4. Construct a 3 × 2 matrix whose elements are given by $a_{ij} = e^{i.x}\sin jx$

Solution:

Let A be a 3 x 2 matrix

Such that, $a_{ij} = e^{i.x}\sin jx$; where where $1 \le i \le 3$; $1 \le j \le 2$

So, the terms are given as

$$a_{11} = e^x \sin x \qquad a_{12} = e^x \sin 2x$$
$$a_{21} = e^{2x} \sin x \qquad a_{22} = e^{2x} \sin 2x$$
$$a_{31} = e^{3x} \sin x \qquad a_{32} = e^{3x} \sin 2x$$

$$\text{Therefore, } A = \begin{bmatrix} e^x \sin x & e^x \sin 2x \\ e^{2x} \sin x & e^{2x} \sin 2x \\ e^{3x} \sin x & e^{3x} \sin 2x \end{bmatrix}$$

Very simple problem to boost your confidence. In jee mains sometimes, they do ask such easy problems.