SECOND MID TERM EXAM., SEMESTER I, 2024

DEPT. MATH., COLLEGE OF SCIENCE
KING SAUD UNIVERSITY

MATH: 107 FULL MARK: 25 TIME: 90 MINUTES

Q1. [3+3=6]

Let $A(2,2,0)$, $B(-1,0,2)$, and $C(0,4,3)$ be three points.

(a) Find the area of the triangle ABC.

(b) Find the distance from C to the line l which passes through A and B.

Q2. [4+4=8]

(a) Find parametric equations for the line of intersection of the planes

$$P_1\colon\ x-2y+3z=1 \text{ and } P_2\colon\ x+y+z=1.$$

(b) Determine whether the two lines

$$l_1:\quad x=1+2t,\quad y=1-4t,\quad z=5-t, \text{ where } t\in\Re,$$
$$l_2:\quad x=4-s,\quad y=-1+6s,\quad z=4+s, \text{ where } s\in\Re$$

intersect, and if so, find the point of intersection.

Q3. [3] Identify the surface given by the equation $z^2-4y^2-64x^2+64=0$.
Sketch the surface by finding traces on the coordinate planes.

Q4. [4+4=8]

(a) Find the velocity, acceleration and speed of a moving point P at time $t=\frac{\pi}{2}$ along

$$\mathbf{r}(t)=t(\cos t\mathbf{i}+\sin t\mathbf{j}+t\mathbf{k}).$$

(b) Find $\mathbf{r}(t)$ subject to the given conditions:

$$\mathbf{r}''(t)=6t\mathbf{i}+3\mathbf{j}, \text{ where } \mathbf{r}'(0)=4\mathbf{i}-\mathbf{j}+\mathbf{k}, \text{ and } \mathbf{r}(0)=7\mathbf{j}.$$