KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
Department of Mathematical Sciences

Math 301 Method of Applied Mathematics

Major Exam # 1 Term 061

Time Allowed 60 minutes

Name ____________________ ID # ________ Section # ______

Q #	Grade
1	/ 5
2	/ 4
3	/ 5
4	/ 6
Total	/ 20

Important Note

Show all work.
Use of programmable calculator is not allowed.
Mobiles and paging devices should not be carried during examination.

Instructor: F. D. Zaman

Q # 1(a) Let **r** be the position vector and **a** a constant vector. Show the following
$\underline{\nabla} \bullet \left[(\underline{r} \bullet \underline{r})\underline{a} \right] = 2(\underline{r} \bullet \underline{a})$. **(2)**

Q1(b) Evaluate the integral
$\int_C 2xydx - 4ydy + e^{xy}dz$ where C is the curve $x = 2t,\ y = \sqrt{t},\ z = 4,\ t = 0,1.$

(3)

Q2) Show that the integral is independent of path and hence evaluate it along any path

$$\int_{(2,1)}^{(3,4)} \frac{y\,dx - (x + y^3)\,dy}{y^2}.$$ **(4)**

Q 3) Use Green's theorem to evaluate the given line integral along the curve in the first quadrant formed by graphs of $y = 0, x = y^2, x = 8 - y^2$ **(5)**

$$\oint_C \frac{x^3 + y^3}{3} dx + (xy + xy^2) dy.$$

Q4) Find the integral giving flux of the vector field **F** =z **k** through the surface S formed by the portion of the paraboloid $z = 5 - x^2 - y^2$ inside the cylinder . $x^2 + y^2 = 4$. **(6)**