Name:

Enrolment No:

UPES

Common Class Test 1

Programme Name : B.Tech. SoCs/ SoAE **Semester : II**

Course Name : Advanced Engineering Mathematics II **Time: 1 Hrs**

Course Code : MATH1065 **Max. Marks: 30**

Nos. of page(s) : 02 **Instructions: Do all the questions.**

S. No.		Marks	CO
Q 1	Construct an analytic function whose imaginary part $v(x,y)$ is $e^x(x\ \cos y - y\sin y)$. Ans: ……	3	CO2
Q 2	For what values of constant A and B following function is analytic $f(z) = A\sin x\cosh y + Bi\cos x\sinh y$. Ans: …….	3	CO2
Q 3	What is the sufficient condition for analyticity of function $f(z) = u(x,y) + iv(x,y)$ in a domain D. Ans: ……..	3	CO2
Q 4	Construct analytic function with real part $u(x,y) = x^3 - 3xy^2$. Ans: ….	3	CO2
Q 5	The approximate value of $\int_0^1 \frac{1}{1+x}dx$ with step size $h = 0.5$ using trapezoidal rule. Ans: ……	3	CO1
Q 6	What is the approximate root of equation $x\sin x + \cos x = 0$ with initial approximation $x_0 = \pi$ after first iterations of Newton Raphson method. Ans: …	3	CO1
Q 7	Given the differential equation $\frac{dy}{dx} = x + y^2$, subject to the condition $y(0) = 1$ Then the first approximate solution of the given initial value problem using Picard's method. Ans: ……..	3	CO1
Q 8	The initial value problem is given as $\frac{dy}{dx} = x(y+1), y(0) = 1$. The value of $y(0.2)$ using Euler's method with step size $h = 0.1$. Ans: …….	3	CO1
Q 9	Using suitable interpolation techniques calculates y(0.5) <table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td>15</td><td>5</td><td>1</td><td>3</td><td>11</td><td>25</td></tr></table> Ans: ……	3	CO1
Q 10	While solving the initial value problem $\frac{dy}{dx} = \frac{y^2-x^2}{y^2+x^2}, y(0) = 1$ for finding $y(0.2)$ with step size $h = 0.2$ using fourth order Runge-Kutta method, the value of k_2 is approximately equal to…….	3	CO1

Name: **Enrolment No:**	

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Common Class Test 1 Set G

Programme Name : B.Tech. SoCs/ SoAE **Semester : II**
Course Name : Advanced Engineering Mathematics II **Time: 1 Hrs**
Course Code : MATH1065 **Max. Marks: 30**
Nos. of page(s) : 01 **Instructions: Do all questions.**

S. No.		Marks	CO
Q 1	The second iteration of root of $f(x) = \cos(x) - xe^x$ in the interval [0,1] using Bisection method is _____.	**3**	**CO1**
Q 2	The solution of the ordinary differential equation $\frac{dy}{dx} - 2xy = 1; y(0) = 3$ at x=0.2 using Euler method is _____. (use h=0.2)	**3**	**CO1**
Q 3	The value of $\int_1^2 e^{x^3} dx$ using Simpson's 1/3 rule is _____ (use h=1/4).	**3**	**CO1**
Q 4	<table><tr><td>x</td><td>0</td><td>10</td><td>20</td><td>30</td></tr><tr><td>y</td><td>0</td><td>0.174</td><td>0.347</td><td>0.518</td></tr></table> The value of $\Delta^3 y$ is _____.	**3**	**CO1**
Q 5	Using Runge-Kutta fourth order method, the value of $y(x)$ at $x = 1.05$ is _____ for the following ODE: $$\frac{dy}{dx} = x^2 + y^2; y(1) = 1.2$$	**3**	**CO1**
Q 6	A curve passes through the points (0, 18), (1, 10), (3, -18) and (6, 90). Then the slope of the curve at x = 1 is ……	**3**	**CO1**
Q 7	The derivative of the function $f(z) = x^2 - y^2 + i2xy$ is $f'(z) =$ _____	**3**	**CO2**
Q 8	The function $u(x, y) = ax^2 + by^2$ is harmonic if the relation between a and b is _____.	**3**	**CO2**
Q 9	The values of a, b, c, d for which the function $f(z) = x^2 + axy + by^2 + i(cx^2 + dxy + y^2)$ is entire are $a =$ $b =$ $c =$ $d =$.	**3**	**CO2**
Q 10	The analytic function $f(z) = u + iv$, where $u(x, y) = x^3 - 3xy^2$ and $f(0) = 0$ is $f(z) =$ _____.	**3**	**CO2**

Name:

Enrolment No:

UPES

Common Class Test 1 (SET B)

Programme Name : B.Tech. SoCs/ SoAE **Semester : II**

Course Name : Advanced Engineering Mathematics II **Time: 1 Hrs**

Course Code : MATH1065 **Max. Marks: 30**

Nos. of page(s) : 1 **Instructions: Do all questions.**

S. No.		Marks	CO
Q 1	The equation $x - \sin x - 0.5 = 0$, is to be solved using the Bisection method in the interval $[a,\ b]$, where a and b are natural numbers. The smallest suitable values of a and b are _____.	**3**	**CO1**
Q 2	To solve the given equation numerically using the Newton-Raphson method $x^3 + 4x - 9 = 0$, the iterative equation for the $(n+1)^{th}$ iteration is given by $$x_{n+1} = \frac{ax_n{}^3 + b}{cx_n{}^2 + d}.$$ The values of a, b, c, and d are _____.	**3**	**CO1**
Q 3	Consider the following system of linear equations: $$27x + 6y - z = 81,$$ $$6x + 15y + 2z = 75,$$ $$x + y + 50z = 110.$$ Using the initial guess as $x_0 = 0, y_0 = 0$, and $z_0 = 0$, the values of x_1, y_1, and z_1 using Gauss-Seidel method are _____.	**3**	**CO1**
Q 4	The values of a function $f(x)$ are tabulated below. x: 0, 1, 2, 3 $f(x$: 1, 2, 1, 10 Using Newton's forward difference formula, the cubic polynomial that can be fitted to the above data, is $ax^3 + bx^2 + cx + d$. The value of a, b, c, and d are _____.	**3**	**CO1**
Q 5	The value of the integral $\int_{-1}^{1.4} x\|x\|dx$ using Simpson's $(1/3)^{rd}$ rule with step size $h = 0.6$ is _____.	**3**	**CO1**
Q 6	If a and $a + h$ are two consecutive approximate roots of the equation $f(x) = 0$ obtained by Newton-Raphson method, then h is equal to	**3**	**CO1**
Q 7	The value of k for which the given function $$f(z) = e^{-kx}e^{-i2y},$$ where $z = x + iy$, and $i = \sqrt{-1}$, is analytic is _____.	**3**	**CO2**
Q 8	The harmonic conjugate of the harmonic function $u(x,y) = \frac{1}{2}\log(x^2 + y^2)$ is given by _____.	**3**	**CO2**
Q 9	The value of m for which the function $2x - x^2 + my^2$ is harmonic is ____.	**3**	**CO2**
Q 10	The real part of an analytic function f(z), where $z = x + iy$ is given by $e^{-y}\cos x$. The imaginary part of f(z) is: _____.	**3**	**CO2**