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Unit 7 - Week 6

Week 6 Assessment

The due date for submitting this assignment has passed. Due on 2017-09-06, 23:59 IST.
As per our records you have not submitted this assignment.

1) What is the probability of fixation of a single mutant with selection coefficient s? ***1 point***

- [ ] **r**
- [ ] $\frac{s}{r}$
- [ ] $1 - \frac{1}{r}$
- [ ] **s**

No, the answer is incorrect.
Score: 0

Accepted Answers:
s
$\frac{1 - \frac{1}{r}}{\frac{s}{r}}$

2) What is the difference between fixation and establishment of a mutation? ***1 point***

- Establishment means taking over the population, whereas Fixation means to overcome the effect of genetic drift.
- Fixation is the survival of a new mutation, whereas establishment is the emergence of a new mutation.
- Establishment is the survival of a new mutation, whereas fixation is the emergence of a new mutation.
- Fixation means taking over the population, whereas establishment means to overcome the effect of genetic drift.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Fixation means taking over the population, whereas establishment means to overcome the effect of genet drift.

3) What is the threshold population size, after achieving which the dynamics of a new mutant individual with selection coefficient – s is not affected by randomness, and instead follows a deterministic trajectory? ***1 point***

- $1 - \frac{1}{r}$
- $\frac{1}{s}$

$\frac{1}{1+s}$

$1 - \frac{1}{s}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{1}{s}$

4) What are the different ways to represent population dynamics during evolution? Tick all correct. ***1 point***

- Histograms of genotypes with different fitnesses, across time.
- Mean Fitness versus time.
- Carrying capacity versus time
- Population fraction versus time

No, the answer is incorrect.
Score: 0

Accepted Answers:
Population fraction versus time
Histograms of genotypes with different fitnesses, across time.
Mean Fitness versus time.

5) In order to perform a serial culture evolution experiment for 1000 generations, where per day the cells grow k generations in one culture, how many days are required? ***1 point***

$1000 - k$

$\frac{k}{1000}$

$1000 \cdot k$

$\frac{1000}{k}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{1000}{k}$

6) During a serial culture evolution experiment, freezer stocks made of intermediate steps can be used for? ***1 point***

- To analyze the trajectory taken by evolution at the end of the experiment.
- None of the choices.
- As backup copies.
- To sequence the genomes of these populations.

No, the answer is incorrect.
Score: 0

Accepted Answers:
To analyze the trajectory taken by evolution at the end of the experiment.
To sequence the genomes of these populations.
As backup copies.

7) What allows a chemostat or CSTR to provide a truly steady environment for evolution experiments? ***1 point***

- The culture is continuously diluted.
- The culture is continuously stirred.
- The dead cells are washed off.
- The nutrient availability and population size are kept constant.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The nutrient availability and population size are kept constant.

8) Mathematically, what is the speed of evolution? Tick all correct. ***1 point***

- [ ] $\frac{\Delta f}{\Delta t}$
- [ ] None of the choices.
- [ ] $\frac{s}{t_1+t_2}$
- [ ] $N \cdot u \cdot s^2$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$N \cdot u \cdot s^2$
$\frac{\Delta f}{\Delta t}$
$\frac{s}{t_1+t_2}$

9) What is the effect of selection on the following: Beneficial, deleterious and neutral mutants? ***1 point***

- Selected for, No selection pressure, Selected against.
- Selected for, Selected against, No selection pressure.
- No selection pressure, Selected for, Selected against.
- Selected against, Selected for, No selection pressure.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Selected for, Selected against, No selection pressure.

10) What is the average number of mutants produced in a generation that survive drift? ***1 point***

- $N \cdot s^2$
- $\frac{N \cdot s}{u}$
- $N \cdot (1+s) \cdot u$
- $N \cdot u \cdot s$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$N \cdot u \cdot s$

11) Given t_1 as the average waiting time before a new mutant is established, and t_2 the average time for its fixation. What are the parameters both these quantities depend upon? ***1 point***

- Mutation rate (u)
- Population size (N), and Mutation rate (u)
- Population size (N), and Selection coefficient (s)
- Selection coefficient (s), and Mutation rate (u)

No, the answer is incorrect.
Score: 0

Accepted Answers:
Population size (N), and Selection coefficient (s)

12) What assumptions do the rare mutations paradigm allow us to make? Tick all correct. ***1 point***

- [ ] Only 2 genotypes can exist at a time.
- [ ] Average time for fixation of an established mutant is very large.
- [ ] Average waiting time for a new mutant is much larger than the time for its deterministic fixation.
- [ ] Probability of having 2 mutations existing together is very low.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Only 2 genotypes can exist at a time.
Average waiting time for a new mutant is much larger than the time for its deterministic fixation.
Probability of having 2 mutations existing together is very low.

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