MODUL TOPIKAL
SOALAN PERCUBAAN SPM 2023

TOPIK TINGKATAN 4
BAB 5

JANJANG
(*PROGRESSIONS*)

SUMBER SOALAN:
SOALAN – SOALAN PERCUBAAN

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

SKEMA JAWAPAN

DISUSUN OLEH:

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(SMK TAMAN TASIK, TAIPING)

PN ZAINAB BINTI ABD RAHMAN
(SMK CONVENT, TAIPING)

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

5	$ar^{5-1} = 9(ar^{3-1})$	K1	4
	$r = 3$	N1	
	$S_6 = \frac{a(3^6-1)}{3-1}$ @ $S_3 = \frac{a(3^3-1)}{3-1}$	K1	
	$S_6 = 28S_3$	N1	

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

5	(a)	$180 = \frac{3}{2}[2a+(3-1)d]$ @ $396 = a+(30-1)d$	**K1**	**10**
		Selesaikan persamaan serentak	**K1**	
		$d = 12$ & $a = 48$	**N1**	
		$S_{30} = \frac{30}{2}[2(^*48)+(30-1)(^*12)]$	**K1**	
		6660	**N1**	
	(b)	$6660 - \frac{20}{2}[2(^*48)+(20-1)(^*12)]$	**K1**	
		3420	**N1**	
	(c)	$T_{29} = {}^*48+(29-1)(^*12)$	**K1**	
		$\frac{384}{12}$	**K1**	
		32	**N1**	

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

4	$pq^{2(5)-1}$ atau $pq^{2(3)-1}$ atau $T_1 = pq^{2(1)-1}$ atau $T_2 = pq^{2(2)-1}$	P1
	$r = \frac{pq^3}{pq}$ atau $pq^9 = 16pq^5$	K1
	$q = 2$	K1
	$r = 4$	N1

SOALAN 4 : SOALAN PERCUBAAN SPM NEGERI SEMBILAN 2023 (KERTAS 1)

5	(a)	$S_{n-1} = 2n^2 - n - 1$	N1
		$T_n = 2n^2 + 3n - (2n^2 - n - 1)$	K1
		$T_n = 4n + 1$	N1
	(b)	5, 9, 13	K1
		$d_1 = 9 - 5 = 4$ dan $d_2 = 13 - 9 = 4$	K1
		$d = 4$ janjang aritmetik	N1

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

4 (a)	$T_7 = a + (7-1)\left(\frac{1}{2}\right) = 13$	K1	
	$a = 10$	N1	
(b)	$S_n = \frac{10\left(1-(\frac{1}{2})^n\right)}{1-\frac{1}{2}}$ atau $T_{11} = 15$	K1	
	$S_n = \frac{10\left(1-(\frac{1}{2})^n\right)}{1-\frac{1}{2}} = 15$	K1	
	$\left(\frac{1}{2}\right)^n = \left(\frac{1}{2}\right)^2$ *or* $n \log_{10} 0.5 = \log_{10} 0.25$	K1	6
	$n = 2$	N1	

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

4			
(a)(i)	$0.8+(n-1)0.02=1.18$ $n=20$	K1 N1	
(ii)	$S_n=\frac{20}{2}[0.8+1.18]$ atau $S_n=\frac{20}{2}[2(0.8)+(20-1)(0.02)]$ $19.8\ kg$	K1 N1	7
4(b)	$0.02:0.5 \quad (d=0.5)$ $T_n=3.5+19(0.5)$ $X=13$ minit	N1 K1 N1	

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

12	a) $S_n=a+(a+d)+(a+2d)+\cdots+[a+(n-2)d)]+[a+(n-1)d]$ *or* $S_n=[a+(n-1)d]+[a+(n-2)d]+\cdots+(a+2d)+(a+d)+a$ Atau (hasil tambah n sebutan pertama ditulis dengan terbalikkan susunan) $2S_n=[2a+(n-1)d]+[2a+(n-1)d]+\cdots+[2a+(n-1)d)]$ $2S_n=n[2a+(n-1)d]$ dan lihat/ and $S_n=\frac{n}{2}[2a+(n-1)d]$	K1 K1 N1	**9**
	b) $S_n=\frac{n}{2}[2(5)+(n-1)4]$ $=2n^2+3n$	K1 N1	
	c) $2n^2+3n=2277$ $2n^2+3n-2277=0$ $(n-33)(2n+69)=0$ $n=33$ $T_{33}=5+32(4)=133$ atau $\frac{33}{2}[5+x]=2277$ $x=133$	K1 N1 K1 N1	

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

4	a) Pertimbangkan, $S_n = \frac{a(1-r^n)}{1-r}$, $\|r\| < 1$ Apabila $r \to \infty$, oleh itu/ hence $(1 - r^n) \to 1$ Maka, $S_n = \frac{a}{1-r}$, $\|r\| < 1$	K1 N1	
	b) $r = \frac{67.2}{70} = 0.96$ $a = 0.96\left(\frac{70\times\pi}{180}\right)$ $= 24.44$ cm $S_\infty = \frac{24.44}{1-0.96}$ $= 611$ cm Tidak, jumlah jarak tidak melebihi jarak 700 m apabila ia berhenti	N1 N1 K1 N1 N1	7

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

8(a)	Guna $S_n = T_1 + T_2 + T_3 + ... + T_{n-1} + T_n$ & $T_n = a + (n-1)d$ **K1** $S_{n1} = a + (a+d) + (a+2d) + ... + [a + (n-2)d] + [a + (n-1)d]$ @ $S_{n2} = [a + (n-1)d] + [a + (n-2)d] + ... + (a+2d) + (a+d) + a$ $S_{n1} + S_{n2}$ **K1** $2S_n = [2a + (n-1)d] + [2a + (n-1)d] + ...$ $S_n = \frac{n}{2}[2a + (n-1)d]$ **N1**	3	
(b)	$S_7 = \frac{7}{2}[2(400) + (7-1)(-8)]$ **K1** $T_8 = 352 + 352$ or $T_7 = 400 + (7-1)(-8)$ **K1** $S_7 + T_8$ **K1** 3 336 **N1**	4	7

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

6(a)	$ar + ar^2 = 30$ OR $ar = a - 9$ **K1** Selesaikan persamaan serentak **K1** $r = \frac{2}{3}$ **N1** $a = 27$ **N1**	4	
(b)	$27\left(\frac{2}{3}\right)^{n-1} = \frac{150}{81}$ **K1** $n = 6.61$ **N1** Bukan integer **N1**	3	7

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

14.	(a)	$n \to \infty$, maka $r^n \approx 0$ dan guna $S_n = \frac{a(1-r^n)}{1-r}$		
		$S_\infty = \frac{a(1-0)}{1-r}$	1	
		$S_\infty = \frac{a}{1-r}$, $\lvert r \rvert < 1$	1	
	(b) (i)	$3\left(\frac{1}{2}\right)^{5-1}$ atau kaedah listing: $3, \frac{3}{2}, \frac{3}{4}, \frac{3}{8}, \frac{3}{16}$	1	
		$\frac{3}{16}$ atau $T_5 = \frac{3}{16}$ (kaedah listing)	1	
	(ii)	Alternatif 1 $a = \frac{1}{8}$, $r = \frac{\frac{1}{32}}{\frac{1}{8}}$ OR	1, 1	
		$S_\infty = \frac{\frac{1}{8}}{1-\frac{1}{4}}$ dan $\frac{1}{6} \times (6 \times 6)$	1	
		6	1	
		Alternatif 2 $a = \frac{1}{2} \times 3 \times 3$, $r = \frac{\frac{1}{2} \times 1.5 \times 1.5}{\frac{1}{2} \times 3 \times 3}$	1, 1	
		$S_\infty = \frac{\frac{1}{2} \times 3 \times 3}{1-\frac{1}{4}}$	1	
		6	1	8

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

7(a)	$\frac{7}{2}[2a+(7-1)d]=511$	1	
	$\frac{19}{2}[2a+(19-1)d]-511=-150$	1	
	Solve the equation by using substitution method or elimination method	1	
	$a=100$, $d=-9$	1,1	
(b)	$100+(n-1)(-9)=-8$	1	
	$n=13$	1	**7**

SOALAN 13 : SOALAN PERCUBAAN SPM NEGERI SELANGOR SET1 2023 (KERTAS 1)

10	(a)		Cari beza sepunya $d_1=12-6=6,\ d_2=18-12=6$ $d_1=d_2$, maka janjang ini merupakan janjang aritmetik.	N1	
	(b)		T_1: $6=6+0=6+0(6)=6+(1-1)(6)$ T_2: $12=6+6=12+1(6)=12+(2-1)(6)$ T_3: $18=6+6+6=18+2(6)=6+(3-1)(6)$ Senaraikan sebutan dalam bentuk $T_1=a,\ T_2=a+d,\ T_3=a+d+d,\ldots$ @ $T_1=a+d(0),\ T_2=a+d(1),\ T_3=a+d(2),\ldots$ T_1: $6=6+0=6+0(6)$ T_2: $12=6+6=6+1(6)$ T_3: $18=6+6+6=6+2(6)$ Gantikan sebutan pertama $=a$ & beza sepunya $=d$ T_1: $a+(1-1)(d)$ T_2: $a+(2-1)(d)$ T_3: $a+(3-1)(d)$ $T_n=a+(n-1)d$	K1 K1 N1	
	(c)		$T_n+T_{n+1}+T_{n+2}=108$ $x+x+6+x+12=108$ $x=30$ $T_5=30$, $T_6=36$, $T_7=42$ $8.00+9.00+10.00+4.90$ RM31.90	K1 N1 K1 N1	
					8

SOALAN 14 : SOALAN PERCUBAAN SPM NEGERI SELANGOR SET1 2023 (KERTAS 2)

6	(a)		Guna ar^{n-1} $T_5 = 4T_3$ $ar^4 = 4ar^2$ $\frac{r^4}{r^2} = 4$ $r = \pm 2$ $\therefore r = 2$	K1 N1	
	(b)	(i)	Guna $S_n = \frac{a(r^n-1)}{r-1}$ $\frac{3(2^n-1)}{2-1} = 1533$ Selesaikan $2^n = 2^9$ $n = 9$	K1 K1 N1	
		(ii)	Guna $T_n = ar^8$ $T_9 = (3)(2)^8$ RM768.00	K1 N1	
					7

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

7	(a)	(i)	$S_n = a + ar + ar^2 + \ldots\ldots + ar^{n-2} + ar^{n-1}$ $rS_n = ar + ar^2 + ar^3 + \ldots\ldots + ar^{n-1} + ar^n$ $S_n - rS_n = a - ar^n$ $(1-r)S_n = a - ar^n$ $S_n = \frac{a(1-r^n)}{1-r}$	 1 1	7
		(ii)	Hasil tambah $= \frac{64(1-(\frac{1}{2})^8)}{1-(\frac{1}{2})} - \frac{64(1-(\frac{1}{2})^5)}{1-(\frac{1}{2})}$ $= \frac{7}{2}$	1 1	
	(b)		$ar^5 = (ar)(ar^3)$ $a = r$ $a(a^7) = 256$ $a^8 = 256$ $a = 2$	1 1 1	