**BT3014 : Analysis and interpretation of Biological Data**

**(Basic math tutorial)**

1. Find the eigenvalues of the given matrix.

(A). (B). (C).

(D). (E).

2. Find one eigenvector for the given matrix corresponding to the given eigenvalue.

(A). (B).

(C). (D).

3. Find *fx* and *fy* where *f(x,y)* is equal to

(A). *3x +4y* (B). *xy3 +x2y2* (C). *x3y + ex* (D). *xe2x+3y* (E). *e-xsin(x+y)*

4. **find the gradient** of a function *f*

(A). (B). (C). (D).

5. Let  . Calculate the gradient of ‘f’ at the point (1, 3, −2)?

6. Find the Jacobian matrix of a function ‘*f*’ given by

(A).  *f(x,y,z) =( xy*+2*yz* , 2*xy*2*z)* (B). *f(x,y,z) =( xyz , y2 , x*+*z)*

7. Compute the Hessian matrix of a function ‘*f*’ given by

(A). (B).

**Answers**

1. (A). 2,5 (B). 3,7 (C). −2,6 (D). 3,4,7 (E). −3,0,2
2. (A). (1,2) (B). (−3,2) (C). (−3,1) (D). (−1,−2,1)
3. (A). *fx* = 3, *fy* = 4 (B). *fx = y 3+2xy2* , *fy = 3xy2+2xy* (C). *fx = 3x2y +ex* , *fy = x3* (D). *fx =2xe2x+3y+e2x+3y* , *fy = 3xe2x+3y* (E). *fx = e-x(cos(x+y)-sin(x+y))* , *fy = e-xcos(x+y)*
4. (A). (B). (C). (D).
5. (A). (B).
6. (A). (B).