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LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF
EDUCATION

MOPANI EAST EDUCATION DISTRICT

PHYSICAL SCIENCES

GRADE 10

FORMAL TEST MEMORANDUM

2022 MAY

TERM 2

SEE ACADEMY

MARKS: 100

TIME: 2 hours

This memorandum consists of 09 pages.

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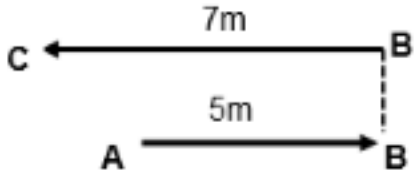
QUESTION 1: MULTIPLE-CHOICE QUESTIONS

1.1	B	✓✓	(2)
1.2	D	✓✓	(2)
1.3	C	✓✓	(2)
1.4	B	✓✓	(2)
1.5	B	✓✓	(2)

[10]

QUESTION 2

2.1



MARKING ALLOCATIONS

✓ X line AB: length, arrow, label

✓ x line BC: length, arrow ,label

(2)

2.2 2 m ✓ to the left✓ OR 2 m ✓ west✓ (2)

2.3 Total distance
= 5 + 7✓
= 12 m✓ (2)

2.4 For the total distance, the whole path length travelled is considered. ✓ For change in position, only the original position and final position ✓ of the man are considered. (2)

2.5 Velocity is the rate ✓ of change of displacement. ✓ (2)

2.6 $v = \frac{\Delta x}{\Delta t}$ ✓

$= \frac{2}{20}$ ✓

= 0,1 m·s^{-1} ✓ west/to the left✓ (4)

[14]

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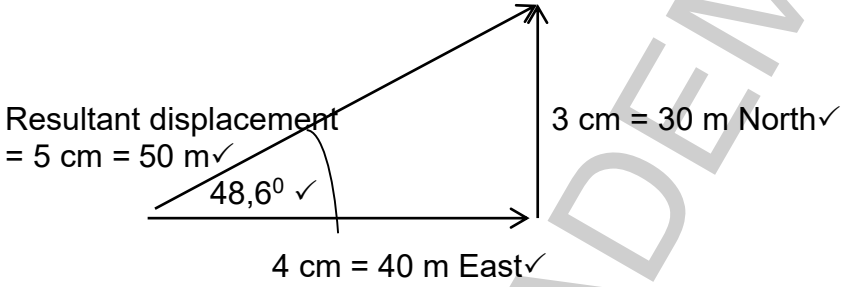
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QUESTION 3

3.1 A resultant vector is a single vector ✓ having the same effect as two or more vectors together ✓ (2)

3.2 Total distance = 40 m + 30 m✓
= 70 m✓ (2)

3.3 Suitable scale: 1 cm = 10 m✓



Therefore the man walked 50 m at 48,6⁰ ✓

MARK ALLOCATION

- ✓ Choosing suitable scale
- ✓ Correct distance to North
- ✓ Correct distance to South
- ✓ Correct resultant displacement answer
- ✓ Correct drawing
- ✓ Correct angle

(6)
[10]

QUESTION 4

4.1 Potential difference across the ends of a conductor is defined as the energy transferred ✓ per unit electric charge ✓ flowing through it. (2)

4.2

4.2.1 **OPTION 1**

$$\frac{1}{R_{//}} = \frac{1}{R_1} + \frac{1}{R_2} \checkmark$$

$$= \frac{1}{6} + \frac{1}{3} \checkmark$$

$$\therefore R_{//} = 2\Omega$$

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Therefore R_{total} = 4 + 2✓
= 6Ω ✓

OPTION 2

$$R_{//} = \frac{R_1 \times R_2}{R_1 + R_2} \checkmark$$
$$= \frac{6 \times 3}{6+3} \checkmark$$
$$= 2\Omega$$

Therefore R_{total} = 4 + 2✓
= 6Ω ✓

OPTION 3

$$R = \frac{V_1}{I_1} \checkmark$$
$$= \frac{12}{2} \checkmark$$
$$= 6\ \Omega \checkmark$$

(4)

4.2.2 $$R_{4\Omega} = \frac{V_2}{I_T} \checkmark$$
$$4 = \frac{V_2}{2} \checkmark$$
$$\therefore V_2 = 8\ V \checkmark$$

(3)

4.2.3 **OPTION 1**

$$I = \frac{V}{R} \checkmark$$
$$= \frac{12 - 8}{6} \checkmark$$
$$= 0{,}67\ A \checkmark$$

OPTION 2

$R \propto \frac{1}{I}$✓ or in words:
resistance is inversely proportional to current and
∴ratio of resistors is 6 : 3
2 : 1

∴ratio of current is 1 : 2 ✓
$A_2 : A_3$

$\therefore I_{A2} = \frac{2}{3} \times 1$
$\therefore I_{A2} = 0{,}67\ A$ ✓

(3)

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4.2.4 $A_1 = 2$ A
$\therefore Q = I \Delta t$ ✓
$= 2 \times 120$ ✓
$= 240$ C ✓ (3)

4.3 Decrease ✓ (1)

4.4 • If the 6 Ω resistor is removed, the resistance of the whole circuit increases ✓
• Since $R \alpha \frac{1}{I}$,
if R increases, and V is constant √ and I of the circuit decreases✓ (3)
[19]

QUESTION 5

5.1 5 m·s^{-1} ✓ north ✓ (accept range from 4,5 to 4,9) (2)

5.2 8,1 m·s^{-1} ✓✓ (accept range from 8,0 to 8,6) (2)

5.3

5.3.1 • The velocity is uniformly increasing.
• Velocity increases from 5 m·s^{-1} to 10 m·s^{-1} in 350 s.
• Positive acceleration.
• The girl is speeding up.

Any ONE of the options ✓✓ (2)

5.3.2 • Uniform/constant velocity
• No acceleration
• Same speed

Any ONE of the options ✓✓ (2)

5.4

5.4.1 **OPTION 1**
Distance A to C
$= \ell \times b + \frac{1}{2} \times b \times h$✓
$= \underline{5 \times 350}$ ✓$+ \underline{\frac{1}{2} \times 150 \times 5}$✓
$= 2\,125$ m ✓

OPTION 2
Distance A to C
$= \ell \times b + \ell \times b + \frac{1}{2} \times b \times h$✓
$= \underline{200 \times 5 + 150 \times 5}$✓$+\frac{1}{2} \times 150 \times 5$✓
$= 2\,125$ m ✓

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OPTION 3

Distance A to C

= ℓ x b + ½ (sum of parallel sides)h✓

= ℓ x b + ½ (som van parallele sye)h✓

= 5 x 200 ✓+ ½ (5 + 10)(150) ✓

= 2 125 m ✓ (4)

5.4.2 $a = \frac{\Delta v}{\Delta t}$✓

I_T

$= \frac{0-10}{600-535}$ ✓✓

$= -0{,}154\ m \cdot s^{-2}$

∴ $a = 0{,}154\ m \cdot s^{-2}$ South✓ (4)

5.5 D to E. ✓✓ (2)

5.6 The change in speed from D to E is (-)10 $m \cdot s^{-1}$ ✓ and that occurs over (50 s) a shorter period. ✓

OR

From B to C, the change in speed is 5 m·s-1 over a period of 150 s. ✓✓

OR

Gradient is the steepest✓✓ (2)

[20]

QUESTION 6

6.1 Acceleration is the rate✓ of change of velocity✓.

OR

Acceleration is the change in velocity✓ per unit time✓. (2)

6.2 No ✓ (1)

6.3 Velocity to the right, acceleration to the left ✓.

OR

Taxi slowing down so acceleration is in opposite direction ✓ to movement. (1)

6.4 **OPTION 1**

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$\Delta x = v_i t + \frac{1}{2}a\Delta t^2$ ✓
$= 25 \times 1$✓ $+ \frac{1}{2} \times 0 \times 1^2$ ✓
$= 25$ m ✓

OPTION 2
$\Delta x = \frac{(v_f + v_i)}{2} \Delta t$ ✓
$= \frac{25 + 25}{2}$ ✓$\times 1$ ✓
$= 25$ m✓

(4)

6.5 **POSITIVE MARKING FROM 6.4**

OPTION 1
$\Delta x = \frac{(v_f + v_i)}{2} \Delta t$ ✓

$= \frac{(0+25)}{2} \times 2$✓
$= 25$ m

∴ total distance
$= 25 + 25$✓
$= 50$ m✓

∴taxi will not stop at the traffic light as distance > 40 m✓

OPTION 2
$v_f = v_i + a\Delta t$✓

$a = \frac{v_f - v_i}{\Delta t}$

$a = \frac{(0 - 25)}{2}$ ✓
$= -12{,}5$ m·s^{-2}

$v_f^2 = v_i^2 + 2a\Delta x$
$0 = 252 + 2 \times -12{,}5 \times \Delta x$✓
∴$\Delta x = 25$m

∴ total distance
$= 25 + 25$
$= 50$ m✓

Only one mark for either equation

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∴taxi will not stop at the traffic light as distance > 40 m✓

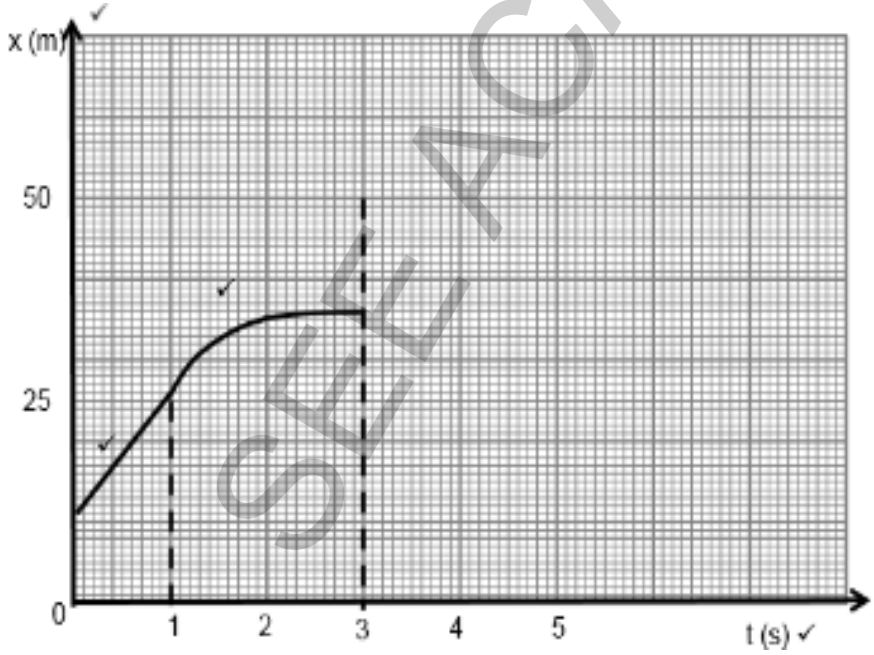
OPTION 3

$a = \frac{(v_f - v_i)}{\Delta t}$ ✓
$= \frac{(0 - 25)}{2}$ ✓
$= -12{,}5\ m \cdot s^{-2}$
$\Delta x = v_i t + \frac{1}{2} a \Delta t^2$
$= 25 \times 2 + \frac{1}{2} \times -12{,}5 \times 2^2$ ✓
$= 25\ m$
∴ total distance
$= 25 + 25$
$= 50\ m$✓

Only one mark for either equation

∴taxi will not stop at the traffic light, as distance > 40 m✓ (5)

6.6



(4)

MARK ALLOCATION

✓ Both axes correctly labelled
✓ Straight line (t =0 s and t = 1 s)
✓✓ Curve shape (t = 1 s and t = 3)

[17]

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QUESTION 7

7.1 Velocity is the rate of change in position, ✓✓

OR

Velocity is the displacement divided by a very small time interval ✓✓ (2)

7.2

7.2.1 $x = v_i t + 1/2at^2$ ✓

. $64 = (0 \times 4) + 1/2a(4)^2$✓

$64 = (8)a$

$a = 8 m.s^{-2}$✓ east✓ (4)

7.2.2 $v_f = v_i + at$ ✓

$v_f = 0 + (8)(4)$ ✓

$= 32 m.s^{-1}$ ✓east✓ (4)

[10]

TOTAL: 100 MARKS

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