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ANSWER KEYSECOND YEAR HIGHER SECONDARY EXAMINATION March 2023

PART-III/III

SUBJECT: Mathematics (Science) (HI)CODE NO: SY 265 SY 565VERSION: 560 SCORES2 HOURS

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
1	(i)	one-one	1	3
	(ii)	$f(x_1) = f(x_2)$	1	
		$\Rightarrow 2x_1 = 2x_2$ $\Rightarrow x_1 = x_2$, f is 1-1	1	
2	(i)	2×2	1	3
	(ii)	$A+B = \begin{bmatrix} 1 & 5 \\ 4 & 9 \end{bmatrix}$	1	
		$(A+B)' = \begin{bmatrix} 1 & 4 \\ 5 & 9 \end{bmatrix}$	1	
3	(i)	5	1	3
	(ii)	$2x - 3 = 5$	1	
		$x = 8/2$ $= 4$	1	
4		$2 + \frac{dy}{dx} = \cos x$	2	3
		$\frac{dy}{dx} = \cos x - 2$	1	

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5		$\int_2^4 x^2 dx = \left[\frac{x^3}{3} \right]_2^4$ $= \frac{4^3}{3} - \frac{2^3}{3}$ $= \frac{56}{3}$	1 1 1	3
6	(i) (ii)	<p>2</p> $\frac{dy}{dx} = e^x$ $\frac{dy}{dx} - e^x = e^x - e^x$ $= 0$	1 1 1	3
7		$2\vec{a} = 10\hat{i} + 16\hat{j} + 2\hat{k}$ $3\vec{b} = 3\hat{i} + 18\hat{j} + 9\hat{k}$ $2\vec{a} + 3\vec{b} = 13\hat{i} + 12\hat{j} + 11\hat{k}$	1 1 1	3
8		$P(A \cap B) = P(A) \cdot P(B)$ $= \frac{3}{5} \cdot \frac{2}{5}$ $= \frac{6}{25}$	1 1 1	3
9	(i) (ii)	$\frac{\pi}{4}$ $L.H.S = \frac{\pi}{6} + \frac{\pi}{3} + \frac{\pi}{4}$	1 3	4

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10		$a_{11} = 3, a_{12} = 5, a_{21} = 4,$ $a_{22} = 6$ $A = \begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix}$	2 2	4
11		$\lim_{x \rightarrow 2^-} f(x) = 4k$ $\lim_{x \rightarrow 2^+} f(x) = 5$ f is continuous, $4k = 5$ $k = \frac{5}{4}$	1 1 1 1	4
12		$A = \pi r^2$ $\frac{dA}{dr} = 2\pi r$ $\left. \frac{dA}{dr} \right _{r=5} = 2\pi \times 5 = 10\pi$	1 1 1 1	4
13	(i) (ii) (iii) (iv)	$x + c$ $\sin x + c$ $\tan x + c$ $\log x + c$	1 1 1 1	4
14		$A = \int_a^b y dx$	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		$= \int_1^2 x^2 dx$ $= \left[\frac{x^3}{3} \right]_1^2$ $= \frac{8}{3} - \frac{1}{3}$ $= \frac{7}{3}$	1 1 1	4
15		<p>D.C are $\frac{x_2 - x_1}{AB}, \frac{y_2 - y_1}{AB}, \frac{z_2 - z_1}{AB}$</p> $AB = \sqrt{(1-2)^2 + (2-4)^2 + (3-5)^2}$ $= 3$ <p>D.C are $\frac{-1}{3}, \frac{-2}{3}, \frac{-2}{3}$</p>	1 1 2	4
16	(i)	$P(A \cap B) = P(A) + P(B) - P(A \cup B)$ $= 0.4 + 0.5 - 0.7$ $= 0.2$	1 1	4
	(ii)	$P(A B) = \frac{P(A \cap B)}{P(B)}$ $= \frac{0.2}{0.5}$ $= 0.04$	1 1	
17		Let $A = \begin{bmatrix} 3 & 5 \\ 1 & 4 \end{bmatrix}$		

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		$A' = \begin{bmatrix} 3 & 1 \\ 5 & 4 \end{bmatrix}$	1	
		$A+A' = \begin{bmatrix} 3 & 5 \\ 1 & 4 \end{bmatrix} + \begin{bmatrix} 3 & 1 \\ 5 & 4 \end{bmatrix}$		
		$= \begin{bmatrix} 6 & 6 \\ 6 & 8 \end{bmatrix}$	1	
		$\frac{A+A'}{2} = \frac{\begin{bmatrix} 6 & 6 \\ 6 & 8 \end{bmatrix}}{2}$	1	6
		$A-A' = \begin{bmatrix} 0 & 4 \\ -4 & 0 \end{bmatrix}$	1	
		$\frac{A-A'}{2} = \frac{\begin{bmatrix} 0 & 4 \\ -4 & 0 \end{bmatrix}}{2}$	1	
		$A = \frac{\begin{bmatrix} 6 & 6 \\ 6 & 8 \end{bmatrix}}{2} + \frac{\begin{bmatrix} 0 & 4 \\ -4 & 0 \end{bmatrix}}{2}$	1	
18		<p>Equations can be written as</p> $AX = B$		
		$A = \begin{bmatrix} 5 & 2 \\ 3 & 2 \end{bmatrix}, X = \begin{bmatrix} x \\ y \end{bmatrix}, B = \begin{bmatrix} 3 \\ 5 \end{bmatrix}$	1	
		$ A = 4$	1	

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		$\text{Adj: } A = \begin{bmatrix} 2 & -2 \\ -3 & 5 \end{bmatrix}$	2	
		$A^{-1} = \frac{\text{adj: } A}{ A }$ $= \frac{\begin{bmatrix} 2 & -2 \\ -3 & 5 \end{bmatrix}}{4}$	1	6
		$X = A^{-1} B$ $= \frac{\begin{bmatrix} 2 & -2 \\ -3 & 5 \end{bmatrix}}{4} \begin{bmatrix} 3 \\ 5 \end{bmatrix}$		
		$x = -1, y = 4$	1	
19	(i)	$\vec{a} \cdot \vec{b} = 2 \times 1 + 1 \times 2 + 3 \times 4$ $= 16$	1	
	(ii)	$\vec{a} \cdot \vec{b} = 2 \times 1 + 3 \times 2 + 2 \times 1$ $= 10$	1	
		$ \vec{b} = \sqrt{1^2 + 2^2 + 1^2}$ $= \sqrt{6}$	1	6
		$\text{projection} = \frac{\vec{a} \cdot \vec{b}}{ \vec{b} }$ $= \frac{10}{\sqrt{6}}$	1	

