

GANPAT UNIVERSITY
B. Tech. 3RD SEMESTER (CIVIL) Engineering
Regular Examination November – December 2013
2CI- 306 Numerical methods & Computer programming

Time: 3 Hours / As per Scheme

Max. Marks: 70

Instruction: 1) Figures to the right indicate marks.

SECTION 1																		
Que.1 (A)	Solve the following systems of equation by gauss Jordan method $2X_1+4X_2+2X_3=15$ $2X_1+X_2+2X_3=-5$ $4X_1+X_2-2X_3=0$	04																
Que.1 (B)	Given $Y' = Y - X$ where $y(0) = 2$. Find $y(0.1)$ and $y(0.2)$ by using runge kutta second order.	04																
Que.1 (C)	Apply taylors series method of order three to find the value of $y(0.1), y(0.2)$ $Y' = XY^{1/3} \quad Y(1) = 1$	04																
OR																		
Que.1 (A)	Solve the following systems of equation by gauss Jordan method $10X_1+X_2-X_3=11.19$ $X_1+10X_2+X_3=20.08$ $-X_1+X_2+10X_3=35.61$	04																
Que.1 (B)	Fit a straight line to the following data by the method of least squares <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">X</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">10</td> <td style="padding: 2px;">15</td> <td style="padding: 2px;">20</td> <td style="padding: 2px;">25</td> <td style="padding: 2px;">30</td> </tr> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">10</td> <td style="padding: 2px;">14</td> <td style="padding: 2px;">19</td> <td style="padding: 2px;">25</td> <td style="padding: 2px;">31</td> <td style="padding: 2px;">36</td> <td style="padding: 2px;">39</td> </tr> </table>	X	0	5	10	15	20	25	30	Y	10	14	19	25	31	36	39	04
X	0	5	10	15	20	25	30											
Y	10	14	19	25	31	36	39											
Que.1 (C)	Solve the following differential equation by Euler's method $Y' = X^2 + Y^2, \quad y(0) = 1$ to find $y(0.2), y(0.4), y(0.6)$	04																
Que.2 (A)	Find the first order and second order derivatives of $f(x)$ at $X=1.5$ <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">X</td> <td style="padding: 2px;">1.5</td> <td style="padding: 2px;">2.0</td> <td style="padding: 2px;">2.5</td> <td style="padding: 2px;">3.0</td> <td style="padding: 2px;">3.5</td> <td style="padding: 2px;">4.0</td> </tr> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">3.375</td> <td style="padding: 2px;">7.000</td> <td style="padding: 2px;">13.625</td> <td style="padding: 2px;">24.000</td> <td style="padding: 2px;">38.875</td> <td style="padding: 2px;">59.000</td> </tr> </table>	X	1.5	2.0	2.5	3.0	3.5	4.0	Y	3.375	7.000	13.625	24.000	38.875	59.000	04		
X	1.5	2.0	2.5	3.0	3.5	4.0												
Y	3.375	7.000	13.625	24.000	38.875	59.000												
Que.2 (B)	Evaluate $\int_0^{10} dx/(1+x^2)$ by using Simpsons three eight rule take $h=1$	04																

Que.2 (C)	Use Newton divided difference formula to find f(1), f(5)	04														
	<table border="1"> <tr> <td>X</td> <td>0</td> <td>2</td> <td>3</td> <td>4</td> <td>7</td> <td>8</td> </tr> <tr> <td>Y</td> <td>4</td> <td>26</td> <td>58</td> <td>112</td> <td>466</td> <td>668</td> </tr> </table>	X	0	2	3	4	7	8	Y	4	26	58	112	466	668	
X	0	2	3	4	7	8										
Y	4	26	58	112	466	668										
	OR															
Que.2 (A)	Fit a second degree parabola curve to the following data	04														
	<table border="1"> <tr> <td>X</td> <td>0.5</td> <td>1</td> <td>2</td> <td>3</td> <td>5</td> </tr> <tr> <td>Y</td> <td>3.1</td> <td>6.0</td> <td>11.2</td> <td>14.8</td> <td>20</td> </tr> </table>	X	0.5	1	2	3	5	Y	3.1	6.0	11.2	14.8	20			
X	0.5	1	2	3	5											
Y	3.1	6.0	11.2	14.8	20											
Que.2 (B)	Evaluate $\int_0^{10} dx/(1+x^2)$ by using Simpsons one third rule take h=1	04														
Que.2 (C)	Using mines predictor –corrector method to obtain the solution of the equation $Y^1=X-Y^2$ at $x=0.8$ $y(0)=0$, $y(.2)=0.0200$, $y(.4)=0.0795$, $y(.6)=0.1762$	04														
Que.3 (A)	What is difference between linear and nonlinear equation.	03														
Que.3 (B)	Use Lagrange's interpolation formula to find the value of $Y(X) = 20$ Using the following data.	04														
	<table border="1"> <tr> <td>X</td> <td>1</td> <td>8</td> <td>27</td> <td>64</td> </tr> <tr> <td>Y</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	X	1	8	27	64	Y	1	2	3	4					
X	1	8	27	64												
Y	1	2	3	4												
Que.3 (C)	Evaluate $\int_0^2 dx/(2+x^2)$ by using Simpsons three eighth rule take h=1	04														
	SECTION 2															
Que.4 (A)	1. Differentiate between C & C++. (Minimum 4 points)	02														
	2. Why we include iostream.h and conio.h as a header files?	02														
Que.4 (B)	1. Write a program to calculate shear force and bending moment of a simply supported beam having UDL all over its length. (answer must contain its unit)	02														
	2. Rewrite the following program after removing the syntactical errors. Underline each correction.	02														
	<pre> #include<iostream.h> #include<conio.h> #include<strng.h> void main() { char a; int b,c; </pre>															

	<pre>cin<<c<<b<<a; b=c*32; cout<<a<<b<<C; getch (); }</pre>	
Que.4 (C)	<ol style="list-style-type: none"> 1. What the applications are of object oriented programming? 2. Explain WHILE loop & FOR loop along with their syntax. 	02 02
OR		
Que.4 (A)	<ol style="list-style-type: none"> 1. Differentiate between Object oriented programming & Procedure oriented programming. (Minimum 4 points) 2. What is the significance of providing getch() and clrscr()? 	02 02
Que.4 (B)	<ol style="list-style-type: none"> 1. Write a program to calculate the value of sigma. (With output) <div style="text-align: center;"> $\beta = \left(\frac{\alpha}{\sigma}\right)^8$ </div> 2. Find the output of the following programs. <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>(i)</p> <pre>void main() { int a,b,c; a=1; b=2; c= (a%b)*b/9; cout<<c; getch(); }</pre> </div> <div style="text-align: center;"> <p>(ii)</p> <pre>void main() { float a,b,c; a=1; b=2; c=3; a=a+b*36-9*2+c; a*=2; cout<<a; getch(); }</pre> </div> </div> 	02 02
Que.4 (C)	<ol style="list-style-type: none"> 1. List out the various relational operators. 2. How combination of assignment operator and mathematical operator is done? Give an example. 	02 02

Que.5 (A)	What is parameterized constructor? Describe its importance.	04
Que.5 (B)	Write a program to calculate the sum of the following series (along with output). 1+2+3+4+.....n.	04
Que.5 (C)	What is an operator overloading? Why it is necessary to overload an operator?	04
	OR	
Que.5(A)	What is destructor? Describe its importance.	04
Que.5 (B)	1. Write a program to find the sum of 4 digit number. 2. Write a program to calculate the sum of numbers between 100 & 150.	04
Que.5(C)	What does inheritance mean in C++? What are the different forms of inheritance?	04
Que.6 (A)	Define the following terms:- (any three) 1. Containership 2. Virtual base class 3. Objects 4. Message Passing 5. Data Encapsulation	06
Que.6 (B)	Write the equivalent C++ expression for the following mathematical expression.	04
Que.6 (C)	Name the header file(s) that shall be needed for successful compilation of the following C++ code. <pre>void main() { char a[15]; int b; cin>>a; cin>>b; z=pow(b, 3.0); cout<<a<<"\n"<<z; getch(); }</pre>	01