



# THE AMERICAN COLLEGE, MADURAI

(An Autonomous Institution Affiliated to Madurai Kamaraj University)  
Re-accredited (2<sup>nd</sup> Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

## Backlog Arrear Examination, March 2021

**MAT/MAS 1602**  
**Calculus-II**

**Max : 75 Marks**  
**Time : 3 hrs.**

**Answer any FIVE questions :-**

**5 × 15 = 75**

1. Evaluate  $\iiint xyz \, dx \, dy \, dz$  taken through the positive octant of the sphere  $x^2 + y^2 + z^2 = a^2$ .
2. Solve  $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$ .
3. Solve  $(D^2 - 4D + 3)y = \sin 3x \cos 2x$ .
4. Solve:  $\frac{d^2y}{dx^2} + y = \sec x$  by variation of parameters.
5. Solve  $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$
6. Solve the equation  $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} - 3y = \sin t$  given that  $y = \frac{dy}{dt} = 0$  when  $t=0$  using Laplace transform.
7. Verify Stokes' theorem when  $F = (2x-y)i - yz^2j - y^2zk$  where  $S$  is the upper hemisphere of the unit sphere  $x^2+y^2+z^2=1$  and  $C$  is its boundary.

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