STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI - 600 086
(For candidates admitted from the academic year 2011-12 & thereafter)

SUBJECT CODE : 11MT/AC/MC24

B. Sc. DEGREE EXAMINATION, APRIL 2015
BRANCH IV - CHEMISTRY
SECOND SEMESTER

COURSE : ALLIED CORE
PAPER : MATHEMATICS FOR CHEMISTRY - II
TIME : 3 HOURS **MAX. MARKS : 100**

SECTION – A

ANSWER ALL THE QUESTIONS: (10X2=20)

1. Solve : $(D^2 -13D + 12) y = 0$.
2. Find the particular integral of $(D + 1)^2 y = x^2$.
3. Find : $L (t^3 -3t^2 + 2)$.
4. Find: $L (\sin 4t)$.
5. Find : $L^{-1}\left[\frac{1}{(s-1)^2}\right]$.
6. Find : $L^{-1}\left[\frac{s+2}{(s+2)^2+9}\right]$.
7. Write down the Fourier expansion of f(x) of period 2π, valid in the interval 0 to 2π.
8. Define correlation.
9. If $bxy = 0.4, byx = 1.6$. Find the correlation coefficient.
10. Write equation of regression lines of Y on X and X on Y.

SECTION – B

ANSWER ANY FIVE QUESTIONS: (5X8=40)

11. Solve : $(D^2 + 16) y = e^{-3x} + \cos 4x$.
12. Solve : $(D^2 + 3D + 2) y = x^2$.
13. Evaluate : (i) $L (t\, e^{-5t})$ (ii) $L\left[\frac{1-e^t}{t}\right]$.
14. Find: $L^{-1}\left[\frac{1}{s(s+1)(s+2)}\right]$.
15. Find the Fourier series of x^2 in the interval $-\pi < x < \pi$.
16. Calculate the coefficient of correlation between x and y for the following data:

X	10	12	13	16	17	20	25
Y	19	22	26	27	29	33	37

17. The following table gives age (x) in years of Cars and annual maintenance Cost y (in are hundred rupees)

X	1	3	5	7	9
Y	15	18	21	23	22

Estimate the maintenance cost for 4 year old Car after finding the regression equation.

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SECTION – C

ANSWER ANY TWO QUESTIONS: (2X20=40)

18. (a) Solve: $(D^2 + 2D + 5)\, y = e^{-x}\cos 2x$.

(b) Solve : $(D^2 - 4D + 4)\, y = e^{2x} + \sin x$. (10+10)

19. (a) Solve : (i) L ($t^2 \sin 2t$).

(ii) $L^{-1}\left[\frac{1}{s(s^2+4)}\right]$.

(b) Solve $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + 5y = 4e^{-t}$, given that y = 0 and $\frac{dy}{dt} = 0$ when t = 0.

(10+10)

20. (a) Determine the Fourier expansion of f(x) = x ($2\pi - x$) in the interval (0, 2π).

(b) The marks obtained by the students in Physics and Mathematics are as follows:

Marks in Physics	35	23	47	17	10	43	9	6	28
Marks in Maths	30	33	45	23	8	49	12	4	31

Calculate the rank correlation.

(10+10)