November 11 2019

Name : _____

Test 2, ENGR 233

Material : calculator; something to write   1h   Marked on 50; all questions on 10

1- Evaluate the work done by the force
$$\vec{F}(x,y,z) = (y - yz\sin(x))\vec{i} + (x + z\cos(x))\vec{j} + y\cos(x)\vec{k}$$

along the path
$$\vec{r}(t) = \langle 2t, (1 + \cos(t))^2, 4\sin^3 t \rangle \text{ with } 0 \le t \le \frac{\pi}{2}$$

2- Evaluate the double integral over the region R bounded by the graphs of the given equations:
$$\iint_R x^3 y^2 dA \; ; \; y = x \; ; y = 0 \; ; x = 1$$

3- Evaluate the double integral
$$\int_{-3}^{3} \int_{0}^{\sqrt{9-x^2}} \sqrt{x^2 + y^2} \, dy \, dx$$

4- Use Green's theorem to evaluate the line integral:
$$\oint_C xy\,dx + x^2 dy \, ,$$
where C is the boundary of the region determined by the graphs of $x = 0 \; ; x^2 + y^2 = 1 \; ; x \ge 0$

5- Find the surface area of the portion of the sphere $x^2 + y^2 + z^2 = a^2$ that is within the cylinder $x^2 + y^2 = b^2, 0 < b < a$, above the xy plane. $z^2 = a^2 - x^2 - y^2$