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Mechanical Engineering

ENG 381: Engineering Mathematics III

### LMS ASSIGNMENT

Question 4

Command window

clc

clear

close all

Syms n(t)

eqn = diff(n, t, 2) - diff(n, t) - 12\*n = 144\*(t^3) + 12\*5;

Cond = n(0) == 5 diff(n, t, n) == -0.5;

Ysol = dsolve (eqn, cond)

t = 0: 0.1: 15

chris = subs (Ysol)

Tplot (chris)

grid on

legend ('chris', 'For')

Question 4b

Command window

clc

clear

close all

Syms n(t), y(t)

eqn 1 = diff (y, t) - 2\*x == exp (-2\*t);

eqn 2 = diff (x, t) + y \* exp (-t);

eqn 3 = [eqn 1, eqn 2]

Cond = x(0) == 0, y(0) == 0;

Ans = dsolve (eqns, cond)

$$x_{sol}(t) = A n s x$$

$$y_{sol}(t) = A n s y$$

### Question 4c

i) Command window

clc

clear

close all

Syms t s w x Ka

$$x = u * e^{(-a * t)} * \sin(s * w * t) * \cos(3 * w * t)$$

$$F = \text{laplace}(x, t, s)$$

simplify(F)

Pretty(ans)

ii) Command window

clc

clear

close all

Syms t s

$$F = P_i * ((s^2) + 15 * pi * 5 + 24 * (P_i^3))$$

i laplace(F)

simplify(ans)

Pretty(ans)