Exam No: _____

GANPAT UNIVERSITY
B. TECH SEM-IIIrd CIVIL ENGINEERING
REGULAR EXAMINATION– NOV-DEC 2015
Subject Code: 2CI- 306
Subject Name: Numerical methods & Computer programming

TIME: 3 HRS   TOTAL MARKS: 60

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION: I

Q.1 (A) Solve the following systems of equation by Jacobi iteration method upto fourth iteration.   (05)

$$10X_1+2X_2+X_3= 21$$
$$X_1+10X_2-X_3= -22$$
$$-2X_1+3X_2+10X_3=22$$

Q.1 (B) Evaluate f (153) using lagrangian interpolation formula.   (05)

X	150	152	154	156
F(X)=√X	12.247	12.329	12.410	12.490

OR

Q.1 (A) Solve the following systems of equation by gauss elimination method   (05)

$$3x-8y+3z=1.1$$
$$2x+3y+4z=2.6$$
$$9x-y+2z=5.3$$

Q.1 (B) Fit a straight line (linear regression) to the following data by the method of least squares.   (05)

X	0	5	10	15	20	25	30
Y	10	14	19	25	31	35	40

Q.2 (A) Evaluate $\int_{\pi/2}^{\pi} dx/(2 + sinx)$ by using simpson's 3/8th rule take 5 intervals.   (05)

Q.2 (B) Solve the following differential equation by Euler's method   (05)

$Y'=X^2+Y^2$, y(0)=1 to find y(0.2), y(0.4), y(0.6)

OR

Q.2 (A) Use Newton divided difference formula to find f(1.8), f(5.5)   (05)

X	0	2	3	4	7	8
Y	4	26	58	111	466	668

Q.2
(B) Solve the following by using Runge kutta method (4th order): (05)

find y at x = 1.1 and 1.2 by solving $y' = x^2 + y^2$, $y(1) = 2.3$

Q.3
(A) Find the roots of the following equation: (05)
$5x^3 - 2x - 1 = 0$, by using bisection formula.

Q.3
(B) Using mines predictor –corrector method to obtain the solution of the equation $Y' = X - Y^2$ (05)
at x =0.8 y(0)=0, y(0.1)=0.0230, y(0.2)=0.0795, y(0.3)= 0.1825

SECTION: II

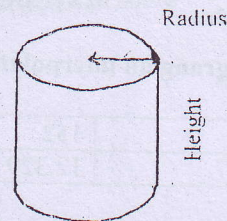**Q.4**
(A) What is object-oriented programming? What are the features of object-oriented (05)
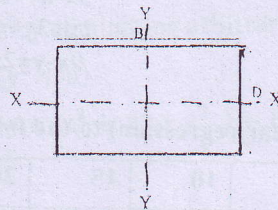programming?

Q.4
(B) What is procedure-oriented programming? What are its main characteristics? (05)

OR

Q.4
(A) Write a program for finding out area of cylinder as shown in figure. (05)

Q.4
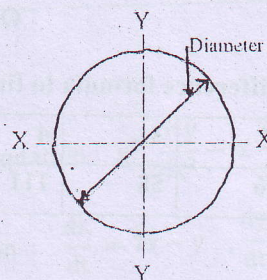**(B)** Write a program for finding out moment of inertia (I) and section modulus (Z) for a (05)
rectangular section as shown in figure.
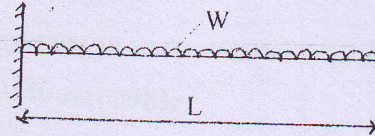

Q.5
(A) Write a short note on: (05)
  a) The main function
  b) Call by reference

Q.5
(B) Write a program for finding out moment of inertia (I) and section modulus (Z) for a (05)
circular section as shown in figure.

Q.5 (A) Prepare a program for finding out stress (σ) and strain (ε) for a rectangular section. (05)

Q.5 (B) Explain inline function in details (05)

Q.6 (A) What are the benefits of object-oriented programming? (05)

Q.6 (B) Prepare a program for finding out shear force, shear force at X distance, Maximum bending moment and bending moment at X distance for a given beam. (05)

---END OF PAPER---