Faculty of science   **Program (Branch): Biochemistry**
Chemistry department
Educational Year: Level 4
Code: BioChem 476   **Course(s): Fermentation**
Time: 2 hrs   Date: 3 / 6 /2014   Full mark: 60   Question mark: 20

Answer the following questions:

Q1-   **Choose the most correct answer(s)   (20 mark):**

1- Facultative anaerobes can utilize aerobic cellular respiration when oxygen is present and fermentation when oxygen is in low supply.
a. True   b. False

2- All of the chemical reactions of the cell are called

A. catabolism.   B. redox reactions.
C. phosphorylation.   D. metabolism.

3- Batch fermentation is also called
a. Closed system   b. Open system
c. Fed-batch system   d. None of these

4- Formation of peptide bonds between amino acids to build a polypeptide would be
A. anabolism.   B. phosphorylation.
C. fermentation.   D. exergonic.

5- The process of alcoholic fermentation produces
a. alcohol only   b. alcohol and carbon dioxide

c. alcohol and oxygen   d. alcohol and yeast

6- Yeast cells prefer aerobic conditions to multiply in number.

a-true   b-false

7- Autotrophs that utilize light as their energy source are

A) fungi.   B) photoautotrophs.

C) chemosynthetic autotrophs.   D) consumers.

8- Fermentation is the…

a-mass controlled culture of microbes to synthesize products.

b-production of alcoholic beverages by bacteria.

c-use of microbes in pollution control.

d-all of the above.

9-Theproduction of substances in industrial microbiology occur in the sequence:

A-fermentation, downstream processing, removal of waste, inoculation.

b- Inoculation, downstream processing, fermentation, removal of waste.

c- Inoculation, fermentation, downstream processing, removal of waste.

d- removal of waste, inoculation, fermentation, downstream processing

10- Secondary metabolites ....

a-are essential to microbe function.

b-are by-products of metabolism that are not important to microbe function.

c-are products that require additional processing before they can be packaged.

d-are harvested during the exponential phase of growth.

Q.2. Answer each of the following questions as requested?

A- Mention the significance of Fermentation Cascade program during fermentation process?(4 mark)

B-Describe the downstream processing for *Penicilium notatum* to produce penicillin G & for *Saccharomyces cerevisiae* to produce compressed yeast?(6 mark)

C-Give a short account on basic features of a stirred tank bioreactor; Oxygen delivery system, showing types of generated shear forces.(10 mark)

Q.3. Answer each of the following questions as requested?

A-Mention the effect of the volumetric oxygen transfer coefficient (k La) During fermentation process.
(6 marks)

B-What are the advantages of Chemo stat, Antifoaming agents, bacteriocins and Fermenter Jacket? (8 mark)

C-What are the factors considered during feeding & inoculation via fermentation process.(6 mark)

With my best wishes,,,,

Examiner: Dr. Ahmed El shobaky

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry 444 Course(s): Surface chemistry and catalysis	كلية العلوم جامعة المنصورة	Second Term examination Fourth level biochemistry Students Time Allowed: 2 hours Date: 6/6/2014

Answer the following

1- **a-** What are the Limitation of Freundlich and Langmuir Adsorption isotherms? **(6marks)**

  b- Explain what is you known about the cohesive and adhesive forces and what is their relationship? **(6marks)**

  c- The volume of CH_4 (corrected to STP) adsorbed per gram of charcoal at 240 K various pressures of CH_4 is:

P/(Torr)	38	55	78	104	133	173	218
V/(cm^3.g^{-1})	14.1	17.5	21.4	24.7	28.0	31.4	34.50

  Verify graphically that the data obey Langmuir adsorption isotherm. Also determine Langmuir constant b and the volume corresponding to complete surface coverage V_m. Calculate the fraction of charcoal surface which is covered by CH_4 molecules at P = 150 torr. **(8marks)**

2- **a -** **Explain the following: (4 marks for each one)**

  i- Spreading coefficient - Factor affecting spreading coefficient

  ii- The applications of adsorption from solutions?

  iii- Explain two methods used for measuring surface tension.

 b - **Write on:**

  i-   The destruction of atmospheric ozone.

  ii-   The intermediate formation theory of catalysis.

3- Answer the following points: (5 marks for each one)

  a- The oxidation of CO with O_2 on Pt catalysts is described by the equation:

$$2CO_{(g)} + O_{2(ads)} \rightarrow 2CO_2$$

  According to which well-known mechanism does this hydrogenation proceed explain?

  b- In the dehydration of ethanol on solid acid catalysts such as sulfated ZrO_2 catalyst is an alternative to the conventional process employing H_2SO_4. List some reasons in view of green chemistry.

  c- When organic compound A reacts with H_2 on the Pt/SiO_2 catalyst surface; the reaction is much faster than that of organic compound B under the same conditions. However, when a mixture of A and B is hydrogenated, then B reacts faster, regardless of the concentration ratio. Explain these observations with the aid of a kinetic model.

  d- The factors that affect the suitability of a catalyst for industrial applications.

Good Luck   Prof. Awad I. Ahmed

Mansoura University		Second term
Faculty of Science		4th level students (Bio-Chemistry)
Chemistry Department		Date: June 2014
Subject : Organic Chemistry		Time allowed: 2 hours
Course:Polymer Chemistry **438**		Full mark: 60 marks

Answer all questions

1- a) <u>**Define briefly**</u> only *Two* of the following: (6 marks)

       i) Tacticity   *ii) Crystallinity*   *iii) Tromsdorff effect*

  b) <u>**Write short notes on**</u> *the different types of initiators generally used in free radical vinyl polymerization. Then select one of them suitable for illustrating the mechanism of polymerization of* **styrene** *monomer.(14 marks)*

2- a) <u>**Compare**</u> between only *Three* of the following: (9 marks)

      a - Thermoplastic and Thermoset polymers.
      b- Addition and Condensation polymerization.
      c- Fractional precipitation and Gel permeation.
      d- Bulk and Solution polymerization techniques.

  b) <u>**Derive**</u> *a mathematical expression for the kinetics of free radical vinyl co-polymerization* (7 marks)

  c) **Mention** <u>*four*</u> *different factors that might affect the polymer chain flexsibility.* (4 marks)

3- a) <u>**Discuss**</u> *the molecular weight determination of polymers via* **Osmometry** *,* **Viscometry,** **Cryoscopy** *and* **Ebulliometry***.* (12 marks)

  b) <u>**Write briefly on**</u> *the polymeric structure, the properties and the importance of a natural polymer of your choice.* (3 marks)

  c) <u>**Show with drawing**</u> *how could you classify polymers according to their shapes?* (5 marks)

                                           Best wishes,
                              Dr. Dalia Mokhtar Ayad

Mansoura University
Faculty of Science
Chemistry Department
Subject: Biochemistry
Course: Cancer Biology, Biochemistry 478

Second Term Examination
4rd Level Students
Date May 31, 2014
Time Allowed: Two hours
Full Marks: 80 Marks

كلية العلوم - بيوكيميا السرطان فرقة ٤٧٨

Answer the following questions:

Q1. For any two of the following biological processes, contrast how that process works in normal cells as compared to cancer cells. **(20 Marks)**

   a) Entry/exit from G_0 of cell cycle,
   b) Activation of genes that promote growth.
   c) Copying the ends of chromosomes.
   d) Invasion of blood vessels.

Q2. (20 Marks)
   a) What kinds of stimuli active the intrinsic and extrinsic pathways of apoptosis? What are two general kinds of caspases, and how are they activated?
   b) Give an account on two hit hypothesis model.

Q3. Illustrate diagrammatically: (20 Marks)

   a) Role of BRCA1 and BRCA 2 in repairing DNA breaks by homologues recombination
   b) Role of P53 protein in responding to DNA damage.

Q4. Choose the correct answer :(20 marks, 2 for each)

   1. If you found a specific chromosomal deletion in the genome from a tumor, what could be the cause of this specific cancer?
       A. The deletion likely affected a tumor-suppressor gene, leading to a loss of function in the tumor cells.
       B. The deletion likely affected a proto-oncogene, leading to a loss of function in the tumor cells.
       C. The deletion likely affected a tumor-suppressor gene, leading to a gain of function in the tumor cells.
       D. The deletion likely affected a proto-oncogene, leading to a gain of function in the tumor cells.
   2. Which definition of cancer is the most accurate?
       A. A group of diseases characterized by uncontrolled cell division.
       B. A disorder in which cells produce a localized tumor.
       C. All of these.
       D. None of these

   3. Genetic changes that can convert proto-oncogenes to oncogenes include all of the following EXCEPT:
       A. Point mutations.
       B. Increase in the copy number of the proto-oncogene.
       C. A change in the relationship between a coding region and regulatory elements.
       D. Deletion of the proto-oncogene.
       E. All of these can convert proto-oncogenes to oncogenes.

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4. Retrovirus causes cancer by integrating into genes that normally control cell division and eliminating their function.
   A. True
   B. False

5. The protein Rb plays a crucial role in cell cycle regulation.
   A. Inhibits transcription by phosphorylation of E2F
   B. Inhibits transcription by binding to E2F
   C. Inhibits transcription by activation of cyclin D
   D. Is a protooncogen which activates the transcription by binding to E2F
   E. Binds E2F and P16 kinase and subsequently activates transcription

6. Cancers often involve mutation in several proteins participating in intracellular signalling and transcriptional regulation. Assume that a somatic mutation has arisen in the protein c-Ras. What could be the consequences of such a mutation?
   A. Activation of tumour suppressor proteins
   B. Constitutive activation of signalling pathways
   C. Inhibition of tyrosine phosphorylation
   D. Cell cycle arrest

7. Metastasis is
   A. a method of freezing cancer cells for study.
   B. cancer cells' ability to move independently and penetrate other tissues.
   C. a gene that makes cancer cells effectively immortal.
   D. a sequence of "junk DNA" specific to cancer cells.

8. Cyclins modulate the progression of cells through the cell cycle by
   A. activating protein kinases that are critical regulators of cell division.
   B. directly activating G proteins.
   C. increasing the production of DNA polymerases.
   D. phosphorylating histones.
   E. inducing synthesis of constitutively active forms of growth cell receptors.

9. Adenoma is a malignant tumor.
   A. True
   B. False

10. Tumor associated antigens are antigens that are found on or secreted by tumor cells but also may be produced by normal cells.
    A. True
    B. False

Good luck

Examiner: Prof Dr Ibrahim Helmy.