6 MAY, 2013

IŞIK UNIVERSITY, MATH 203 MIDTERM EXAM II

First Name:	Last Name:		Row#:	
Student ID:	Q1	Q2	Q3	$\mathbf{Q4}$
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Q1. (12p) Evaluate $\int_C (x^2 + y) ds$ where C is the line segment from (-2, -1) to (1, 2).

Q2. (13p) If the vector field $\overrightarrow{F} = ay^2 \overrightarrow{i} + (2xy + 2yz) \overrightarrow{j} + (by^2 + z^2) \overrightarrow{k}$ is conservative, then

a) find the values of a and b.

b) For these values of a and b, find a potential function for \overrightarrow{F} .

c) Evaluate the integral $\int_C \overrightarrow{F} \cdot d\overrightarrow{r}$ where C is the curve parameterized by $x = e^t(1-t), y = 2t^2, z = 3t$ and $0 \le t \le 1$.

Q3. (13p) Find the counterclockwise circulation of $\overrightarrow{F} = -xy^2 \overrightarrow{i} + x^2 y \overrightarrow{j}$ around and over the curve in the first quadrant enclosed by the circles $x^2 + y^2 = 1$, $x^2 + y^2 = 4$ and the lines y = x and y = 0.

Q4. (12p) Find the area of the surface parameterized by $\overrightarrow{r} = u \overrightarrow{i} + uv \overrightarrow{j} + v \overrightarrow{k}$, and $u^2 + v^2 \leq 1$.

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Student ID:	Q5	Q6	Q7	Q8

Q5. (12p) Find the general solution of the differential equation

 $y'' - 3y' + 2y = 4e^{3t} - e^{2t}.$

Q6. (13p) Solve the differential equation

$$(2x^{2} + y) dx + (x^{2}y - x) dy = 0.$$

Q7. (12p) Solve the initial value problem; $ty' - 2y = t^3 \sin t$, $y(\pi/2) = 1$.

Q8. (13p) Given that $y_1 = x$ is a solution of the equation $x^2y'' + xy' - y = 0$. Find the general solution of the differential equation.