Section A (36 marks)

When t=4, area under graph is 's' or displacement. = (4×10) = 20m When t=18, area under graph 20 + (\$(12×10)) + (1/2 (2×10)) = 20 + 120 + 10 = 150 m When t= 20 , S=20m When t= 18, s= 150 1 (ii) 5 160 . 140 120 100 80 60 40 20 At t=4, s=20 /, At t=18, S=150 /

2(i) If One Vector is a multiple of another, they are paralle!

P=12i-5j Q=16i+1.5j

P+q=12i+16i-5j+1.5j

P+9=328i-3.5j.

28i - 3.5i = K(8i - j)

 $K = \frac{28i}{8i}$ $JK = \frac{-3.5j}{-5}$ 50 K = 3.5

... hence parallel.

2 (ii) A Vertical component must be O.

3(12i-5j) + 10(16i + 1.5j) = 36i - 15j + 160i + 15j= 196i + 0j

Oj so only in horizontal direction.

2 (iii)	Horizontal component:
	$K(12i) + 3(16i) = 0$ $12K + 36 = 0$ $12K = -36$ $K = -\frac{36}{12} = -4$
	Weight only acts in Vertical component:
W+	Vertical Component: -4(-5j) + 3(1.5j) = 20 + 4.5 + w = 0 20 + 4.5 + w = 0, $24.5 + w = 040 + 4.5 + w = 0$, $24.5 + w = 040 + 4.5 +$
3 (i)	
	Who de RN SN
	RATINGCOSOL CAMPUONE SINE ON
	Cosine and on the
	They inversed at 15° so d. 245

3 (ii)	Son, Can, Toa
	SO FOR R:
	Rn= W Cosd
	For Sn Sn=WSind
	Sn=WSind
	Mar College annual market
(iii),	
`	
	Sn
	36 60 90
	Rn=W3 Cosd & They are Sine and
	Cosine Function:
	Sn=WSind
	They intersect at 45° so d>45
	45°< d ≤ 90°
	45< d = 90°

		/
4(1) Verify.		So=75m
		5=0
5= So + W	+ = at	u=20 Sin30
		\ \ = 0
0=75+6	$20\sin 30)t - 5t^2$	1 a=-10ms2
		\ t=?
We Solve 9	vadratic	
) (E+3)
: t=5		
Now, we w	ant displacer	nent, Just use
	way of wor	
4	3 ,	· · · · · ·
V= F	ut=d v	= 20 (0530
	E	= 5
(20 (0530)	$1 \times (5) = 501$	$\sqrt{3} \approx 86.603m$
90-50-3	3 = 3.3975m	
hence belo	7U 5m	Altriginal remarks and the
10190 0010		
	NED THE WAR	LEMENT PLANSAGE
		(answer space continued on next page)
		(anonor space continued on next page)

4 (i)	(continued)
	Endet deskriften E.C. externae
	0 = 2 × 0 0 0 / 1 + 2 × 1 = 45 / 3 × 0 + 2 × 10 0 / 2 =
4 (ii)	It will have less acceleration downwards so it will be in the air much
	longer hence it will travel further.
	14t = = = 150.000 = 35000 t = 0
	150:000 - 35 0.60 f
	Con- Seek Con / In Ash L. Pa Villa et Us Can Vive Rom / As

5(1) $V=37500 (4t-t^2) $ $(V=0 \text{ on curival})$ $(37500 t) (4-t) = 0$ hence $t=4$ hours 5(11) Find expression For distance We intergrate! $V=37500 (4t+t^2) = 150,000t - 37500t^2$ $V=37500 (4t+t^2) = 150,000t - 37500t^2$ $V=375000 t^2 - 37500 t^3 + t^2$ $V=375000 t^2 - 125,00t^3$ When $t=4 - 75000 (4^2) - 12500 (4^3)$ $V=37500000 - 80,0000 = 400,000000$
hence $t=4$ hours Find expression For distance We Intergrate! $v=37500 \text{ (4t} = t^2) = 150,000t - 37500t^2$ $150,000 + 2 - 37500 + 3 + 6$ 2 3 $5=75,000t^2 - 125,00t^3$ When $t=4 - 375000 + 12500 + 12$
5(ii) Find expression For distance We Intergrate! $V = 37500 (4t = t^2) = 150,000t - 37500t^2$ $150,000 = t^2 - 37500 = t^3 + t^2$ $S = 75,000t^2 - 125,00t^3$ When $t = 4 \rightarrow 75000 (4^2) - 12500 (4^3)$
We Intergrate! $V = 37500 \text{ Cyt} = 150,000t - 37500t^2$ $150,000 \text{ t}^2 - 37500 \text{ t}^3 + \text{c}$ $2 = 75,000t^2 - 125,00t^3$ When $t = 4 \rightarrow 75000 \text{ (4}^2) - 12500 \text{ (4}^3)$
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$V = 37500 (4t = t^2) = 150,000t - 37500t^2$ $\frac{150,000}{2} = t^2 - 37500 = t^3 + t$ $S = 75,000t^2 - 125,00t^3$ When $t = 4 \rightarrow 75000 (4^2) - 12500 (4^3)$
$\frac{250,000}{2} = 37500 = 3 + 6$ $\frac{150,000}{2} = 125,000 = 3 + 6$ $\frac{150,000}{2} = 125,000 = 3 + 6$ When $t=4 \rightarrow 75000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 12$
$\frac{250,000}{2} = 37500 = 3 + 6$ $\frac{150,000}{2} = 125,000 = 3 + 6$ $\frac{150,000}{2} = 125,000 = 3 + 6$ When $t=4 \rightarrow 75000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 125000 = 12$
$\frac{150,000}{2} = \frac{2}{3} + \frac{2}{3} + \frac{2}{3}$ $5 = \frac{15,000}{2} + \frac{125,00}{3} + \frac{3}{3} + \frac{2}{3}$ When $t = 4 \rightarrow \frac{125,00}{3} + \frac{12500}{3} $
$\frac{150,000}{2} = \frac{2}{3} + \frac{2}{3} + \frac{2}{3}$ $5 = \frac{15,000}{2} + \frac{125,00}{3} + \frac{3}{3} + \frac{2}{3}$ When $t = 4 \rightarrow \frac{125,00}{3} + \frac{12500}{3} $
$S = 75.000t^{2} - 125.00t^{3}$ When $t = 4 \rightarrow 75000(4^{2}) - 12500(4^{3})$
When t=4 -> 75000 (42) -12500 (43)
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120 0000 - 1100 000 KM
120,0000 - 80,0000 - 400,000
5(iii) Imagine (v = 37500 (4t-t2) like a
quadratic, when gradient is zero, it
is at a max point v=150,000t-37500t2
1000 = dy = 150,000 - 75000 t
35 do do do do 15000 t
Let do = , 150,000-75000 t =0
150,000 = 750,00t
t= 150,000/75,000 = 2 hours
At this hours, it is at max speed.
$V=3+5,00(4(2)-(2)^2)=150,000 \mathrm{Km/h}$