Code: R5 102305

R5

B.Tech I Year (R05) Supplementary Examinations, May 2012

MATHEMATICS FOR BIOTECHNOLOGISTS

(Biotechnology)

Time: 3 hours Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 (a) If A = (1, 2, 3) B = (x, y, z) = f (1) = x, f (2) = y, f(3) = y then find f is an injection, surjection or bijection.
(b) Find $\frac{d}{dx}$ $(\frac{\cos 3x}{x^2})$.

2 (a) Evaluate $\int \frac{dx}{3\cos x+4\sin x+6}$.
(b) Find the area bounded by y = sin x, y = cos x between any two successive intersections.

3 (a) Solve the following system of equations x+y+4z = 6, 3x + 2y – 2z = 9, 5x + y + 2z = 13. Using Cramer's rule.
(b) Find the rank of the matrix by reducing it to the normal form.
$\begin{bmatrix} 1 & 0 & 1 & 0 \\ 3 & -1 & 2 & 1 \\ 2 & 1 & 2 & 1 \\ 2 & -2 & 1 & 0 \end{bmatrix}$.

4 (a) Solve $(e^y + 1)\cos x dx + e^y \sin x dy = 0$.
(b) Solve $\frac{dy}{dx} - \frac{tany}{1+x} = (1+x)e^x \sec y$.

5 (a) Solve the differential equation $y'' - y' - 2y = 3e^{2x}$ $y(0) = 0, y'(0) = 2$
(b) Find the orthogonal trajectories of the family of circles $x^2 + y^2 = ax$.

6 (a) Find out the square root of 25 given $x_0 = 2.0$, $x_1 = 7$ using bisection method.
(b) Using the Newton-Raphson method find the root of equation $f(x) = e^x - 3x$ that lies between 0 and 1.

7 (a) Construct difference table for the following data:

X	0.1	0.3	0.5	0.7	0.9	1.1	1.3
F (x)	0.003	0.067	0.148	0.248	0.370	0.518	0.697

And find F (0.6) using a cube that fits at x = 0.3, 0.5, 0.7 and 0.9 using Newton's forward formula.

(b) Evaluate $\int^5$ e e^{-x^2} dx using trapezoidal rule. Taking h = 1.

8 (a) Find L {cos 3t}.
(b) Find $L^{-1}\{\frac{s^2+2s-4}{(s^2+9)(s-5)}\}$.

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