

Attendance Quiz-2
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Que - 1 Who was Sir Ronald Ross? What was he famous for?

Ans-1 Sir Ronald Ross was a British medical doctor who received the Nobel prize for physiology for his work on the transmission of Malaria. While he is remembered for his work on Malaria he was also an amateur artist and a mathematician.

Paste the code from the lecture and remove option remember and see how long it takes

Ans-2 Removing remember from the maple code and testing it out

```
a := proc(n) :  
if n = 0 then  
0 :  
elif n = 1 then  
1 :  
elif n = 2 then  
4 :  
else  
3 * a(n-1) - 3 * a(n-2) + a(n-3) :  
fi:  
end:
```

Que-3: Use maple to solve the differential equation $y'(t) = \frac{a1}{y^{a3}} \cdot t^{a2}$, $y(1) = a2$

Ans-3
a1 := 0
a2 := 1
a3 := 2

$$\text{dsolve}\left(\left\{\text{diff}(y(t), t) = \frac{0 \cdot t^1}{y(t)^2}, y(1) = 1\right\}, y(t)\right);$$
$$y(t) = 1 \tag{1}$$

Que-4 Hilda Hudson, was a collaborator of Sir Ronald Ross. What was her middle name?

Ans-4 Hilda Hudson's middle name was Phoebe.

Que-5 Use maple to solve the differential equation $a1 \cdot y''(t) + a2 \cdot y'(t) + a3 \cdot y(t) = 0$, subject to $y(0) = 1, y'(0) = 0$

Ans-5
a1 := 1
a2 := 20
a3 := 44

$$\text{dsolve}(\{1 \cdot D(D(y))(t) + 20 \cdot D(y)(t) + 44 \cdot y(t) = 0, y(0) = 1, D(y)(0) = 0\}, y(t));$$
$$y(t) = \frac{\sqrt{14} e^{2(-5 + \sqrt{14})t}}{56} - \frac{\sqrt{14} e^{-2(5 + \sqrt{14})t}}{56} \tag{2}$$

Que-6 Find in (floating points) the second largest eigenvalue (in absolute value) and the corresponding eigenvector

```
# Ans-6
# a1 := 45
# a2 := 44
# a3 := 14
```

```
with(LinearAlgebra) :
A := Matrix([[45, 44, 14], [44, 14, 45], [14, 44, 45]])
```

$$A := \begin{bmatrix} 45 & 44 & 14 \\ 44 & 14 & 45 \\ 14 & 44 & 45 \end{bmatrix} \quad (3)$$

```
evalf(Eigenvalues(A));
```

$$\begin{bmatrix} -30. \\ 31. \\ 103. \end{bmatrix} \quad (4)$$

```
evalf(Eigenvectors(A));
```

$$\begin{bmatrix} 103. \\ 31. \\ -30. \end{bmatrix}, \begin{bmatrix} 1. & -1.020239190 & 1. \\ 1. & 0.006439742410 & -2.022727273 \\ 1. & 1. & 1. \end{bmatrix} \quad (5)$$

Answer - The second largest Eigenvalues is 31 and it's corresponding Eigenvector is [-1.0202, 0.0064, 1]