

## EE23BTECH11217 - Prajwal M\*

## EXERCISE 9.1

**12) Write the first five terms of each of the sequences and obtain the corresponding series**

$$a_1 = -1, a_n = \frac{a_{n-1}}{n}, n \geq 2$$

Solution:

$$\text{Given: } a_1 = -1, a_n = \frac{a_{n-1}}{n}, n \geq 2.$$

First five terms of the sequence:

$$\begin{aligned} a_1 &= -1 \\ a_2 &= \frac{a_1}{2} = -\frac{1}{2} \\ a_3 &= \frac{a_2}{3} = -\frac{1}{2 \cdot 3} = -\frac{1}{6} \\ a_4 &= \frac{a_3}{4} = -\frac{1}{2 \cdot 3 \cdot 4} = -\frac{1}{24} \\ a_5 &= \frac{a_4}{5} = -\frac{1}{2 \cdot 3 \cdot 4 \cdot 5} = -\frac{1}{120} \end{aligned}$$

So the first five terms of the series are:

$$-1, -\frac{1}{2}, -\frac{1}{6}, -\frac{1}{24}, -\frac{1}{120}$$

The corresponding series:

$$\begin{aligned} \sum_{n=1}^{\infty} a_n &= a_1 + a_2 + a_3 + a_4 + a_5 + \dots \\ &= -1 + \left(-\frac{1}{2}\right) + \left(-\frac{1}{6}\right) + \left(-\frac{1}{24}\right) + \dots \end{aligned}$$