BITS, Pilani, Dubai Campus
Second Semester 2013-14
BIOT C441 / CHE C421 / CHE F421 Biochemical Engineering
Comprehensive Exam[Closed Book]

Max.Marks:40 **Date: 1-06-2014**

Weightage: 40 % **Time: 3hrs**

1. Give any two examples of lipid and its biological functions**(1)**
2. Explain anomers with suitable example**(1)**
3. Contrast glycogen from cellulose**(1)**
4. Differentiate amylase from amylopectin**(1)**
5. Differentiate polypeptides from proteins**(1)**
6. Explain the significance of the primary structure of protein with suitable example**(1)**
7. Explain any two chemical method of immobilization with suitable example**(1)**
8. Name and explain the role of enzymes used to convert starch into high fructose corn syrup (HFCS)**(1)**
9. Name the active enzyme present in rennet**(1)**
10. What are the conditions required to operate a chemostat with a dilution rate higher than the maximum growth rate?**(1)**
11. What are beta lactamase? **(1)**
12. Explain the proximity effect and the orientation effect in enzyme catalyzed reactions**(2)**
13. Discuss (a) Lock and Key model (b) induced fit theory to explain the formation of ES complex **(2)**
14. Name the commonly used antidote for methanol poisoning and explain its function**(2)**
15. In an enzyme –substrate system obeying the Michaleis –Menton mechanism ,

$$E + S \underset{k_{-1}}{\overset{k_1}{\rightleftarrows}} ES \xrightarrow{k_2} E + P$$

the rate of the product formation was 0.003mol/dm^3 when the substrate concentration is very large. At a substrate concentration of 285mg/dm^3 ,the rate is half of the value with large substrate concentration. Calculate the ratio of K1/K-1 assuming k2<<k-1.**(2)**

16. Comment on the media formulation required for the primary and secondary metabolites**(2)**
17. Explain the role of medium during the enrichment of microorganism using a suitable example **(2)**.

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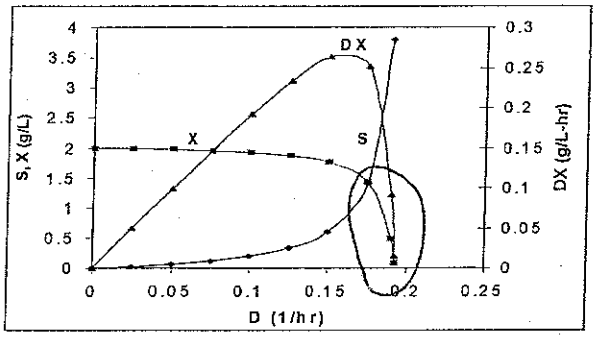
Test 2 [Open Book]

Max.Marks:20 **Date: 13-04-2014**

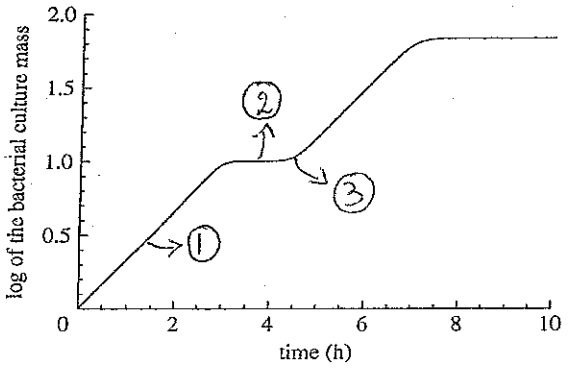
Weightage: 20 % **Time: 50min**

1. An organism that is adapting to a medium will be in which growth phase. ?(0.5)

2. Identify the marked condition in a chemostat, Justify?(2)



3. Explain point 1,2 and 3 in the growth pattern observed for a bacteria in an unknown medium(1.5)



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Test 1 [Closed Book]

Max.Marks:25 **Date: 23-02-2014**

Weightage: 25 % **Time: 50min**

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1. Name the sugar which forms major component of nucleic acids (1)
2. Name the storage polysaccharide made by animals(1)
3. When DNA polymerase is in contact with guanine in the parental strand, what does it add to the growing daughter strand? (1)
4. What are essential amino acids? (1)
5. Name any two reasons which make RNA more reactive than DNA(1)
6. Differentiate apoenzyme from haloenzyme(1)
7. Differentiate cofactor from coenzyme(1)
8. Which is the rate-determining step in Michaelis Menten kinetics? (1)
9. Name the enzyme which causes the conversion of glucose to fructose in HFCS production. (1)
10. Name the cofactor which is required for the functioning of α-amylase (1)
11. Differentiate the Alpha and beta pleated sheets in protein(2)
12. Write a note on the structural importance of Phospholipids (2)
13. What is the effect of non-competitive inhibition on a Lineweaver-Burk Plot ?(2)
14. What makes Glucokinase more important for human metabolism over other hexokinases?(2)
15. When competitive inhibitions takes place? Also explain if it is possible to reverse the effect? (2)
16. Given an enzyme with a K_m = 10m M and V_{max} = 100 m mol/min. If [S] = 100 mM, what will be the rate of the reaction? (2)
17. Drive the expression for the velocity of an enzyme catalyzed reaction ,When substrate [S] = K_M assuming Michaelis-Menten model .(3)

x----------x

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Quiz 1 [Closed Book]

Max.Marks:8 **Date: 16-03-2014**

Weightage: 8 % **Time: 20min**

1. Name the parameter used to measure the diffusional resistance due to immobilization of enzymes? (0.5)

2. When do you expect the intrinsic kinetic parameters to be unchanged during the immobilization of enzyme?(0.5)

3. *What type of organism is S.cerevisiae* if it depends on glucose as source of energy*?(*0.5)

4. What is the significance of effectiveness factor and how to increase it? (1)

5. Biological denitrification of nitrate containing waste waters can be described by the following overall reaction,

$$NO_3^{-1} + a\ CH_3OH + H^+ \rightarrow b\ C_5H_7NO_2 + cN_2 + dCO_2 + eH_2O$$

(substrate) (bacteria)

a) Determine a,b,c,d and e if $Y_{x/s} = 0.5g\ X / g\ S$

b) Determine the degree of reduction of bacteria and methanol (5.5)