MATH 237 FALL 2016 Extra Questions

MATERIAL : 12.6,12.7,14.3

1. Give the critical points of the following:
(a) $f(x,y,z) = yxz^2 + \ln\sqrt{x^2+y^2}$ (b) $w = ze^{-x^2-yz}$.

2. Give the relative extrema and saddle points of the following
(a) $f(x,y) = x^4y^4 - 2x^2y^2 + 8$ (b) $z = 2x^2 + 8xy + 2y^2 - 6x + 8$ (c) $f(x,y) = x^3 - 9xy + y^3$.

3. Give the relative extrema of $z = e^{x^2+y^2}$ for (x,y) on $xy = 1$.

4. Give the location of the relative extrema of $f(x,y,z) = e^{x^2+y^2-z}$ on $2x + 4y - 6z = 8$.

5. Give the minimum distance from (0,1,2) to $x^2 + y^2 - z = 4$.

6. Give the dimensions of the box of maximum volume whose height plus area of the base is 32.

7. Give the surface areas of the following volumes: (a) $z = 2r, 0 \le z \le 4$ (b) $z = 9 - x^2 - y^2, z \ge 0$
(c) $z = 18 - x^2 - y^2, x^2 + y^2 = 1, z \ge 0$ (d) $z = 9 - x^2 - y^2$ and $z = 1 + x^2 + y^2$
(e) $x = 0, y = 0, z = 0$ and $x + y + z = 3$.