STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086
(For candidates admitted during the academic year 2019 – 20 & thereafter)
B.SC. DEGREE EXAMINATION, April 2021
BRANCH I – MATHEMATICS

SUBJECT CODE: 19MT/AC/MP25

PAPER: MATHEMATICS FOR PHYSICS-II
TIME : 90 minutes **MAX. MARKS: 50**

Section – A

Answer *all* questions **(3 × 2 = 6)**

1. Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$.
2. Find $L[t^3 - 3t^2 + 2]$.
3. Define the probable error of the coefficient of correlation.

Section – B

Answer any *three* questions **(3 × 8 = 24)**

4. Show that $\int_0^\infty xe^{-x^8}dx \int_0^\infty x^2e^{-x^4}dx = \frac{\pi}{16\sqrt{2}}$..
5. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezoidal rule with h = 0.2. Hence determine the value of π.
6. By changing the order of integration evaluate $\int_0^a \int_0^{2\sqrt{ax}} x^2\, dx\, dy$.
7. Write a note on scatter diagram and its uses.

Section – C

Answer any *one* question **(1 × 20 = 20)**

8. (a) From the following data obtain the first and second derivatives of $y = \log_e x$ at $x = 500$

x	500	510	520	530	540	550
$y = \log_e x$	6.2146	6.2344	6.2538	6.2729	6.2916	6.3099

Also calculate the actual values of the derivatives at these points.

(b) Solve $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = 4$ subject to $y = 2$ and $\frac{dy}{dx} = 3$ when x = 0.

(10 + 10)

9. (a) Evaluate $\iint (x^2 + y^2)dx\, dy$ over the region for which x, y are each ≥ 0 and $x + y \leq 1$.

(b) Find Karl Pearson's coefficient of correlation from the following data:

Wages:	100	101	102	102	100	99	97	98	96	95
Cost of living:	98	99	99	97	95	92	95	94	90	91

(10+10)

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