ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	BCA	**Semester:**	II
Paper Title:	Mathematics II	**Paper Code:**	MTH11507
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	**17**	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. **2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	Find the $\|z\|$ and $amp(z)$ for the complex number $z = 2 + 2\sqrt{3}\,i$.	**R**	**CO1**
2	Find the order and degree of the differential equation $\left(\frac{d^3y}{dx^3}\right)^2 + 2x^2\left(\frac{dy}{dx}\right)^4 + 7xy = e^x$.	**U**	**CO4**
3	Explain whether the differential equation $\frac{d^3y}{dx^3} + 5x^2y\frac{dy}{dx} + 3y = x^3$ is linear.	**U**	**CO4**
4	Find the distance between the points $A(3,0)$ and $B(0,4)$.	**U**	**CO5**
5	Find the slope of the straight line $5x + 3y = 2$.	**U**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Find $\frac{(1+2i)}{1+i}$ in the form $A + iB$.	**R**	**CO1**
	(OR)		
6 b)	Find z_1z_2 and $\frac{z_1}{z_2}$ where $z_1 = 1 + 2i$ and $z_2 = -1 + i$.	**R**	**CO1**
7 a)	Explain whether the differential equation $(xe^y + y + 1)dx + (ye^x + x)dy$ is exact.	**R**	**CO2**
	(OR)		
7 b)	Find solution of the differential equation $e^x(1 + y^2)dx - 2y(1 + e^x)dy = 0$ by separation of variable method.	**R**	**CO2**
8 a)	Find solution of the differential equation $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = 0$.	**AP**	**CO3**
	(OR)		
8 b)	Find the integrating factor of the linear differential equation $\frac{dy}{dx} + \frac{1-2x}{x^2}y = 1$.	**AP**	**CO3**
9 a)	Find the intercept form of the straight line $2x + 3y = 4$.	**U**	**CO4**
	(OR)		
9 b)	Explain whether the straight lines $5x + 4y = 1$ and $4x - 5y = 2$ are perpendicular.	**U**	**CO4**
10 a)	Find the slope-intercept form of the straight line $2x + 3y = 9$.	**U**	**CO5**
	(OR)		
10 b)	Find the equation of the straight line passing through the points $(2,1)$ and $(3,3)$.	**U**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	(i) Find the square root of the complex number $5 + 12i$. (ii) Find the differential equation for the function $y = Ae^{3x} + Be^{-3x}$. (3+2)	**R** **R**	**CO1**

	(OR)		
11 b)	(i) Find z^2 and $\|z^2\|$ for the complex number $3+5i$. (ii) Find the differential equation for the function $y = A\cos 4x + B\sin 4x$. (3+2)	**R**	**CO1**
12 a)	Show that -2 is an Eigen value of the matrix $A = \begin{pmatrix} 1 & -3 & 3 \\ 3 & -5 & 3 \\ 5 & -6 & 4 \end{pmatrix}$. Then find the Eigenvectors of A corresponding to the eigen value -2	**R**	**CO2**
	(OR)		
12 b)	Find the inverse of the matrix $A = \begin{pmatrix} 1 & -1 & 2 \\ 2 & 0 & 3 \\ 0 & 1 & -1 \end{pmatrix}$ using the elementary row operation method.	**R**	**CO2**
13 a)	Find the solution of the following system of linear equations using Cramer's Rule $x - 2y + 2z = 9$ $3x + 2y = 3$ $y - 3z = -12$	**AP**	**CO3**
	(OR)		
13 b)	Find the inverse of the matrix $A = \begin{pmatrix} 3 & 3 & -1 \\ -2 & -1 & 1 \\ -2 & -2 & 1 \end{pmatrix}$ without using row operations.	**AP**	**CO3**
14 a)	Explain whether the differential equation $(x^3 - 3xy^2)dx + (y^3 - 3x^2y)dy = 0$ is exact. Then solve it.	**U**	**CO4**
	(OR)		
14 b)	Find solution of the differential equation $\frac{dy}{dx} + \frac{1-4x}{x^2}y = 1$.	**U**	**CO4**
15 a)	Find the solution of the differential equation $(x^2 + y^2)dx = 2x^2ydy$.	**U**	**CO4**
	(OR)		
15 b)	Find the solution of the differential equation $(3x^2 + 4y + 7)dx + (4x - 3y^2 + 5)dy = 0$.	**U**	**CO4**
16 a)	Find the solution of the differential equation $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = e^{5x}$.	**U**	**CO5**
	(OR)		
16 b)	Find the solution of the differential equation $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + y = \sin 2x$	**U**	**CO5**
17 a)	(i) Show that the points $A(1,7), B(4,2), C(-1,-1)$ and $D(-4\ 4)$ are the vertices of a square. (ii) Find whether the differential equation $(x^2 - y^2)dx + (x^3 - y^3)dy = 0$ is homogeneous. (4+1)	**U** **U**	**CO5** **CO1**
	(OR)		
17 b)	(i) Find whether the straight lines $2x + 3y = 7$ and $4x + 6y = 10$ are parallel. 2 (ii) Find whether the straight lines $x + 5y = 3$ and $5x + y = 3$ are perpendicular. 2 (iii) Find the degree of homogeneity of the differential equation $y^3dx + x^2ydy = 0$. 1	**U** **U** **R**	**CO5** **CO5** **CO1**