KATHMANDU UNIVERSITY

INTERNAL EXAMINATION

Subject: MATHS(104)

Full marks: 20 Time: 1hours.

1(a) Convert spherical coordinates$(8,\frac{\pi}{3},\frac{\pi}{6})$ into Cartesian and cylindrical coordinates. [2]

(b)Find the area of region in the plane enclosed by the cardioid $r = 2(1 + cos\theta)$ [3]

2(a)Find the equation of tangent plane to the surface $z = xcosy - ye^x$ *at point* (0,0,0) [2]

(b)Determine extreme values of function $f(x,y,z) = x^2 + 2y - z^2$subject to the constraints

$y + z = 0$ *and* $2x - y = 0$ [3]

3(a)sketch the curve and change the order of integration of $\int_0^1 \int_2^{4-2x} dydx$ [2]

(b)Find the average value of f(x,y,z)=xyz throughout the region D bounded by coordinate planes x=2, y=2, z=2 in the first octant. [3]

4(a)Replace polar equation by Cartesian equation.$r^2 = 4rcos\theta$ [2]

(b)Prove that$\beta(m,n) = 2\int_0^{\frac{\pi}{2}} sin^{2m-1}\theta cos^{2n-1}\theta d\theta$ [3]