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NPTEL

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Courses » Introduction to Evolutionary Dynamics

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## Unit 9 - Week 8



## Course outline

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Week 1

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Week 8

- Lecture 36 : Evolutionary Game Theory – 3
- Lecture 37 : Evolutionary Game Theory – 4
- Lecture 38 : Evolutionary Game Theory Applied to Moran Process
- Lecture 39 : Evolutionary Games During Weak Selection
- Lecture 40 : Evolutionary Dynamics of HIV
- Quiz : Week 8 Assessment
- Week 8 Assessment Solutions

## Week 8 Assessment

The due date for submitting this assignment has passed. **Due on 2017-09-20, 23:59 IST**  
As per our records you have not submitted this assignment.

1) Given the payoff matrix  $P = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ , it denotes the payoffs received by whom? 1 point

- The players or strategy or genotype denoted by each column
- The players or strategy or genotype denoted by each row and column
- None of the choices
- The players or strategy or genotype denoted by each row

**No, the answer is incorrect.****Score: 0****Accepted Answers:***The players or strategy or genotype denoted by each row*

2) Given the payoff matrix  $P = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ , and  $X_A$  and  $X_B$  the population fractions, calculate the fitness of the two species A and B. 1 point

- $f_A = bX_A + aX_B, f_B = dX_A + cX_B$
- $f_A = aX_A + bX_B, f_B = dX_A + cX_B$
- $f_A = cX_A + dX_B, f_B = aX_A + bX_B$
- $f_A = aX_A + bX_B, f_B = cX_A + dX_B$

**No, the answer is incorrect.****Score: 0****Accepted Answers:** *$f_A = aX_A + bX_B, f_B = cX_A + dX_B$* 

3) Given the payoff matrix  $P = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ , where  $a > c$  and  $b > d$ . Tick all correct: 1 point

- A is wiped out of the population
- $\frac{dX_A}{dt} > 0$
- $\frac{dX_A}{dt} < 0$
- B is wiped out of the population

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$$\frac{dX_A}{dt} > 0$$

*B is wiped out of the population*

4) What describes the steady state of HIV infection? Tick all correct.

**1 point**

- Constant viral load
- Asymptomatic phase
- Constant immune response
- AIDS



**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Constant viral load*

*Constant immune response*

*Asymptomatic phase*

5) What are the different outcomes associated with different values of parameters in the HIV infection model? Select the correct choice.

**1 point**

- Immediate disease
- Indefinite virus control
- Disease after asymptomatic period
- All the above

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*All the above*

6) Which of the two strategies A and B are Nash equilibria in the Payoff matrix  $P = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$  **1 point**

- B
- Neither A nor B
- A
- A and B

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Neither A nor B*

7) The genome of HIV is approximately:

**1 point**

- 100 bases
- 10000 bases
- 100000 bases
- 1000 bases

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*10000 bases*

8) The weak selection regime corresponds to:

**1 point**

- 
- $\omega = 0$
- 
- $\omega \rightarrow 0$



$\omega = 1$



$\omega \rightarrow 1$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$\omega \rightarrow 0$

9) For  $\omega = 1$ ,



Fitness = payoff



Fitness = 1/payoff



Fitness > payoff



Fitness < payoff

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Fitness = payoff*

10)

Identify the Nash equilibrium in matrix  $P = \begin{bmatrix} 3 & 4 \\ 2 & 8 \end{bmatrix}$



B only



Neither A nor B



A only



A and B

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*A and B*



1 point



1 point

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