Daffodil International University

Faculty of Science and Information Technology
Department of Computer Science and Engineering
Final Examination, Summer 2019

Course Code: MAT111   Course Title: Basic Mathematics
Section: All (Day)   Level/Term: L1T1
Course Teacher (with Initial): All

Time: 2.0 Hours   Total Marks: 40

Answer any five from the following six questions.

1.	(a) Show the solution set of $\dfrac{x^2 - 5x + 6}{x^2 + 5x + 6} \geq 0$ in the number line.	[5]
	(b) Find the decomposition of $\dfrac{2x^2 + x + 1}{x^3 + x}$.	[3]
2.	(a) Find the possible solution of $4x^3 - 24x^2 + 23x + 18 = 0$ in where roots are in arithmetical progression.	[4]
	(b) If $\dfrac{2}{3}$ is the root of the equation $3x^3 - 26x^2 + 52x - 24 = 0$ then find its other two roots.	[4]
3.	(a) In the expansion of $(a + bx)^5$ the coefficient of x^4 is the 8 times of the coefficient of x^2, then find $a : b = 1 : 4$ where a and b are non-zero positive integers.	[5]
	(b) What is the value of p when $(3x^2 + 8x - 3)$ is multiplied by $(px - 1)$ and the resulting product is divided by $(x + 1)$ with remainder 24?	[3]
4	(a) Find $\dfrac{dy}{dx}$ for the functions $y = \sin ax$ by using First principal rule.	[5]
	(b) Find the value of $f^{iv}(4)$ when $f(x) = \dfrac{\cos x - \sin x}{\sqrt{1 - \sin 2x}}$.	[3]
5.	(a) Find the value of $\dfrac{d}{dx}\left(\cos^4 x + \sin^4 x\right)$.	[5]
	(b) Find the derivative of y in terms of x if $x = 2\cos t - 3\sin t$ & $y = 2\cos t + 3\sin t$.	[3]
6.	Evaluates (i) $\int \left(\cos^2(2x+3) + \ln(x) + \sin^4 x\right) dx$ (ii) $\int \dfrac{dx}{x^2 - 5x + 6}$	[5+3]