K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:II
Class:FY	Program:B.Tech
Branch Code:FYE	Pattern:2022
Name of Course:Applied Mathematics - II	Course Code:FYE221002
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 3 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. Use of non-programmable pocket calculator is allowed.
6. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

1 Solve $\frac{dy}{dx} + (secx)y = \tan x$ (6) CO3

Question No. 2 Attempt following Question

2 A voltage 200 e^{-5t} is applied to a circuit contaning resistance R =20 Ohms and condenser of capacity C= 0.01 F in series. Find the charge and current at any time assuming t=0 ,q=0. (6) CO3

Question No. 3 Attempt following Question

3.a) Find value of y for x=1.2 for the following table of x, y (5) CO2

x	1	2	3	4	5
y	14	30	62	116	198

Using Newton's forward difference formula.

OR

3.b) The value of sinx are given below for different value of x, Find the value of sin 47°,by using Newton's Backward diffrence formula (5) CO2

X	30°	35°	40°	45°	50°
Y	0.500	0.5336	0.6428	0.7070	0.7660

3.c) 1) Prove that $(1 + \Delta)(1 - \Delta) = 1$ 2) Prove that $\Delta = E - 1$ (5) CO3

OR

3.d) 1)Prove that , $(\Delta - \nabla)\ x^2 = 2$ 2) Find $\Delta(x^3)$, $h = 1$ (5) CO3

3.e) The velocity distribution of a fluid near a flat surface is given below. X is the distance from the surface(mm), V is the velocity (mm/sec) ,Use Lagrange's interpolating polynomial to obtain the velocity at x =0.4 (6) CO3

x	0.1	0.3	0.6	0.8
V	0.72	1.81	2.73	3.47

OR

3.f) Use Stirling's interpolation Formula to find y for x=35 from the following table (6) CO3

x	20	30	40	50
y	512	439	346	243

Question No. 4 Attempt following Question

4.a) Use Euler's method to solve the equation, subject to the condition y (0)=0, h=0.2, $\frac{dy}{dx} = x + y$, Find y for x= 0.8 (5) CO3

OR

4.b) Solve the equation, y(0)=1, h=0.05, $\frac{dy}{dx} = x^2 + y$, to find y at x=0.05 using modified Euler's method. (5) CO3

4.c) Using fourth order R-K Method find y for x=0.2 , given that $\frac{dy}{dx} = \frac{1}{x+y}$, with y(0) = 1 ,h=0.2 (6) CO5

OR

4.d) Numerical solution of the differential equation $\frac{dy}{dx} = 1 + xy^2$ is tabulated as , (6) CO5

X	0	0.1	0.2	0.3
Y	1	1.105	1.223	1.355

Find y at x=0.4 by Milne's predictor- corrector method taking h=0.1

4.e) Use Simpson's $\frac{1}{3}$ rd rule to evaluate $\int_4^{5.2} \log x\, dx$, by taking h=0.2 (5) CO5

OR

4.f) Use Simpson's $\frac{3}{8}$th rule to evaluate $\int_0^1 \frac{1}{1+x^2} dx$, taking h=1/6 (5) CO5

Question No. 5 Attempt following Question

5.a) Evaluate $\int_0^{\log 2} \int_0^{x} \int_0^{x+y} e^{x+y+z}\ dxdydz$ (6) CO3

OR

5.b)	Find the volume of the paraboloid $x^2 + y^2 = 4z$ cut off by the plane z=4	(6)	CO3
5.c)	Evaluate $\int\int_R ydxdy$,over the region bounded by x=0 , y=X^2, X+Y=2 In the first quadrant.	(5)	CO2
	OR		
5.d)	Evaluate by change of order $\int_0^{\frac{\pi}{2}} \int_0^y \cos 2y \sqrt{1 - a^2 \sin^2 x}\ dxdy$	(5)	CO2
5.e)	Evaluate $\int_0^{\frac{a}{\sqrt{2}}} \int_y^{\sqrt{a^2 - y^2}} \log(x^2 + y^2)dxdy$	(5)	CO2
	OR		
5.f)	Find the area bounded by the curves $y^2 = 4ax, \quad x^2 = 4ay$	(5)	CO2

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