

### HOMEWORK 3

**Problem 1.** Find a work which should be done in the force field  $\mathbf{F} = x\vec{i} - \sqrt{y}\vec{j}$  in order to move an object along the curve  $y = x^{\frac{3}{2}}$  from  $(0, 0)$  to  $(4, 8)$ .

**A** 5; **B**  $\sqrt{3} + 1$ ; **C**  $\frac{8}{3}(3 - \sqrt{32})$ ; **D**  $\frac{4}{3}(3 - \sqrt{32})$ ; **F**  $\frac{8}{3}(1 - \sqrt{32})$ ; **J**  $\frac{7}{3}(3 - \sqrt{31})$ ;  
**K** None of above

**Problem 2.** Evaluate the line integral  $\int_C 2xyzdx + x^2zdy + x^2ydz$ . Here  $C$  : smooth curve from  $(0, 0, 0)$  to  $(1, 4, 3)$ .

**A** 1; **B** 2; **C** 4; **D** 10 **F** 12; **J** 14; **K** None of above

**Problem 3.** Evaluate the surface integral  $\int \int_S z dS$  over the surface

$$S : r(u, v) = (u + v)\vec{i} + (u - v)\vec{j} + \sin(v)\vec{k}, 0 \leq u \leq 2, 0 \leq v \leq \pi.$$

**A** 0; **B** 1; **C** 2; **D** 3; **F** 5; **J** 7; **K** None of above

**Problem 4.** Find the flux  $\int_S \mathbf{F} \cdot d\mathbf{S}$  where  $\mathbf{F} = x^2\vec{i} + xy\vec{j} + z\vec{k}$  Here  $S$  is the surface of the solid  $E$  oriented outward, and  $E$  -solid region bounded by the coordinate planes and the plane  $4x + 6y + 6z = 24$ .

**A** 10; **B** 12; **C** 14; **D** 16; **F** 18; **J** 20; **K** None of above

**Problem 5.** Find the surface area of the part of the cone  $z^2 = 4(x^2 + y^2)$  located below the  $xy$ -plane and above the plane  $z = -2$ .

**A**  $4\pi$ ; **B**  $2\pi$ ; **C**  $\sqrt{\pi}$ ; **D**  $\frac{4\pi}{3}$ ; **F**  $6\pi$ ; **J**  $5\pi$ ; **K** None of above