Assignment 3

The due date for submitting this assignment has passed. 
As per our records you have not submitted this assignment. 
Due on 2019-02-27, 23:59 IST.

1) Match the following:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lag phase</td>
<td>a. Period of constant specific growth rate</td>
</tr>
<tr>
<td>Log phase</td>
<td>b. Period of adaptation</td>
</tr>
<tr>
<td>Stationary phase</td>
<td>c. Period which results from nutrient depletion/toxin accumulation</td>
</tr>
<tr>
<td>Death phase</td>
<td>d. Period with secondary metabolite production</td>
</tr>
</tbody>
</table>

No, the answer is incorrect.
Score: 0
Accepted Answers:
1-b, 2-a, 3-d, 4-c

2) Diauxic growth is observed when

- There is only one limiting substrate available for growth
- There are more than one substrates available which are used sequentially.
- There is a shortage of limiting substrate
- There is feedback inhibition by the product formed

No, the answer is incorrect.
Score: 0
Accepted Answers:
There are more than one substrates available which are used sequentially.

3) A chemostat is operated in a

No, the answer is incorrect.
Score: 0
Accepted Answers:

4) In a chemostat containing suspended cells only, operating at steady state with negligible death rate,

- The growth rate of cells is equal to the dilution rate
- The growth rate of cells is greater than the dilution rate
- The growth rate of cells is lesser than the dilution rate
- The growth rate is unaffected by the dilution rate.

No, the answer is incorrect.

Score: 0

Accepted Answers:
Continuous mode

5) Washout occurs in a chemostat when,

- D > µm
- D < µm
- D = µm
- Washout does not occur in a chemostat

No, the answer is incorrect.

Score: 0

Accepted Answers:
The growth rate of cells is equal to the dilution rate

6) A batch operation is carried out using an aerobic bacteria to produce an industrially important enzyme. 20 g of cells were seeded in 80 L of media. The lag phase was found to be 30 min. The specific growth rate of the organism is 0.1h⁻¹ under the conditions maintained. Calculate the cell concentration after 3hrs of growth. Choose the answer closest to your calculated answer.

- 0.321 g/l
- 0.564 g/l
- 0.226 g/l
- 0.865 g/l

No, the answer is incorrect.

Score: 0

Accepted Answers:
0.321 g/l

7) At the same conditions as above, what is the time required to yield a cell concentration of 1.5 g/l?

- 13.0 h
- 14.5 h
- 18.4 h
- 16.2 h

No, the answer is incorrect.

Score: 0

Accepted Answers:
18.4 h

8) A gram positive bacterium is cultured in a chemostat of capacity 50m³. $K_s$ for the
organism is 0.56 g/l. Under the operating conditions, the organism has a maximum specific growth rate of 10/day. The chemostat is operated with a continuous feed substrate concentration of 20 g/l. Estimate the feed flow rate required to achieve 95% substrate conversion. Choose the answer closest to your calculated answer.

- 11.3 m³/h
- 12.2 m³/h
- 13.3 m³/h
- 15.6 m³/h

No, the answer is incorrect.
Score: 0
Accepted Answers:
13.3 m³/h

9) Identify the flow rates where the washout occurs

- 13.3 m³/h
- 16.0 m³/h
- 9.2 m³/h
- 20.2 m³/h

No, the answer is incorrect.
Score: 0
Accepted Answers:
20.2 m³/h

10) Which of the following statements show the advantages of a chemostat over batch reactor? 1 point

- It gives 3-4 times more productivity
- It enables better control over growth
- It enables selection of mutant strains
- It is easier to maintain than batch reactor.

No, the answer is incorrect.
Score: 0
Accepted Answers:
It gives 3-4 times more productivity
It enables better control over growth
It enables selection of mutant strains

11) Match the type of organisms in A to the optimum temperature given in B 1 point

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesophile</td>
<td>60°C</td>
</tr>
<tr>
<td>Thermophile</td>
<td>15°C</td>
</tr>
<tr>
<td>Psychrophile</td>
<td>30°C</td>
</tr>
</tbody>
</table>

- 1-a, 2-b, 3-c
- 1-c, 2-b, 3-a
12) Identify the components involved in temperature control in a bioreactor

- Resistance temperature device
- Water jacket
- Baffles
- DO probe

No, the answer is incorrect.
Score: 0
Accepted Answers:
Resistance temperature device
Water jacket

13) Impellers are used in a bioreactor to bring about agitation of the contents so that:

- The contents are in a suspension
- It helps in $O_2$ mass transfer
- To prevent vortex formation
- The products produced will be more stress tolerant.

No, the answer is incorrect.
Score: 0
Accepted Answers:
The contents are in a suspension
It helps in $O_2$ mass transfer

14) When an oxygen mass balance is carried out with the bioreactor contents as the system, if input rate = output rate, and the accumulation rate = 0, then which of the following is correct?

- DO increases
- DO decreases
- DO is constant
- DO increases and then decreases

No, the answer is incorrect.
Score: 0
Accepted Answers:
DO is constant

15) Sulphite-oxidation method can be used to estimate which parameter of a bioreactor?

- Temperature variation
- $K_L a$ value
- Cell viability
- Productivity

No, the answer is incorrect.
Score: 0

Accepted Answers:

$K_L a \; value$