

SECOND YEAR HIGHER SECONDARY EXAMINATION MARCH 2017

SUBJECT : MATHEMATICS (COMMERCE)

CODE. NO: 5053

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
1	a)	(iv) 4	1	1
	b)	$ A = -30$ $\text{adj. } A = \begin{bmatrix} -9 & 5 & -1 \\ -3 & 5 & -7 \\ -3 & -15 & 3 \end{bmatrix}$ $A^{-1} = \frac{1}{ A } \text{adj } A$ $= \frac{1}{-30} \begin{bmatrix} -9 & 5 & -1 \\ -3 & 5 & -7 \\ -3 & -15 & 3 \end{bmatrix}$	1 1/2 1/2	3
				4
2	a)	Correct answer $-\frac{\pi}{6}$ is not given So give 1 score for any answer	1	1
	b)	$\tan^{-1} \frac{1}{2} + \tan^{-1} \frac{1}{3} = \tan^{-1} \left(\frac{\frac{1}{2} + \frac{1}{3}}{1 - \frac{1}{2} \times \frac{1}{3}} \right)$ $= \tan^{-1} (1)$ $= \frac{\pi}{4}$ Rem. $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \left(\frac{x+y}{1-xy} \right)$ (1 score)	1 1 1	3
				4
3	a)	$A = \begin{bmatrix} 1 & 0 & 1 \\ 7 & 5 & 1 \\ 3 & 1 & 2 \end{bmatrix}$	1	1
	b)	$(A+B)' = A' + B'$ $= A + B$	1 1	2
	c)	$P = \frac{A+A'}{2} = \begin{bmatrix} 1 & 9/2 \\ 9/2 & 9 \end{bmatrix}$, $Q = \frac{A-A'}{2} = \begin{bmatrix} 0 & 5/2 \\ -5/2 & 0 \end{bmatrix}$ P is symmetric, Q is skew symmetric Rem. If proved using particular example, give 1/2 score.	1/2 1/2	2
				5

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
4	a)	$2^{8 \sin x} \cos x \log 2$ Rem: For taking log give $\frac{1}{2}$ score.	1	1
	b)	$y \log x = x \log y$ $y \times \frac{1}{x} + \log x \frac{dy}{dx} = x \times \frac{1}{y} \frac{dy}{dx} + \log y$ $\frac{dy}{dx} \left(\log x - \frac{x}{y} \right) = \log y - \frac{y}{x}$ $\frac{dy}{dx} = \frac{\log y - \frac{y}{x}}{\log x - \frac{x}{y}}$ Rem: 1. For taking log give $\frac{1}{2}$ score 2. For differentiating give 1 score	1 $\frac{1}{2}$ $\frac{1}{2}$	2
	c)	$\frac{dy}{dx} = 5a e^{5x} - 5b e^{-5x}$ $\frac{d^2y}{dx^2} = 25a e^{5x} + 25b e^{-5x}$ $= 25y$ $\therefore \frac{d^2y}{dx^2} - 25y = 0$	1 $\frac{1}{2}$ $\frac{1}{2}$	3
5	a)	(iv) $\tan x + C$	1	1
	b)	$\int \tan^{-1} x \cdot x dx = \tan^{-1} x \cdot \frac{x^2}{2} - \int \frac{1}{1+x^2} \cdot \frac{x^2}{2} dx$ $= \frac{x^2}{2} \tan^{-1} x - \frac{1}{2} \int \frac{1+x^2-1}{1+x^2} dx$ $= \frac{x^2}{2} \tan^{-1} x - \frac{1}{2} \int \left(1 - \frac{1}{1+x^2} \right) dx$ $= \frac{x^2}{2} \tan^{-1} x - \frac{1}{2} [x - \tan^{-1} x] + C$ Rem: Integration by parts formula give 1 score	1+1 1 $\frac{1}{2}$ $\frac{1}{2}$	4
6	i)	$\frac{\vec{a} + \vec{b}}{2} = \frac{4\hat{i} - 8\hat{j} + 4\hat{k}}{2} = 2\hat{i} - 4\hat{j} + 2\hat{k}$ Rem: If $\vec{a} + \vec{b}$ is correct, give 1 score	1	
	ii)	Unit vector = $\frac{2\hat{i} - 4\hat{j} + 2\hat{k}}{\sqrt{24}}$ Rem: 1. For writing <u>vector</u> give 1 score 2. For modulus = $\sqrt{24}$, give 1 score	2	5