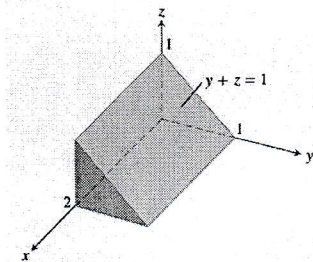


Note : Answer Five questions only

Q1: A) Determine the local extreme values of the function:

$$F(x,y) = y^2 + xy - 2x - 2y + 2$$

B) Using triple integral, find the volume of the solid shown in the following figure:



(20 Marks)

Q2: A) Find the equation of plane through (0, 2, -1) normal to $n = 3i - 2j - k$.

B) Change the Cartesian integral into an equivalent polar integral. Then evaluate

The polar integral.
$$\int_0^2 \int_0^{\sqrt{1-(x-1)^2}} \frac{x+y}{x^2+y^2} dy dx$$

(20 Marks)

Q3: A) Estimate how much the value of $\{ f(x,y,z) = y \sin x + 2yz \}$ will change if the point

$P(x,y,z)$ moves 0.1 unit from $P_0(0,1,0)$ straight toward $P_1(2,2,-2)$.

B) Find the moment of inertia about the x-axis of a thin plate bounded by the parabola

$$x = y - y^2 \text{ and the line } x + y = 0 \text{ if } \delta = x + y$$

(20 Marks)

Q4: A) Find the distance from the point $S(1,1,5)$ to the line

$$x = 1 + t \quad y = 3 - t \quad z = 2t$$

B) Integrate

$$\int_0^3 \int_{\sqrt{x/3}}^1 e^{y^3} dy dx$$

(20 Marks)

Q5: Solve the following differential equations:

1) $y' = (y - 2) \cot x$

2) $\cos(x + y) dx + (3y^2 + 2y + \cos(x + y)) dy = 0$

3) $x^2 y'' + 0.7 xy' - 0.1 y = 0$

4) $y'' - 4y' - 5y = e^x + 4$

(20 Marks)

Q6: Test the following series:

1) $\sum_{n=1}^{\infty} \frac{1}{n} - \frac{1}{n+2}$ (*Telescoping series*)

2) $\sum_{n=1}^{\infty} \frac{1}{n^2 + 1}$ (*integral test*)

3) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{3n-2}}$ (*limit comparison test*)

4) $\sum_{n=1}^{\infty} \frac{3^n}{n^2 2^{n+1}}$ (*ratio test*)

(20 Marks)

.....GOOD LUCK.....