DEPARTMENT OF MATHEMATICAL SCIENCES, FACULTY OF SCIENCE UNIVERSITI TEKNOLOGI MALAYSIA SEMESTER 2 1718

SSCE 1993

ASSIGNMENT 2 UTMSPACE KL

Answer **all** questions.

1. Evaluate the integral

$$\int_0^1 \int_{\sqrt{x}}^1 \sin\left(\frac{y^3+1}{2}\right) \, dy \, dx$$

by reversing the order of integration.

[5 marks]

2. Evaluate

$$\int_{0}^{2} \int_{0}^{\sqrt{1 - (y - 1)^{2}}} \left(\frac{2}{y}\right) \, dx \, dy$$

by first changing it to polar coordinates.

[6 marks]

3. A solid is bounded by the surfaces $z = 2 - x^2$ and $z = x^2$ for $0 \le y \le 3$. Find the mass of the solid when the density $\delta(x, y, z) = x + y$.

[7 marks]

4. Find the volume of a solid that lies inside the cylinder $x^2 + y^2 = 4$ bounded above by $z = x^2 + y^2 + 6$ and below by $z = 4 - x^2 - y^2$.

[6 marks]

5. Use spherical coordinates to evaluate

$$\int_{-\sqrt{2}}^{\sqrt{2}} \int_{0}^{\sqrt{2-x^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{4-x^2-y^2}} z^2 \, dz \, dy \, dx.$$

[6 marks]