

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI - 600 086
(For candidates admitted from the academic year 2008-09)

SUBJECT CODE : MT/AC/MC44

B. Sc. DEGREE EXAMINATION, APRIL 2010
BRANCH I – MATHEMATICS
FOURTH SEMESTER

COURSE : ALLIED CORE
PAPER : MATHEMATICS FOR CHEMISTRY-II
TIME : 3 HOURS

MAX. MARKS : 100

SECTION – A

ANSWER ALL THE QUESTIONS:

(10X2=20)

1. Find the P.I of $(D^2 - 5D + 6) y = e^{4x}$
2. Find the C.F of $(D^2 - 8D + 9) y = 8 \sin 5x$
3. $L(at^2 + bt + c)$
4. Find $L(e^{at}t^n)$.
5. Find $L^{-1}\left(\frac{s}{s^2+b^2}\right)$
6. Find $L^{-1}\left(\frac{1}{(s+a)^n}\right)$
7. Write the Fourier series for the function $f(x)$
8. Define an odd function and give one example.
9. Define positive correlation.
10. Write the regression of X on Y and its normal equations.

SECTION – B

ANSWER ANY FIVE QUESTIONS:

(5X8=40)

11. Solve $(D^2 + 16)y = e^{-3x} + \cos 4x$
12. Solve $(D^3 - D^2 - D + 1)y = 1 + x^2$
13. Find $L(te^t \sin 2t)$
14. Find $L^{-1}\left(\frac{1}{s(s+1)(s+2)}\right)$
15. Express $f(x) = x$ ($-\pi < x < \pi$) as a Fourier series with period 2π
16. Calculate the coefficient of correlation from the following data:

X	77	54	27	52	14	35	90	25	56	60
Y	35	38	60	40	50	40	35	56	34	42

17. From the following data obtain the regression of Y on X

X	6	2	10	4	8
Y	9	11	5	8	7

SECTION – C

ANSWER ANY TWO QUESTIONS:

(2X20=40)

18. a. Solve $(D^3 - 2D + 4)y = e^x \cos x$

b. Solve $(D^2 + 1)y = x^2 e^{2x} + x \cos x$ (12 + 8)

19. a. Find $L^{-1}\left(\frac{1}{(s+1)(s^2+2s+2)}\right)$

b. Solve the equation $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 13y = 2e^{-x}$,
given that $y = 0, \frac{dy}{dx} = -1$ when $x = 0$ (8 + 12)

20. a. A function $f(x)$ is defined within the range $(0, 2\pi)$ by the relations

$$f(x) = \begin{cases} x & \text{in the range } (0, \pi) \\ 2\pi - x & \text{in the range } (\pi, 2\pi) \end{cases}$$

Show that $f(x) = \frac{\pi}{2} - \frac{2}{\pi} \sum_{n=1}^{\infty} \frac{1 - (-1)^n}{n^2} \cos nx$

b. Two judges in the beauty competition rank the 12 entries as follows:

X	1	2	3	4	5	6	7	8	9	10	11	12
Y	12	9	6	10	3	5	4	7	8	2	11	1

What degree of agreement (rank correlation) is there between the judgment of the two judges.

(12 + 8)

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