देवी अहिल्या विश्वविद्यालय इन्दौर
(Regular) छात्रों के लिए

Class: BCA II Semester.
Paper: Mathematics - II

Attempt all the five Questions. Each Question carry equal marks.

Q.1 (a) Trace the Curve $a^2y^2 = x^3(a^2-x^2)$
(b) Test the Convergence of $\int_0^2 \frac{\log x}{\sqrt{2-x}}\,dx$

Q.2 Prove that $\int_0^\infty \frac{x^{m-1}+x^{n-1}}{(1+x)^{m+n}}\,dx = B(m,n)$

Q.3 (a) Evaluate $\int_0^3\int_0^2\int_0^1 (x+y+z)\,dx\,dy\,dz$
(b) Using stoke's theorem, Find
$\int_C e^x dx + 2y\,dy - dz$

Q.4. If $u = \log(x^3+y^3+z^3-3xyz)$ show that
$\left(\frac{\partial}{\partial x}+\frac{\partial}{\partial y}+\frac{\partial}{\partial z}\right)u = \frac{-9}{(x+y+z)^2}$

Q.5 (a) Discuss the maximum or minimum values of saddle points of $f(x,y) = x^3 - 4xy + 2y^2$

(b) Test the Convergence of the Series
$\frac{x}{1.2} + \frac{x^2}{3.4} + \frac{x^3}{5.6} + \frac{x^4}{7.8} + \cdots$