector that effectively replaces 2 or more vectors acting together✓✓ (2)

3.3 300 m✓ west✓ (2)

3.4 $Average\ speed = \frac{Total\ distance}{total\ time}$✓

$= \frac{1300}{270}$✓✓

= 4.81 m·s^{-1}✓ (4)

[12]

QUESTION 4

4.1 Rate of change of displacement (2)

4.2 $a = \frac{\Delta v}{\Delta t}$ ✓

$= \frac{10 - 0}{3 - 0}$ ✓

= 3,33 ms^{-2} ✓ (3)

Stanmorephysics.com

4.3.1 Car is moving at constant velocity✓ (1)

4.3.2 Car is slowing down (uniformly)✓ , stops at 6s, changes direction✓ and accelerates uniformly ✓ (3)

4.4

Δ x = area under the graph

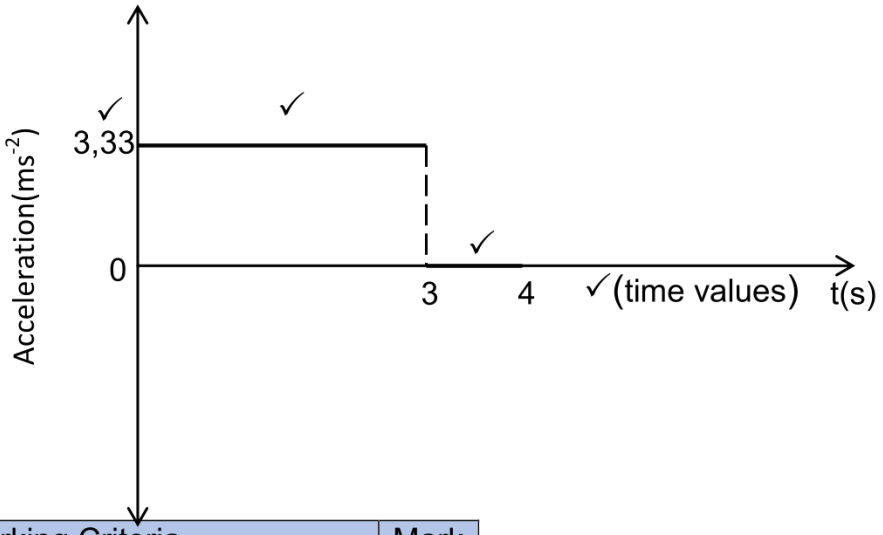
Δ x = (½ bxh) + (lxb) + (½ bxh)+ (½ bxh)

✓ANY ONE

= (½ x 3 x10) ✓+ (1x10)✓ + (½ x 2 x 10) +(½ x 2 x-10)✓

= 25m✓ (5)

4.5



Marking Criteria	Mark
• shape of graph correctly drawn	2
• both acceleration values shown	1
• both time values shown	1

(4)

[18]

QUESTION 5

5.1 Car : $\underline{\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2}$ ⟶ (1 mark for both formulae)

$= 10(40) + \frac{1}{2}(0)\Delta t^2$ ✓

= 400m

Motor cycle : $\underline{\Delta x = \left(\frac{v_i + v_f}{2}\right) \Delta t}$

$= \left(\frac{0 + 15}{2}\right) 40$ ✓

= 300 m

Car is ahead by 400 –300 = 100 m ✓

OR

Car : Δ x = Area = LxB (1 mark for both area formulae)

= (10)(40) ✓

= 400 m

Motor cycle : Δ x = Area = ½ bxh

= ½ (40)(15) ✓

= 300 m

400 –300 ✓ = 100 m Car is ahead ✓

(4)

5.2 Car : $\Delta x = Area\ of\ car = 10\ t$ ✓

Motor cycle : $\Delta x =$ Area of motor cycle

$= ½(\ 40x15) + 15(t-40)$ ✓

$10\ t = ½(\ 40x15) + 15(t-40)$ ✓

$t = 60\ s$ ✓

OR

Car : $\Delta x = 400\ m\ at\ t = 40s$

At t-40(s) : $\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$

= 10 (t-40) + 0

$\Delta x = 400 + 10(t-40) \ldots\ldots (1)$ ✓

Motor cycle : $\Delta x = 300$ m at $t = 40s$

At t - 40(s) : $\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$

= 15 (t-40) + 0

$\Delta x = 300 + 15\ (t-40) \ldots\ldots (2)$ ✓

$\Delta x\ of\ car = \Delta x\ of\ motor\ cycle$

$400 + 10\ (t-40) = 300 + 15(t-40)$ ✓

$t = 60$ s ✓ (4)

QUESTION 6

6.1 Rate of change of velocity (2)

6.2 $v_f = v_i + a\Delta t$ ✓

= 10 ✓+ (0,5 x 15) ✓

= 17,5 $m{\cdot}s^{-1}$ ✓ (4)

6.3 $v_f^2 = v_i^2 + 2a\Delta x$ ✓

30^2 ✓ = $10^2 + 2\ (0,5)\ \Delta x$ ✓

Δx = 800 m ✓ (4)

6.4 $v_f = v_i + a\Delta t$ ✓

$0 = 30 + a\ 10$ ✓

a = -3 $m{\cdot}s^{-2}$

a = 3 $m{\cdot}s^{-2}$ ✓in opposite direction✓ (4)

[14]

QUESTION 7

7.1 Total mechanical energy ✓of an isolated system remains constant✓ (2)

7.2 E_{TOT} = Ep + Ek ✓

= (0,2 x 9.8 x 1,5) ✓ + 0✓

= 2,94 J✓ (4)

7.3 E_{TOT} = Ep + Ek

2,94 J✓ = 0 ✓ + ½ (0,2)(v^2) ✓

v = 5,42 $m{\cdot}s^{-1}$ ✓ (4)

7.4 EQUAL TO ✓ total mechanical energy is conserved. ✓ (2)

[12]

TOTAL : 100 MARKS

Copyright reserved