MODUL TOPIKAL
SOALAN PERCUBAAN SPM 2023

TOPIK TINGKATAN 4
BAB 8

VEKTOR
(*VECTORS*)

SUMBER SOALAN:
SOALAN – SOALAN PERCUBAAN

TERENGGANU
NEGERI SEMBILAN
KELANTAN
SABAH
SBP
MELAKA
SELANGOR (MODUL PINTAS-SET 1)
PERAK

SKEMA JAWAPAN

DISUSUN OLEH:

PN. NOORUL HUDA BINTI MOHD HASHIM
(SMK TAMAN TASIK, TAIPING)

PN ZAINAB BINTI ABD RAHMAN
(SMK CONVENT, TAIPING)

SOALAN 1 : SOALAN PERCUBAAN SPM NEGERI TERENGGANU 2023 (KERTAS 1)

13 (a) Tulis hukum segi tiga atau hukum poligon dalam (i) atau (ii) **P1**

$\overrightarrow{AD}=\overrightarrow{AB}+\overrightarrow{BC}+\overrightarrow{CD}$ @ $\overrightarrow{QP}=\overrightarrow{QC}+\overrightarrow{CP}$

Guna hukum segi tiga atau hukum poligon dalam (i) atau (ii)

$6\underset{\sim}{x}+8\underset{\sim}{y}+(-8\underset{\sim}{x})$ @ $(1-\lambda)(-8\underset{\sim}{x})+6\underset{\sim}{y}$ **K1**

(i) $-2\underset{\sim}{x}+8\underset{\sim}{y}$ **N1**

(ii) $(-8+8\lambda)\underset{\sim}{x}+6\underset{\sim}{y}$ [Panduan : $\overrightarrow{CP}=(1-\lambda)\overrightarrow{CD}$] **N1**

(b) $\overrightarrow{AD}=k\overrightarrow{QP}$

(guna apa-apa huruf @ simbol selain λ)

$-2\underset{\sim}{x}+8\underset{\sim}{y}=k\left[(-8+8\lambda)\underset{\sim}{x}+6\underset{\sim}{y}\right]$ **K1**

Bandingkan : $-2=(-8+8\lambda)k$ & $8=6k$ K1

selesaikan persamaan serentak **K1**

$k=\frac{4}{3}$ & $\lambda=\frac{13}{16}$ **N1**

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SOALAN 2 : SOALAN PERCUBAAN SPM NEGERI TERENGGANU 2023 (KERTAS 2)

7 (a) $\overrightarrow{OP}=-4\underset{\sim}{i}+\underset{\sim}{j}$ (Boleh tersirat) **P1**

Tulis hukum segi tiga bagi ΔPQR **P1**

Panduan: $\overrightarrow{OR}=\overrightarrow{OP}+\overrightarrow{PR}$ @ $\overrightarrow{OQ}=\overrightarrow{OR}+\overrightarrow{RQ}$

$-4\underset{\sim}{i}+\underset{\sim}{j}+6\underset{\sim}{i}+3\underset{\sim}{j}$ @ $2\underset{\sim}{i}+4\underset{\sim}{j}+2\underset{\sim}{i}-6\underset{\sim}{j}$ **K1**

$2\underset{\sim}{i}+4\underset{\sim}{j}$ & $4\underset{\sim}{i}-2\underset{\sim}{j}$ **N1**

$\left(\frac{2+4}{2},\frac{4+(-2)}{2}\right)$ @ setara **K1**

(3,1) **N1**

(b) $\frac{6\underset{\sim}{i}+3\underset{\sim}{j}}{\sqrt{(6)^2+(3)^2}}$ **K1**

$\frac{2}{\sqrt{5}}\underset{\sim}{i}+\frac{1}{\sqrt{5}}\underset{\sim}{j}$ @ setara **N1**

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SOALAN 3 : SOALAN PERCUBAAN SPM NEGERI SEMBILAN 2023 (KERTAS 1)

13	(a)	$-4+k+(-1)=0$ atau $h+(-2)+(-7)=0$	K1
		$k=5$ dan $h=9$	N1
	(b)	$\underset{\sim}{i}+7\underset{\sim}{j}$	P1
		$\sqrt{(-4+5)^2+(9-2)^2}$	K1
		$5\sqrt{2}$	N1
	(c)	$F_{1new}=-2\underset{\sim}{i}+4\underset{\sim}{j}$	P1
		$\sqrt{(-2)^2+4^2}$ atau $\sqrt{(-2)^2+4^2}$	K1
		$\frac{-\underset{\sim}{i}+2\underset{\sim}{j}}{\sqrt{5}}$	N1

SOALAN 4 : SOALAN PERCUBAAN SPM NEGERI SEMBILAN 2023 (KERTAS 2)

7(a)	$(p+1)\underset{\sim}{a}+(-2)\underset{\sim}{a}+(q+1)\underset{\sim}{b}+(-q)\underset{\sim}{a}=\left(\frac{p+1}{2}\right)\underset{\sim}{a}+2q\underset{\sim}{b}$ atau setara	K1
	$p+1-2-q=\frac{p+1}{2}$ atau $q+1=2q$ atau setara	K1
	Selesaikan persamaan serentak	K1
	$p=5$ dan $q=1$	N1
7(b)	$\overrightarrow{JM}=\lambda\overrightarrow{JR}$ atau setara $3\underset{\sim}{a}+2\underset{\sim}{b}=\lambda\left(\frac{9}{2}\underset{\sim}{a}+k\underset{\sim}{b}\right)$ atau setara	K1
	Bandingkan vektor $\underset{\sim}{a}$ dan $\underset{\sim}{b}$ dan selesaikan persamaan serentak $3=\frac{9}{2}\lambda$ dan $2=\lambda k$ atau setara	K1
	$k=3$	N1
	2 : 1	N1

SOALAN 5 : SOALAN PERCUBAAN SPM NEGERI KELANTAN 2023 (KERTAS 1)

9. (a)	$\left\|-\overrightarrow{OQ}\right\| = \sqrt{3^2+(-4)^2}$ 5 unit	K1 N1	
9. (b)	$\overrightarrow{RQ} = \overrightarrow{RO} + \overrightarrow{OQ}$ $-r+q$	K1 N1	4
10 (a)	6!1! atau 2!2!2! $\frac{6!1!}{2!2!2!}$ 90	P1 K1 N1	

SOALAN 6 : SOALAN PERCUBAAN SPM NEGERI KELANTAN 2023 (KERTAS 2)

8 (a)	$\overrightarrow{PB} = \overrightarrow{PO} + \overrightarrow{OB}$ atau $\overrightarrow{PB} = \overrightarrow{PA} + \overrightarrow{AB}$ atau $\overrightarrow{OQ} = \overrightarrow{OA} + \overrightarrow{AQ}$ $\overrightarrow{PB} = -6\underset{\sim}{h} + 4\underset{\sim}{k}$ $\overrightarrow{OQ} = \frac{9}{2}\underset{\sim}{h} + 2\underset{\sim}{k}$	P1 N1 N1	
8 (b)	$\overrightarrow{PR} = -\frac{12}{5}\underset{\sim}{h} + \frac{8}{5}\underset{\sim}{k}$ atau setara $-\frac{12}{5} = -6\lambda$ dan $\frac{8}{5} = 4\lambda$ $\lambda = \frac{2}{5}$ atau setara $\overrightarrow{PR} = \frac{2}{5}\overrightarrow{PB}$ atau setara	K1 K1 K1 N1	10
(c)	$\frac{1}{2}\left\|3\underset{\sim}{h}\right\| h = 12$ atau $\frac{1}{2}(3PA)h$ atau $\frac{OAB}{PAB} = \frac{3}{1}$ $\frac{1}{2}\left\|9\underset{\sim}{h}\right\|\left(\frac{8}{\left\|\underset{\sim}{h}\right\|}\right)$ atau 3×12 atau $OAB = 3(12)$ 36	KI K1 N1	

SOALAN 7 : SOALAN PERCUBAAN SPM NEGERI SABAH 2023 (KERTAS 1)

5	a) $\begin{pmatrix} 1 \\ p-1 \end{pmatrix} = \lambda\begin{pmatrix} 9 \\ 8 \end{pmatrix}$ atau setara $\frac{17}{9}$	K1 N1	**4**
	b) $\sqrt{1^2+(p-1)^2} = \sqrt{9^2+8^2}$ $p^2-2p-143=0$ $(p-13)(p+11)=0$ *mesti ada kedua-duanya $p=13, p=-11$ *mesti betul kedua-dua nilai	K1 N1 	

SOALAN 8 : SOALAN PERCUBAAN SPM NEGERI SABAH 2023 (KERTAS 2)

8	a) i) $\hat{r} = \frac{15\mathbf{i}+3\mathbf{j}}{\sqrt{15^2+3^2}}$ $\hat{r} = \frac{15\mathbf{i}+3\mathbf{j}.}{\sqrt{234}}$	K1 N1	**10**
	b) i) $\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$ $\overrightarrow{AO} = 10\mathbf{i} - 6\mathbf{j}$ $\overrightarrow{OC} = 5\mathbf{i} + 9\mathbf{j} + 10\mathbf{i} - 6\mathbf{j}$ $\overrightarrow{OC} = 10\mathbf{i} - 6\mathbf{j}$ ii) $\overrightarrow{AB} = \mu\overrightarrow{BD}$ $15\mathbf{i} + 3\mathbf{j} = \mu[h\mathbf{i} + (k-2)\mathbf{j}]$ $15 = \mu h \quad 3 = \mu(k-2)$ Selesaikan persamaan serentak. $\frac{15}{h} = \frac{3}{k-2}$ $k = \frac{h+10}{5}$	K1 N1 K1 N1 P1 K1 K1 N1	

SOALAN 9 : SOALAN PERCUBAAN SPM SBP 2023 (KERTAS 1)

6(*a*)	Guna hukum segi tiga vektor $\overrightarrow{OP} = \overrightarrow{OQ} + \overrightarrow{QP}$ **K1** P (-3, -4) **N1**		2	
(*b*)	Mencari magnitud $\sqrt{(-3)^2 + (-4)^2}$ **K1** boleh tersirat $\frac{-3\underset{\sim}{i} - 4\underset{\sim}{j}}{5}$ @ $\frac{-3\underset{\sim}{i}}{5} - \frac{4\underset{\sim}{j}}{5}$ @ setara **N1**		2	
(*c*)	$\overrightarrow{RS} = \lambda\overrightarrow{PQ}$ **K1** $k = \frac{25}{7}$ **N1**		2	6

SOALAN 10 : SOALAN PERCUBAAN SPM SBP 2023 (KERTAS 2)

3(a)	Tulis hukum segi tiga	4	
	$\overrightarrow{PT} = \overrightarrow{PR} + \overrightarrow{RT}$ @ $\overrightarrow{RU} = \overrightarrow{RP} + \overrightarrow{PU}$ **P1**		
	$\overrightarrow{PT} = \underset{\sim}{x} + \frac{4}{5}(\underset{\sim}{y} - \underset{\sim}{x})$ @ $\overrightarrow{RU} = -\underset{\sim}{x} + 2\left(\frac{\underset{\sim}{x}}{5} + \frac{4\underset{\sim}{y}}{5}\right)$ **K1**		
	$\overrightarrow{PT} = \frac{\underset{\sim}{x}}{5} + \frac{4\underset{\sim}{y}}{5}$ **N1**		
	$\overrightarrow{RU} = -\frac{3\underset{\sim}{x}}{5} + \frac{8\underset{\sim}{y}}{5}$ **N1**		
(b)	$\overrightarrow{RQ} = -\frac{3k\underset{\sim}{x}}{5} + \frac{8k\underset{\sim}{y}}{5}$ @ $\overrightarrow{RQ} = -\underset{\sim}{x} + h\underset{\sim}{y}$ **N1**	3	
	Banding *pekali bagi $\underset{\sim}{x}$ dan $\underset{\sim}{y}$		
	$-1 = -\frac{3k}{5}$ @ $h = \frac{8k}{5}$ **K1**		
	$k = \frac{5}{3}$ dan $h = \frac{8}{3}$ **N1**		7

SOALAN 11 : SOALAN PERCUBAAN SPM NEGERI MELAKA 2023 (KERTAS 1)

9. (a)	$\overrightarrow{PT} = \overrightarrow{PQ} + \overrightarrow{QT}$	1	
	$4\underset{\sim}{i} - 6\underset{\sim}{j} + \frac{3}{4}(-2\underset{\sim}{i} + 10\underset{\sim}{j})$	1	
	$\frac{5}{2}\underset{\sim}{i} + \frac{3}{2}\underset{\sim}{j}$	1	
(b)	$\frac{1}{\sqrt{\left(\frac{5}{2}\right)^2 + \left(\frac{3}{2}\right)^2}}\left(\frac{5}{2}\underset{\sim}{i} + \frac{3}{2}\underset{\sim}{j}\right)$	1	
	$\frac{5}{\sqrt{34}}\underset{\sim}{i} + \frac{3}{\sqrt{34}}\underset{\sim}{j}$	1	5

SOALAN 12 : SOALAN PERCUBAAN SPM NEGERI MELAKA 2023 (KERTAS 2)

9 **(a) i**	Tulis hukum bagi segi tiga $AY = \overrightarrow{AO} + \overrightarrow{OY}$ atau setara $\overrightarrow{AY} = -\underset{\sim}{a} + \underset{\sim}{b}$	1 1	
(a) ii	$\overrightarrow{OM} = \overrightarrow{OA} + \overrightarrow{AM}$ $\frac{3}{5}\underset{\sim}{a} + \frac{2}{5}\underset{\sim}{b}$	 1	
(b) i	$\frac{3}{5}k\underset{\sim}{a} + \frac{2}{5}k\underset{\sim}{b}$	1	
(b) ii	$h\underset{\sim}{b}$ $\overrightarrow{OX} = \overrightarrow{OA} + \overrightarrow{AX}$ atau setara $\frac{3}{5}k\underset{\sim}{a} + \frac{2}{5}k\underset{\sim}{b} = \underset{\sim}{a} + h\underset{\sim}{b}$ Banding pekali $\frac{3}{5}k = 1$ atau $\frac{2}{5}k = h$ selesaikan $k = \frac{5}{3}$ $h = \frac{2}{3}$	1 1 1 1 1	**10**
(c)	$OM:MX = 3:2$	1	

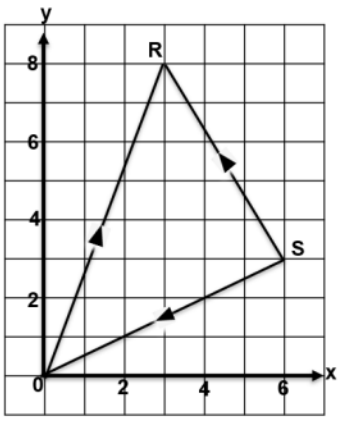
SOALAN 13 : SOALAN PERCUBAAN SPM NEGERI SELANGOR SET 1 2023 (KERTAS 1)

11	(a)		Guna hukum segi tiga vektor $\overrightarrow{PR} = \overrightarrow{PA} + \overrightarrow{AR}$ $-\frac{2}{3}(2\underline{a}) + \lambda(2\underline{b})$ $-\frac{4}{3}\underline{a} + 2\lambda\underline{b}$	 K1 N1	
	(b)	(i)	$\overrightarrow{PQ} = -\frac{8}{15}\underline{a} + \frac{6}{5}\underline{b}$ $\overrightarrow{PQ} = k\overrightarrow{PR}$ Bandingkan $\left(-\frac{8}{15}\underline{a} + \frac{6}{5}\underline{b}\right) = k\left(-\frac{4}{3}\underline{a} + 2\lambda\underline{b}\right)$ $\lambda = \frac{3}{2}$	 K1 N1	
		(ii)	$PQ:QR = 2:3$	N1	
					5

SOALAN 14 : SOALAN PERCUBAAN SPM NEGERI SELANGOR SET 1 2023 (KERTAS 2)

8	(a)	(i)	Guna hukum segi tiga vector untuk mencari $\overrightarrow{AB}$ @ $\overrightarrow{AC}$	K1
			$\overrightarrow{AB} = -3\underline{i} + 2\underline{j}$ // $\begin{pmatrix}-3\\2\end{pmatrix}$	N1
			$\overrightarrow{AC} = -7\underline{i} + 5\underline{j}$ // $\begin{pmatrix}-7\\5\end{pmatrix}$	N1
		(ii)	$\overrightarrow{BC} = \overrightarrow{BA} + \overrightarrow{AC}$	K1
			$\overrightarrow{BC} = \left(3\underline{i} - 2\underline{j}\right) + \left(-7\underline{i} + 5\underline{j}\right)$	
			$\overrightarrow{BC} = -4\underline{i} + 3\underline{j}$	N1
			$\left\|\overrightarrow{BC}\right\| = \sqrt{(-4)^2 + (3)^2} = 5$	K1
			Vektor unit dalam arah $\overrightarrow{BC}$	N1
			$= \frac{-4\underline{i}+3\underline{j}}{5}$ // $\frac{1}{5}\left(-4\underline{i} + 3\underline{j}\right)$ atau setara	

SOALAN 15 : SOALAN PERCUBAAN SPM NEGERI PERAK 2023 (KERTAS 1)

6	(a)		1,1	4
	(b)	$\overrightarrow{SR} = \overrightarrow{SO} + \overrightarrow{OR}$ $\overrightarrow{SR} = -6\mathbf{i} - 3\mathbf{j} + 3\mathbf{i} + 8\mathbf{j}$		
		$\overrightarrow{SR} = -(6+3)\mathbf{i} + (-3+8)\mathbf{j}$	1	
		$\overrightarrow{SR} = -3\mathbf{i} + 5\mathbf{j}$		
		vektor unit dalam arah $\overrightarrow{SR} = \frac{1}{\sqrt{34}}(-3\boldsymbol{i} + 5\boldsymbol{j})$	1	

SOALAN 16 : SOALAN PERCUBAAN SPM NEGERI PERAK 2023 (KERTAS 2)

11	(a)		$v_P = \begin{pmatrix}16\\8\end{pmatrix}$ *or* $16\underline{i} + 8\underline{j}$	1	10
			$v_Q = \begin{pmatrix}5\\-3\end{pmatrix}$ *or* $5\underline{i} - 3\underline{j}$	1	
			$\begin{pmatrix}8+16t\\2+8t\end{pmatrix} = \begin{pmatrix}15\\9\end{pmatrix} + t\begin{pmatrix}5\\-3\end{pmatrix}$ OR $8 + 16t = 15 + 5t \;\; or \;\; 2 + 8t = 9 - 3t$	1	
			$t = \frac{7}{11}$ @ $0.636\ jam$	1	
	(b)	I	$\begin{pmatrix}15\\9\end{pmatrix} + (1)\begin{pmatrix}5\\-3\end{pmatrix}$	1	
			$\overrightarrow{OA} = \begin{pmatrix}20\\6\end{pmatrix}$ *OR* $A(20,6)$	1	
		ii	$\overrightarrow{QA} = \overrightarrow{QO} + \overrightarrow{OA}$ $\overrightarrow{QA} = \begin{pmatrix}-15\\-9\end{pmatrix} + \begin{pmatrix}20\\6\end{pmatrix}$	1	
			$\overrightarrow{QA} = \begin{pmatrix}5\\-3\end{pmatrix}$ @ $5\underline{i} - 3\underline{j}$	1	
			$\frac{1}{\sqrt{(5)^2+(-3)^2}}\begin{pmatrix}5\\-3\end{pmatrix}$ OR $\frac{5\underline{i}-3\underline{j}}{\sqrt{(5)^2+(-3)^2}}$	1	
			$\frac{1}{\sqrt{34}}\begin{pmatrix}5\\-3\end{pmatrix}$ OR $\frac{5\underline{i}-3\underline{j}}{\sqrt{34}}$	1	