## Any data not given is to be assumed

## PROBLEM NO 1

a - It is required to expand the Load shown in Fig. 1 in a double Fourier Series Form

$$
P(x, y)=\sum_{m=1}^{s} \sum_{n=1}^{\infty} q_{m n n} \sin \frac{m \pi x}{a} \sin \frac{n \pi y}{b}
$$

b - It is required to determine the Type of the Surface and the Normal Curvature $k_{n}$ for the Position Vector

$$
r=x \underline{i}+y \dot{j}+z(x, y) \underline{k}, \quad z(x, y)=c\left(x^{2}-y^{2}\right), \quad c=\text { constant }
$$

PROBLEM NO 2
It is required to design a Reinforced Concrete Elliptic Paraboloid Shell Roof System to cover a Square Area of $26 \times 26 \mathrm{~ms}$
$\left(f_{x}=5.0 \mathrm{~ms}, f_{y}=5.0 \mathrm{~ms}\right.$, Slab thickness 10 cm , Cover $=50 \mathrm{~kg} / \mathrm{m}^{2}$ and Live Load $\left.=100 \mathrm{~kg} / \mathrm{m}^{2}\right)$
Choose one of the following problems
PROBLEM NO 3
It is required to design a Reinforced Concrete Hyperbolic Paraboloid Shell Roof System to cover the Area shown in Fig. 2

PROBLEM NO 4
It is required to design a One Bay Reinforced Concrete Circular Cylindrical Shell Roof System having the Cross-Section shown in Fig. 3 to cover a Rectangular Area of $5 \times 24 \mathrm{~ms}$


Fig. 1


2


