PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2017
(First Semester)

Branch - MATHEMATICS WITH COMPUTER APPLICATIONS

DIFFERENTIAL EQUATIONS LAPLACE TRANSFORMS & FOURIER SERIES

Time : Three Hours Maximum : 75 Marks

SECTION-A (20 Marks)
Answer ALL questipns
ALL questions carry EQUAL marks (10x2 = 20)

1 Solve $y = (x-a)\,p - p^2$.

2 Solve $(D^2 - 2mD + m^2)\,y = 0$.

3 Solve $\frac{d^2z}{dxdy} = 0$.

Eliminate a and b from $z = (x + a)(x + b)$.

Find $L\left(U^2\right)$

6 Evaluate $\int e^{2t} \sin 3t\, dt$.

Find $L^{-1}\left(\frac{}{(s + a}\right)$ *y*

Write the formula to find $L^{-1}\{f(s)\}$.

Expand f(x) = x as a fourier series in *(-7i, it).*

10 Write the Fourier series expansion of an odd function f(x) in *(-n,* 7t).

SECTION - B (25 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5x5 = 25)

11 a Solve $x^2 = 1 + p^2$.

OR

b Solve $(D^2 - 3D - h\,2)y = \sin 3x$.

12 a Solve $p(l + q^2) = q(z - 1)$.

OR

Solve $z = px + qy + yl + p^2 + q^2$.

13 a Find $L(\sin^2 2t)$.

OR

Find L q-e*'

Cont...

14 a Find $L^{-1}\left\{\frac{s-3}{(s-3)^2+4}\right\}$

OR

b Find $L^{-1}\left\{\frac{1}{(s+2)^4}\right\}$

15 a Find a_n in the Fourier series expansion of $f(x) = x$ in $(-7C, 7t)$.

OR

• b Express $f(x) = x$ $(-71 < x < 71)$ as a Fourier series with period 271.

SECTION - C (30 Marks)

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 1 0 = 3 0)

16 Solve $\frac{d^4y}{dx^4} + 3\frac{dy}{dx} + y = \frac{1}{(1-x)^4}$

17 Solve $(x^2 - yz)p + (p^2 - zx)q = z^2 - xy$.

18 Evaluate $\int_0^{\infty} \frac{e^{-t} - e^{-2t}}{t}\,dt$.

19 Solve $\frac{d^2v}{dt^2} + 2\frac{dv}{dt} + 3y = \sin t$ given that $y(0) = y'(0) = 0$, using inverse Laplace transforms.

20 Find Fourier series for

$f(x) = 1 + x \quad 0 < x < 71$

$= -1 + x \quad -71 < x < 0$.

Z-Z-Z END