ET/SSS/2022(2023)/OL/32/S/A/E-2

අධ්‍යාපන අමාත්‍යාංශය
கல்வி அமைச்சு
Ministry of Education

G. C. E. Ordinary Level | අ. පො. ස. සාමාන්‍ය පෙළ | 2022 (2023)

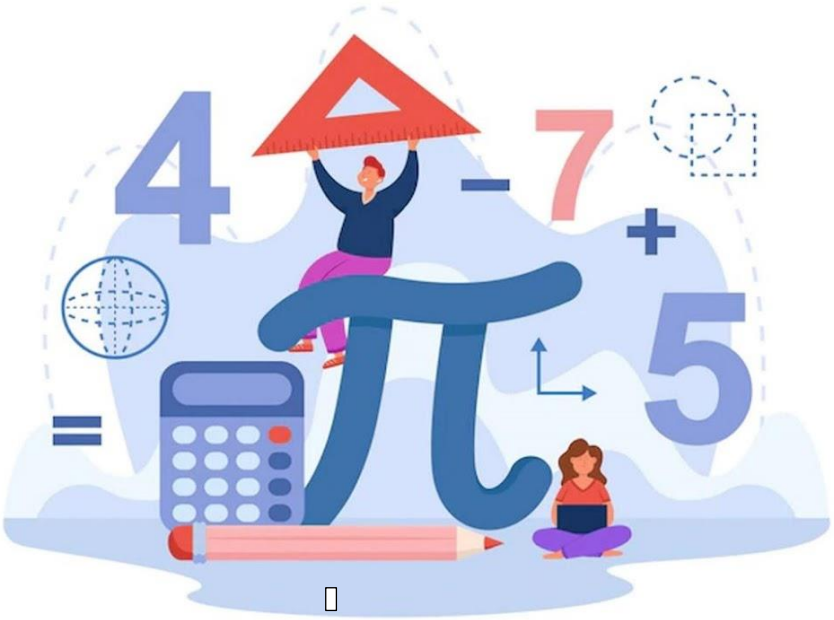
Student Seminar Series

ශිෂ්‍ය සම්මන්ත්‍රණ මාලාව

Practice Paper | උපකාරක ප්‍රශ්න පත්‍ර

Mathematics

ගණිතය



Answer Sheet - I, II (English Medium)

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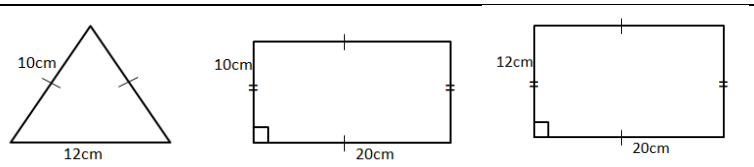
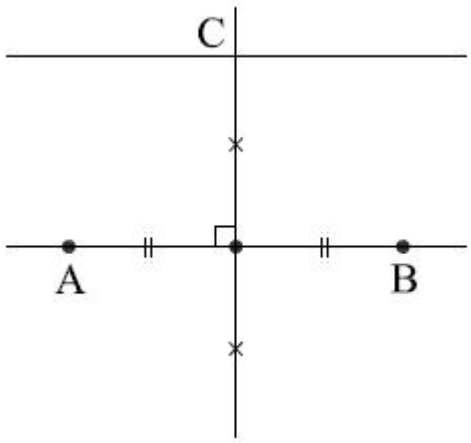
Mathematics I part A

Question Number			Answer	Marks Allocation		
01			3000 6%	1 1	02	02
02			$x = 30$ $90 + x = 4x$ $3x = 90$	1 1	02	02
03			$(2x - 3)(x - 2)$	2	02	02
04				1+1	02	02
05			$32cm$ $DB^2 + DO^2 = OB^2$ $DB^2 + 12^2 = 20^2$	1 1	02	02
06			$12a^2b^2$	2	02	02
07			$\frac{3}{5}$ or 0.6 $AC = 5$	1 1	02	02
08			$AB = DC \quad AD = BC$ √ If all three correct $DAB = B\hat{C}D \quad A\hat{B}C = ADC$ √ If at least 1 is correct $D\hat{A}C = B\hat{A}C \quad AC \perp BD$ ×	2 1	02	02
09			$9ax$	2	02	02

Question Number			Answer	Marks		
10			4.5	2	02	02
11			8	2	02	02
12			9 $\frac{1}{8} \times \pi \times 21 \times 21 \div \frac{1}{8} \times \pi \times 7 \times 7$	1 1	02	02
13			$x = 65^0$ $80 + 35 + x = 180$	1 1	02	02
14			$x = 2$ $x = -3$	1 1	02	02
15			70	2	02	02
16			$x = 135^0$ $AOC\ reflect\ angle\ =\ 270^0$	1 1	02	02
17			9 times $\frac{ar^9}{ar^7} = r^2$ $r^2 = 9$	2	02	02

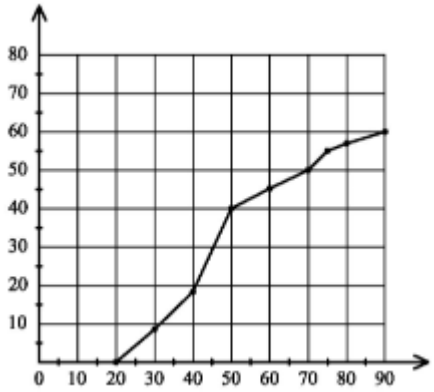
Question Number			Answer	Marks Allocation		
18			If both angles are correct If only one angle is correct	2 1	02	02
19			(i) BC = 16cm (ii) AC = 24 cm	1 1	02	02
20			Gradient = $\frac{3}{4}$ Intercept = 3 or $\frac{0-3}{4-0}$	1 1	02	02
21			2 hours $\frac{60\times4}{40}$	1 1	02	02
22			(i) centre. (ii) twice	2	02	02
23			$\frac{2}{4}$ or $\frac{1}{2}$	2	02	02
24			6 10	1 1	02	02

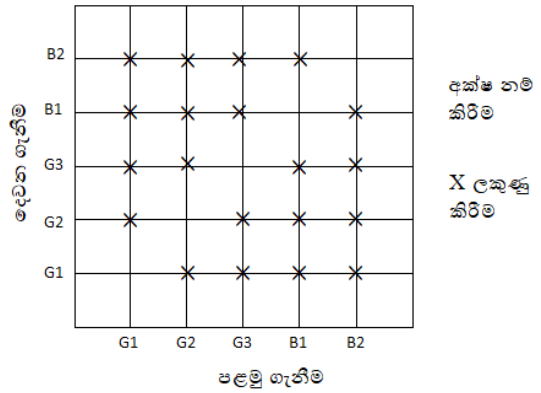
Question Number			Answer	Marks Allocation		
25			 To the diagram	2	02	02

Mathematics I part B

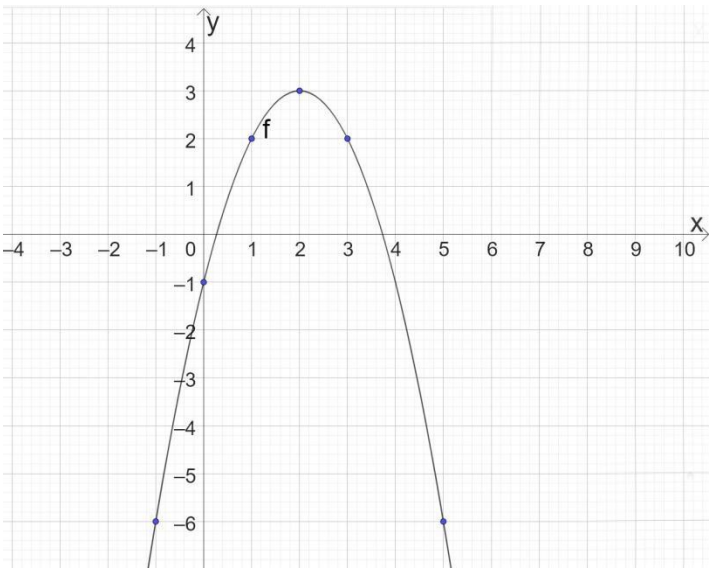
Question Number			Answer	Marks Allocation		
01		i.	$1-\frac{1}{7}=\frac{6}{7}$	1	01	
		ii.	$\frac{6}{7}$ of $\frac{2}{3}$ $=\frac{4}{7}$	1 1	02	
		iii.	$1-\left(\frac{1}{7}+\frac{4}{7}\right)=1$ $=\frac{2}{7}$	1 1	02	
		iv.	$\frac{2}{7}=24500$ $\frac{1}{7}=12250$ ∴ Total Population = 12250×7 $=85750$	1 1 1	03	
		v.	$\frac{4}{7}\div\frac{2}{7}$ Twice	1 1	02	10

Question Number			Answer	Marks Allocation		
02		i.	$\frac{22}{7} \times 14 \times 14 \times \frac{1}{4}$	1		
				1	02	
			$154cm^2$			
		ii.	Area of the Trapezium $= \frac{1}{2}(30 + 14) \times 14$	1		
			$= 308cm^2$	1		
			∴ Total Area $= 308 + 154$			
			$= 462cm^2$	1	03	
		iii.	$2 \times \frac{22}{7} \times 14 \times \frac{1}{4}$			
			$= 22cm$	1		
				1	02	
		iv.	Total Perimeter $= 79 + 22$			
			$= 101cm$	1		
				1	02	
		v.	$\frac{154}{14} = 11cm$	1	01	10
03	(a)	i.	36×20			
			720	1	01	
		ii.	$36 \times 5 = 180$	1	01	
			$720 - 180 = 540$			
			Number of People = $36 - 9 = 27$			
			$27 + 3 = 30$ or	1	01	
			$36 - 6 = 30$			
			Number of days $= \frac{540}{30}$			
			$= 18$	1	01	
	(b)	i.	Income that should pay the tax = 800 000 – 500 000	1		
			= 300 000	1	03	10
			Income tax = $300\,000 \times \frac{4}{100} = 12\,000$	1		
		ii.	Tax for 500 000 $= 500\,000 \times \frac{4}{100}$			
			= 20 000	1		
			Remaining Tax = 36 000 – 20 000			
			= 16 000			
			Income $= 16\,000 \times \frac{100}{8}$	1		
			= 200 000	1	03	

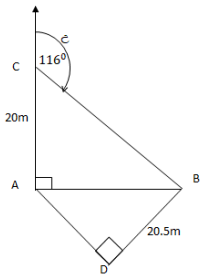
Question Number			Answer	Marks Allocation		
04				02	(02)	
		i.	Cumulative Frequency 8 18 30 45 51 56 60	03	(04)	
		ii.	Cumulative Frequency Curve Median = 50	01 1		
		iii.	$Q_3 = \frac{3}{4} \times 60th\ person = 45\ th\ person$ = 60	1 1	(02)	
		iv.	Represent in the graph Number of students = 6	1 1	(02)	10

Question Number			Answer	Marks Allocation		
05	A	i.		1 1	02	
		ii.	6	1		
			$\frac{\frac{6}{20}}{\frac{3}{10}}$	1	02	
	b	i.	$\frac{3}{5}\times\frac{2}{4}+\frac{3}{5}\times\frac{2}{4}+\frac{2}{5}\times\frac{3}{4}$ Events $=\frac{6}{20}+\frac{6}{20}+\frac{6}{20}$ Probability $=\frac{18}{20}$ or $\frac{9}{10}$ Second Method $=1-\left(\frac{2}{5}\times\frac{1}{4}\right)$ $=1-\frac{2}{20}$	1 3	04	
		ii.	$=\frac{18}{20}$ or $\frac{9}{10}$	1 1 1 1	02 or 02	10

Mathematics II

Question Number			Answer	Marks Allocation		
01	a		Loan without the Interest = $\frac{120\,000}{12} = රු.\,10\,000$ Interest per a month $= 10\,000 \times \frac{24}{100} \times \frac{1}{12}$ $=$ Rs. 200	1 1 1		Allocate marks for other alternative methods
	b	i.	Monthly Units = $\frac{12}{2}(12+1) = 78$ Total Interest $= 200 \times 78 = රු.\,15\,600$	1 1	(05)	
			Number of shares = $\frac{120\,000}{15} = 8\,000$ Divident Income = $8\,000 \times 3$ $=$ Rs. 24 000	1 1 1	(03)	
	c		Profit = Rs. 24 000 – 15 600 = Rs. 8 400	1 1	(02)	
						(10)
02	a					

Question Number			Answer	Marks Allocation		
02	a	i.	$y = -1$	1	(01)	
		ii.	Correct Axis Correct 5 points Smooth Curve	1 1 1	(03)	
	b.	i.	(2, 3)	1	(01)	
		ii.	$0.2 < x < 2$	2	(02)	
	c.		$y = -(x-2)^2 + 3$ $0 = -x^2 + 4x - 1$ $x^2 - 4x + 1 = 0$ $y = 0$ Roots 0.2 හා 3.8	1 2	(03)	10
03	a	i.	$\frac{5}{x+2} = \frac{3}{x-1}$ $5x - 5 = 3x + 6$ $2x = 11$ $x = 5\frac{1}{2}$	1 1 1	(02)	
	b	i.	$50x + 10y = 1340$ (1) $x + y = 30$ (2) $(2) \times 10\ 10x + 10y = 300$ (3) $(1) - (3)\ 40x = 1040$ $x = 26$ Substituting the value of x in (2) $26 + y = 30$ $y = 4$ Number of Rs. 50 stamps = 26 Number of Rs. 10 stamps = 4	1 1 1 1 1 1 1 1	(08)	1

Question Number			Answer	Marks Allocation		
04			Length of the rectangular laminar = $2x + 8$	1		
			$\therefore\ x(2x + 8) = 32$	1		
			$2x^2 + 8x = 32$	1	(03)	
			$x^2 + 4x - 16 = 0$			
			$x^2 + 4x = 16$			
			$(x + 2)^2 = 16 + 4$	1		
			$x + 2 = \pm\sqrt{20}$	1		
			$x + 2 = \pm 2\sqrt{5}$	1		
			$x + 2 = \pm 2 \times 2.24$	1	(04)	
			$x + 2 = \pm 4.48$			
			$x = -2 + 4.48$ or $x = -2 - 4.48$			
				1		
			$x = 2.48$ or $x = -6.48$			
			The length cannot be negative, so cannot be $x < 0$			
			$x = 2.48$	1		
			$\therefore\ x = 2.5cm$	1	(03)	10
05			For marking at least two measurements given	2	(02)	
						
			For $ABC\Delta\ tan\ t$			
			$2.050 \times 20 = A$			
			$AB = 41m$			
			If $D\hat{A}B = \theta$			
			$sin\theta = \frac{20.5}{41}$			
			$sin\theta = 0.5000$	1		
			$\theta = 30^0$	1		
			$\therefore\ A\hat{B}D = 60^0.$	1	(03)	
			$\therefore$ Bearing of D from B $= 180^0 + 30^0$			
			$= 210^0$	1		
				1		
				1		
				1		
				1		
				1	(05)	10

<table>
<tr><th colspan="3">Question Number</th><th>Answer</th><th colspan="3">Marks Allocation</th></tr>
<tr><td>06</td><td></td><td>i.</td><td>8 – 10</td><td>1</td><td>01</td><td></td></tr>
<tr><td></td><td></td><td>ii.</td><td>8 – 10</td><td>1</td><td>01</td><td></td></tr>
<tr><td></td><td></td><td>iii.</td><td>
<table>
<tr><th>Class Interval</th><th>Mid Value x</th><th>Frequency f</th><th>fx</th></tr>
<tr><td>4-6</td><td>5</td><td>10</td><td>50</td></tr>
<tr><td>6-8</td><td>7</td><td>15</td><td>105</td></tr>
<tr><td>8-10</td><td>9</td><td>18</td><td>162</td></tr>
<tr><td>10-12</td><td>11</td><td>8</td><td>88</td></tr>
<tr><td>12-14</td><td>13</td><td>6</td><td>78</td></tr>
<tr><td>14-16</td><td>15</td><td>3</td><td>45</td></tr>
</table>
$\sum f = 60 \quad \sum fx = 528$
Mid value
$\sum x$
$\sum fx$
Mean $= \frac{\sum +x}{\sum f} = \frac{528}{60}$
$= 8.8$</td><td>3

1
1
1
1
1</td><td>03

05</td><td>10</td></tr>
<tr><td></td><td></td><td>iv.</td><td>Total mass of the tea leaves
$= 8.8 \times 60$
$= 528t$
Mass of high quality tea leaves
$= 528 \times \frac{60}{100}$
$= 316.8t$
Mass of other tea leaves
$= 528 - 316.8 = 211.2$
Cost for high quality tea leaves
$= 316.8 \times 1000 \times 300$
$= රු. 95040000$
Cost for other tea leaves
$= 211.2 \times 1000 \times 250$
$= රු. 52\ 800\ 000$
Total cost $= 95040000 + 52800000$
$= රු. 147\ 840\ 000$</td><td>1

1

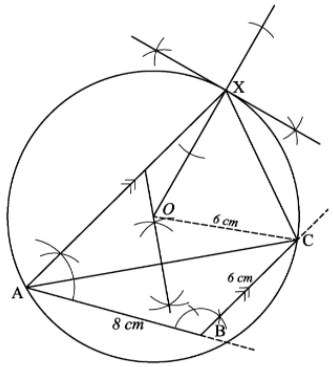
1

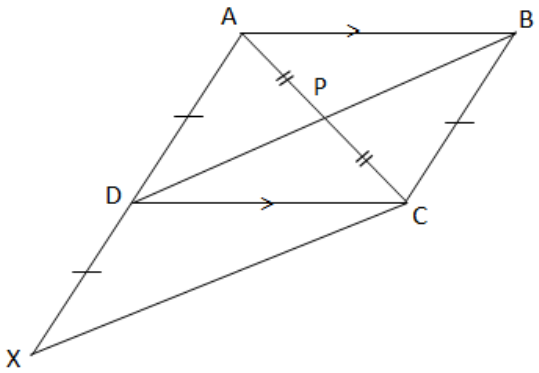
1</td><td>03</td><td>Allocate 1 mark if one step of multiplication is correct

Allocate marks for the subtraction step

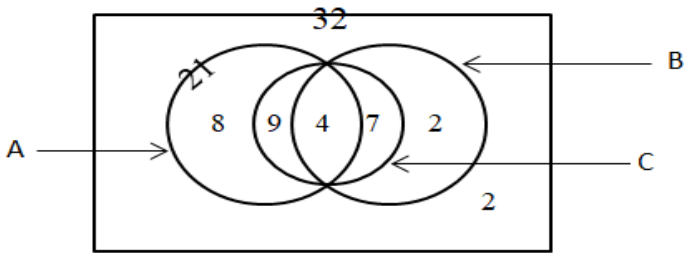
10</td></tr>
</table>

Question Number			Answer	Marks Allocation		
07.		i.	1, 3, 5, 7	1		
			d = 3-1 = 2, d = 5-3, d = 7-5	1	(02)	
			it is an arithmetic progression			
		ii.	a = 1, d = 2, n = 15			
			$T_n = a + (n-1)d$	1		
			$T_{15} = 1 + (15-1)2$			
			$T_{15} = 1 + 28$	1	(02)	
			$T_{15} = 29$			
		iii.	$T_n = 39$			
			$39 = 1 + (n-1) \times 2$	1		
			$39 = 1 + 2n - 2$			
			$40 = 2n$			
			$n = 20$	1	(02)	
		iv.	Red color bulb pattern 1, 5, 9, ...			
			Green color bulb pattern 3, 7, 11, ...	1		
			As the total number of rows is 65,			
			Number of Red color rows = 33			
			Number of Green color rows = 32			
			Number of Red color Bulbs $S_{33} = \frac{33}{2}\{2 \times 1 + 32 \times 4\}$			
			= 2145	1		
			Number of Green color bulbs $S_{33} = \frac{32}{2}\{2 \times 3 + 31 \times 4\}$			
			= 2080			
			Number of more Red color bulbs = 2145 – 2080	1		
			= 65	1	(04)	10

Question Number			Answer	Marks Allocation		
08						
		i.	To draw AB = 8 cm To construct 120^0 To construct the triangle ABC	1 1 1	03	
		ii.	Construction of the perpendicular bisector of AC To finding the centre of the circle Construction of the circle	1 1 1	03	
		iii.	Copying the angle Construction of the parallel line	1 1	02	
		iv.	Construction of the tangent	1	01	
			$A\hat{B}C = 120^0$ (given) $A\hat{B}C + B\hat{A}X = 180^0$ (allied angles) $\therefore$ B$\hat{A}X = 60^0$	1	01	10

Question Numner			Answer	Marks Allocation		
09			 $APB\Delta,\ DPC\Delta$ $B\hat{A}P = P\hat{C}D$ (given) $AP = PC$ $A\hat{P}B = D\hat{P}C$ (vertically opposite angles) $\therefore\ APB\Delta \equiv DPC\Delta$ (a. a. s. instance) AB = DC (Corresponding angles of two congruent triangles) AD = BC (given) ∴ ABCD is a parallelogram (As the pair of opposite sides are equal) $ABC\Delta\ Area = DBC\Delta\ Area$ (As the diagonals bisects the area of the parallelogram) $\therefore\ AD \parallel BC$ (opposite sides of a parallelogram) $AX \parallel BC$ $\therefore\ DX \parallel BC$ AD = BC (given) AD = DX (given) BC = DX ∴ DBCX is a parallelogram (Opposite sides are equal and parallel) ∴ Area of the parallelogram DBCX = 2 area of the triangle DBC (The diagonal of the parallelogram bisects the area of it) ∴ Area of the parallelogram DBCX = $2\ Area\ of\ the\ triangle\ ABC\Delta$	1 1 1 1 1 1 1 1 1 1	(10)	10

Question Number			Answer	Marks Allocation		
10	a		Volume of the prism = $20hcm^3$ Volume of a sphere = $\frac{4}{3}\pi r^3$ Number of spheres = $20h \div \frac{4}{3}\pi r^3$ n = $\frac{15h}{\pi r^3}$	1 1 1 1	(04)	
	B		n = $\frac{15\times 23.08}{3.14\times 0.82^3}$ $logn = lg15 + lg23.08 - (lg\ lg\ 3.14 + 3\ lg\ lg\ 0.82)$ $= 1.1761 + 1.3632 - (0.4969 + 3 \times J.9138)$ $=2.5393 - (0.4969 + T.7414)$ $=2.5393 - 0.2383$ $=2.3010$ n = $antilog\ 2.3010$	1 1 1 1	(05)	J.9138 – 1 3න් ගුණ කිරීම 10
11		i.	$C\hat{B}X = B\hat{D}C$ *(Angle in between the tangent and the chord is equals to the angle in the alternate segment of the circle)* $BC = CD$ (given) $C\hat{B}D = B\hat{D}C$ *(*Angles opposite to the equal sides of an isosceles triangle are equal) $C\hat{B}D = C\hat{A}D$ Angles on the same segment $\therefore C\hat{B}X = C\hat{A}D$	1 1 1	(03)	
		ii.	$B\hat{A}P = C\hat{D}P$ Angles on the same segment $A\hat{P}B = C\hat{P}D$ Vertically opposite angles $\therefore ABP\Delta$ and $CDP\Delta$ are equi angular $\therefore ABP\Delta$ and $CDP\Delta$ are equal in shape $\therefore \frac{AB}{CD} = \frac{AP}{DP}$	1 1 1 1	(03)	
		iii.	$C\hat{B}D = B\hat{D}C$ (Proved earlier) $B\hat{D}C = B\hat{A}C$ (Angles of the same segment) $C\hat{B}D = B\hat{A}C$ $A\hat{B}C = A\hat{B}P + C\hat{B}P$ $A\hat{B}C = A\hat{B}P + B\hat{A}P$ $B\hat{P}C = A\hat{B}P + B\hat{A}P$ (The exterior angle formed by extending a side of a triangle is equals to the sum of interior opposite angles of the triangle) $A\hat{D}C + A\hat{B}C = 180^0$ (As opposite angles of a cyclic quadrilateral are equal) $\therefore A\hat{D}C + B\hat{P}C = 180^0$	1 1 1 1 1	(02) (04)	10

Question Number			Answer	Marks Allocation		
12				2		
		i.	9			
		ii.	7	1	03	
		iii.	2	2	02	
		iv.	Number of houses which are using gas = 20 Percentage = $\frac{20}{32} \times 100 = 62.5\%$	2	02	
			$62.5\% > 60\%$ ∴ Statement is correct	1 1		
				1	03	10