Roll No:						

PADRE CONCEIÇÃO COLLEGE OF ENGINEERING,
VERNA-GOA

TUTORIAL NO: 11

Semester: II (RC 2019-'20)
Course Instructor: Ms. Komal Paroolkar

Course: FE210
Mathematics-II

Topic: Line Integral and Green's Theorem.

	Question	CO	CL
Q1.	Find the work done in moving the particle in the force field $\bar{F} = 3xy\,\hat{\imath} - 5z\,\hat{\jmath} + 10x\,\hat{k}$ along $x = t^2 + 1, y = 2t^2, z = t^3$ $from\ t = 1\ to\ t = 2.$	**FE210.3**	**CL3**
Q2	Find the work done in moving the particle in the force field $\bar{F} = (2y+3)\hat{\imath} + xz\,\hat{\jmath} + (yz-2)\,\hat{k}$ along $x = 2t^2, y = t, z = t^2$ $from\ t = 0\ to\ t = 1.$	**FE210.3**	**CL3**
Q3	Verify Green's Theorem in the plane for $\oint[(xy+1)dx + (4x^2)dy]$ where 'C' is the boundary of the region bounded by $y = 0, x = 1, y = x.$	**FE210.3**	**CL3**
Q4.	Verify Green's Theorem in the plane for $\oint[(y^2+2x)dx + (5+xy)dy]$ where 'C' is the boundary of the region bounded by $y^2 = 4x\ and\ y = 2x.$	**FE210.3**	**CL3**
		FE210.3	**CL3**
Q5.	Find the total work done in moving the particle in the force field $\bar{F} = (2x\,siny - 3)\hat{\imath} + (x^2\cos y + z^2)\,\hat{\jmath} + 2(yz+1)\,\hat{k}$ along the straight line joining		

(1,0,-1) to (2, $\frac{\pi}{2}$,1).

Q6. Verify Green's Theorem in the plane for $\bar{F} = (x^2 - y^2)\hat{\imath} + (x + y)\hat{\jmath}$ where 'C' is the triangle with vertices $(0,0), (1,1), (2,1)$. **FE210.3 CL3**

Q7. Find the work done in moving the particle in the force field $\bar{F} = (2x + 1)\hat{\imath} + x^2\,\hat{\jmath} + (3z)\,\hat{k}$ along $x = z^2, y = z - 2\ from\ z = 0\ to\ z = 2.$ **FE210.3 CL3**

Q8. Verify Green's Theorem in the plane for $\bar{F} = (x^2 + y^2)\hat{\imath} + (x^3 - y^3)\hat{\jmath}$ where 'C' is the rectangle with vertices $(0,0), (1,0), (0,2)\,and\ (1,2)$. **FE210.3 CL3**

Q9. Prove that $\bar{F} = (y^2 - 2xyz^3)\hat{\imath} + (3 + 2xy - x^2z^3)\hat{\jmath} + (6z^3 - 3x^2yz^2)\hat{k}$ is irrotational and hence find its potential function. Further, evaluate the tangential line integral from $(1,0,1)\,and\ (2,1,0)$ **FE210.3 CL3**

Q10. Prove that $\bar{F} = (4xy)\hat{\imath} + (2x^2 + 4z^2y)\hat{\jmath} + (4y^2z)\hat{k}$ is irrotational and hence find its potential function. Further, evaluate $\int_{(1,2,2)}^{(3,0,1)} \bar{F} \cdot d\bar{r}$ **FE210.3 CL3**

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