B.Sc. (Hons.) Mathematics (Sem : 2nd)
CALCULUS-II
Subject Code: BMATS1201
Paper ID: [19131206]

Time: 03 Hours   **Maximum Marks: 60**
Instruction for candidates:
1.   Section A is compulsory. It consists of 10 parts of two marks each.
2.   Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3.   Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section - A   **(2 marks each)**

Q1.   Attempt the followings:
    a.   Find the area bounded by the lines $y = x, x = 1\ and\ x =- 1$
    b.   Find the length of the arc of the curve $y = x^{\frac{3}{2}}\ from\ (0, 0)\ to\ (4, 8)$
    c.   Write the value of $\int_{0}^{\frac{\pi}{2}} Sin^8\theta d\theta$
    d.   Prove the symmetry property of Beta function.
    e.   Evaluate $\frac{\Gamma(6)}{2\Gamma(3)}$
    f.   Write the statement of Green theorem in plane.
    g.   Write any four properties of Definite integral.
    h.   Evaluate $\int_{0}^{2}(x + 4)dx$
    i.   Integrate the function $\frac{1}{(x-3)(x+1)}$ using partial fraction.
    j.   Define improper integrals with the help of an example.

Section - B   **(5 marks each)**

Q2.   Find the area of the curve $x = acos^3t,\ y = bSin^3t$

Q3.   Discuss the convergence of improper integral $\int_{0}^{1}\frac{dx}{\sqrt{x-x^2}}$

Q4.   Express $\int_{0}^{\frac{\pi}{2}} Sin^pxCos^qx\ dx$, p$>- 1, q >- $1in terms of Gamma function.

Q5.   Evaluate $\int_{0}^{1}\int_{0}^{1-x}\int_{0}^{2-x} xyz\ dz\ dy\ dx$

Q6.   Obtain reduction formula for $\int_{0}^{\frac{\pi}{2}} Sin^mx\ dx$, where m is a positive integer.

Section-C   **(10 marks each)**

Q7. Change the order of integration and evaluate $\int\limits_{0}^{4}\int\limits_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy\, dx$

Q8. Evaluate $\int\limits_{0}^{\frac{\pi}{2}} \frac{\sqrt{Cosx}}{\sqrt{Cosx}+\sqrt{Sinx}}\, dx$

Q9. Find the length of the arc of the parabola $y^2 - 4y + 2x = 0$ which lies in the first quadrant.