Exam No. _____

GANPAT UNIVERSITY

B.TECH.SEMESTER – III(EC) CBCS(NEW) REGULAR EXAMINATION NOV – 2015

2HS302: Mathematics for Electronics & Communication Engineering

TIME: 03 HRS TOTAL MARKS: 60

Instruction:

1. This question paper has two sections. Attempt each section in separate answer book
2. Figures on right indiacte marks.
3. Be precise and to the point in answering the descriptive question.

SECTION – I

Que – 1

(A) Find laplace transform of (i) $5t^2 + e^{2t} + t^2$ (ii) $e^{4t}\cos 3t$ (4)

(B) Find the laplace inverse of $\frac{3s}{(s+1)(s-3)}$ (3)

(C) Use laplace transform solve $y'' - y' - 2y = 20sint\,; y(0) = 1,\ y'(0) = 0$ (3)

OR

Que – 1

(A) Express following function in terms of unit step function andfind its laplace transform $f(t) = \begin{cases} t-1 & ;\ 1 < t < 2 \\ 3-t & ;\ 2 < t < 3 \end{cases}$ (4)

(B) Using convolution theorem find $L^{-1}\left\{\frac{s}{(s^2+a^2)^2}\right\}$ (3)

(C) Evaluate the given integral by laplace transform $\int_0^\infty e^{-2t}\cos 4t\, dt$ (3)

Que – 2

(A) Find $\int_0^{2+i} (x^2 - iy)dz$ along the path $x = t, y = t^2$. (4)

(B) Prove that coshz is an analytic function and find its derivative. (3)

(C) Find an analytic function whose imaginary part is $e^x siny$. (3)

OR

Que – 2

(A) Find bilinear transformation which maps points $z = 1, i, -1$ onto the points $w = 0, 1, \infty$ (4)

(B) Show that s nxcoshy is harmonic and find its harmonic conjugate. (3)

(C) Evaluate $\oint_C \frac{z^2 + 2e^z}{(z+1)(z-2)} dz$ where $C: |z| = 3$ (3)

Que – 3

(A) Find (i) $L\left\{\frac{1-cost}{t}\right\}$ (ii) $L^{-1}\left\{log\left(\frac{s+3}{s-3}\right)\right\}$ (5)

(B) Show that polar function $f(r, \theta) = z^7$ is an analytic function. (5)

OR

(B) State and prove Cauchy's theorem for contour integration. (5)

SECTION – II

Que – 4

(A) Find the value of $sin(52)$ for given data. (4)

x	45	50	55	60	65
$y = sinx$	0.7071	0.7660	0.8192	0.8660	0.9063

(B) In usual notation prove the following results. (3)

(i) $\Delta\nabla = \nabla\Delta = \Delta - \nabla$ (ii) $\Delta + \nabla = \frac{\Delta}{\nabla} - \frac{\nabla}{\Delta}$

(C) Obtain value of y at $x = 2$ for following data. (3)

x	−1	0	2	3
$y = f(x)$	8	3	1	12

OR

Que – 4

(A) Solve: $y_{n+2} - 4y_n = 9n^2$ (4)

(B) Evaluate: (i) $\Delta^2 e^{2x}$ (ii) $\Delta\, logf(x)$ (3)

(C) Solve the following difference equation. (3)

(i) $u_{n+2} - 3u_{n+1} + 4u_n = 0$ (ii) $u_{n+2} - 4u_{n+1} + 4u_n = 0$

Que – 5

(A) *Use Euler's method to find* $y(1)$ *for* $y' = x + y ; y(0) = 1$ (4)

(B) *Find first order derivative for* $x = 0.2$ *for given data.* (3)

x	0	0.2	0.4	0.6	0.8	1
$y = f(x)$	0	0.12	0.48	1.10	2.0	3.2

(C) *Solve following equations by Jacobi method.* (3)

$5x + 2y + z = 12 , x + 4y + 2z = 15 , x + 2y + 5z = 20$ *upto 4th step.*

OR

Que – 5

(A) *Find the real root of the equation* $x^3 - x - 2 = 0$ *correct upto four decimal places using newton raphson method.* (4)

(B) *Find the real root by using bisection method for* $x^2 - 4x - 10 = 0$ *upto fourth approximation.* (3)

(C) *Apply Gauss – Jordan method to solve following equations.* (3)

$x + 4y - z = -5 , x + y - 6z = -12 , 3x - y - z = 4$

Que – 6 ***Attempt any two***

(A) *Obtain* $f(1)$ *and* $f(6)$ *using divide difference formula.* (5)

x	−4	−1	0	2	5
y	1245	33	5	9	1335

(B) *Use Runge – Kutta method for finding an approximate value of y at* $x = 0.1$ *given that* $y' = x - y^2 ;\ y = 1$ *when* $x = 0$. (5)

(C) *Evaluate* $\int_0^1 e^x \, dx$ *with* $h = 0.2$ *by using all three rules.* (5)

END OF PAPER