Answers of Final 2007 Spring

Part I:

(1) C (Note: $(-1, 1)$ is not a critical point)

(2) E ($\int_2^5 \int_1^3 (\frac{(v-u)}{6})^2 \frac{1}{6} \, du dv$)

(3) $4(x - 3) + 5(y - 2) + 6(z - 1) = 0$

(4) 2

(5) 38

(6) $2(x - 1) - 4(y - 2) - (z + 2) = 0$

Part II:

(7)(i) $< 0, 1, 0 >$

(ii) $< 2t - 1, 3e^{3t}, 0 >$

(iii) $< \frac{1}{3}t^3 - \frac{1}{2}t^2, \frac{1}{3}e^{3t}, 0 > +C$

(iv) $< -\frac{1}{6}, \frac{1}{3}e^3 - \frac{1}{3}, 0 >$

(8) see example 2.5 (P. 834)

(9)(i) $f_x = 3x^2 - ye^{xy}$

(ii) $f_y = -xe^{xy} + 3y^2$

(iii) $f_{xy} = -e^{xy} - xye^{xy}$

(iv) $f_{xx} = 6x - y^2 e^{xy}$

(10) $g_u(u, v) = \frac{5}{2}[(\frac{u-v}{u+v})^{\frac{3}{4}} + 3(\frac{u+v}{u-v})^{\frac{1}{4}}]$

$g_v(u, v) = \frac{5}{2}[(\frac{u-v}{u+v})^{\frac{3}{4}} - 3(\frac{u+v}{u-v})^{\frac{1}{4}}]$

(11) $max = 7, min = -5$ Note: See example 8.3 (P905); point $(0, -3)$ does not satisfy the constraint.

(12) $e - 1$ Note: see example 1.7 (P.932)