Final Assignment = 01

Name: Joy Matubber
ID: 20 - 41959-1
Serial: 07

Ans to the q NO:-01

Calculate the trend value using semi-averages method.

Year	208	209	2010	2011	2012	2013
Income (in crore)	43	51	64	76	81	96

Ans:

Year	Income	3-Year semi total	3-Year semi Avg	Trend values
2008	43			52.67 − 10.55 = 42.11
2009	51	158	52.67	42.11 + 10.55 = 52.67
2010	64			52.67 + 10.55 = 63.22
2011	76			63.22 + 10.55 = 73.77
2012	81	253	84.33	73.77 + 10.55 = 84.32
2013	96			84.32 + 10.55 = 94.87

NOW,

Difference between the central years = 2012 − 2009
= 3

Difference between the semi-averages = 84.33 − 52.67
= 31.66

Increase in trend value for one year

$= \frac{31.66}{3}$

$= 10.55$

Joy Matubber

ID: 20-41959-1

Serial = 07

Section = [O]

Ans NO:-02

3-Year Moving Average.

Year	Loan Income	3-Year semi total	3-Year semi-average
2004	40	-------	--------
2005	42	121	40.33
2006	39	106	35.33
2007	25	91	30.33
2008	27	103	34.33
2009	51	106	35.33
2010	28	105	35
2011	26	85	28.33
2012	31	87	29
2013	30	109	36.33
2014	48	-------	-------

Ans NO:-03

The transition probability Matrix: P

$$P = \begin{bmatrix} P_{00} & P_{01} \\ P_{10} & P_{11} \end{bmatrix} = \begin{bmatrix} 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix}$$. We need P_{00}^5, P^5

Now,

$$P^2 = P \times P = \begin{bmatrix} 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix} \times \begin{bmatrix} 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix} = \begin{bmatrix} 0.68 & 0.32 \\ 0.64 & 0.36 \end{bmatrix}$$

Now,

$$P^4 = P^2 \times P^2 = \begin{bmatrix} 0.68 & 0.32 \\ 0.64 & 0.36 \end{bmatrix} \times \begin{bmatrix} 0.68 & 0.32 \\ 0.64 & 0.36 \end{bmatrix}$$

$$= \begin{bmatrix} 0.6672 & 0.3328 \\ 0.6656 & 0.3344 \end{bmatrix}$$

And,

$$P^5 = P^4 \times P = \begin{bmatrix} 0.6672 & 0.3328 \\ 0.6656 & 0.3344 \end{bmatrix} \times \begin{bmatrix} 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix}$$

$$= \begin{bmatrix} 0.66656 & 0.33344 \\ 0.66688 & 0.33312 \end{bmatrix}$$

So, The required probability is 0.66656.

Ans NO:-04

Let, T be the elapsed time between the entrance of $(n-1)^{th}$ and n^{th} signal.

And given poisson rate $\lambda = 2$ per minute

i) more than 1 minute,

$$P(T>1) = e^{-\lambda t} = e^{-2\times 1} = 0.1353$$

ii) less than 2 minute.

$$P(T<2) = 1 - e^{-\lambda t}$$

$$= 1 - e^{-2\times 2}$$

$$= 1 - e^{-4}$$

$$= 0.9816$$

iii) between 1 to 2 minute

$$P(1<T<2) = e^{-\lambda t_1} - e^{-\lambda t_2}$$

$$= e^{-2\times 1} - e^{-2\times 2}$$

$$= e^{-2} - e^{-4}$$

$$= 0.1353 - 0.0183$$

$$= 0.117$$