I B.TECH – EXAMINATIONS, JUNE - 2011
MATHEMATICES FOR BIOTECHNOLOGISTS
(BIOTECHNOLOGY)

Time: 3hours   **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks
- - -

1.a)   Find $\underset{x \to 0}{Lim}\left[\dfrac{(1+x)^{3/2}-1}{x}\right]$.

  b)   Find the length of the tangent and normal to the curve $y = x^3 + 4x^2 + 6x$ at '-1'. [8+8]

2.a)   Evaluate $\int x\sin^2 x\,dx$.

  b)   Find the area bounded between the curves $y = x^2 - 5x$ and $y = 4 - 2x$.   [8+8]

3.a)   Solve $x + 2y + z = 14;\ 3x + 4y + z = 11;\ 2x + 3y + z = 11$ by Gauss-Jordan Method.

  b)   Find the Eigen values and Eigen vectors of $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$.   [8+8]

4.a)   Form the differential equation of $y = e^x\left(A\cos x + B\sin x\right)$ by estimating
       orbitrary constants A and B.

  b)   Solve $x\dfrac{dy}{dx} + y = x^3 y^6$.   [8+8]

5.a)   Solve $\dfrac{d^2 y}{dx^2} + \dfrac{dy}{dx} = x^2 + 2x$.

  b)   The number 'N' of bacteria in a culture grew at a rate proportional to 'N'. The value of
       'N' is initially 100 and increased 332 in one hour. What was the value of 'N' after $1\frac{1}{2}$
       hour?   [8+8]

6.   Solve the following system of equations by Gauss Seidel Iteration Method
       $28x + 4y - z = 32;\ x + 3y + 10z = 24;\ 2x + 17y + 4z = 35$.   [16]

7.a)   Find $f(2.5)$ using Newton's forward formula from the following table

x	0	1	2	3	4	5	6
y	0	1	16	81	256	625	1296

  b)   Evaluate $\int\limits_{0}^{1}\sqrt{1+x^4}\,dx$ using Simpson's $\frac{3}{8}$ rule $h = \frac{1}{6}$.   [8+8]

8.a)   Find the Laplace Transform of $i)\,t^2 e^{-2t}$ $ii)\,\dfrac{1-\cos t}{t^2}$.

  b)   Solve $y''' + 2y'' - y' - 2y = 0;\ y(0) = 1;\ y'(0) = y''(0) = 2$.   [8+8]

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