



**Instructions to candidates**

This paper consists of three (03) parts

Part I: MCQ, Part II: Structured, Part III: Essay

Total number of questions: Part I: Twenty (20), Part II: Three (03), Part III: Two (02)

**Answer All Questions**

Time Allocated: Two (02) hours (30 minutes – Part I, 01 hour and 30 minutes – Part II and Part III)

Marks allocation: 200 (Part I – 40, Part II – 90, Part III – 70)

<b>Index No.</b>
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**Part II – Structured**

**Provide answers within the given space**

1. (a). Define the term “Nanotechnology”. (04 marks)

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(b). Give four (04) recent trends in Nanotechnology. (04 marks)

- (i) .....
- (ii) .....
- (iii) .....
- (iv) .....

(c). What are the two (02) approaches in Nano fabrication? Give three (03) examples for each. (10 marks)

Approach	Examples



(d). State the six (06) essential elements in photolithography?

(06 marks)

(c)

(i) .....

(ii) .....

(iii) .....

(iv) .....

(v) .....

(vi) .....

(e). State three (03) Soft lithographic techniques.

(03 marks)

(i) .....

(ii) .....

(iii) .....

(f). Give three (03) advantages of Electron beam lithography over photolithography. (03 marks)

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(c)

2. (a). Give three (03) common applications of "Vapor Deposition".

(06 marks)

(c)

(i) .....

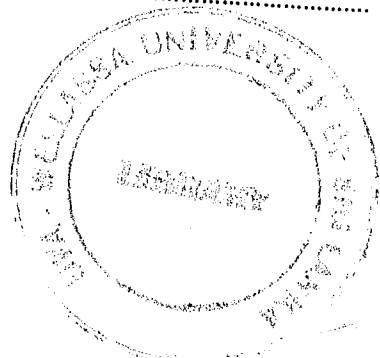
(ii) .....

(iii) .....

(b). What is "Chemical Vapor Deposition" method?

(03 marks)

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marks) (c). What are the major components in "Chemical Vapor Deposition" system? and State the usage each. (09 marks)

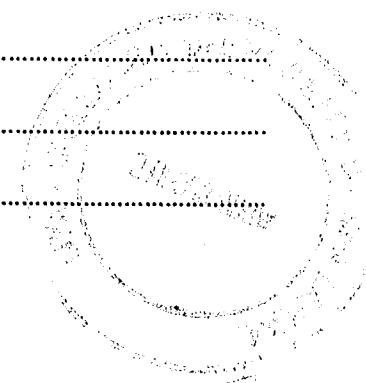
Components of CVD system		Usage of each component
(i)		
(ii)		
(iii)		
(iv)		
(v)		
(vi)		

(d). Give two (02) most common types of precursors in "Chemical Vapor Deposition". (02 marks)

- (i) .....
- (ii) .....

(e). What are the eight (08) major steps of "Chemical Vapor Deposition"? (08 marks)

- (i) .....
- (ii) .....
- (iii) .....
- (iv) .....
- (v) .....
- (vi) .....
- (vii) .....
- (viii) .....



(f). Give two (02) advantages of "Chemical Vapor Deposition" over "Physical Vapor Deposition". (02 marks)

- (i) .....
- (ii) .....

3. (a). State four (04) different parameters in the characterization of nanoparticles. (04 marks)

- (i) ..... (ii) .....
- (iii) ..... (iv) .....

(b). What are the favorable conditions that facilitate the nano particle precipitation in acid mine drainage systems? (02 marks)

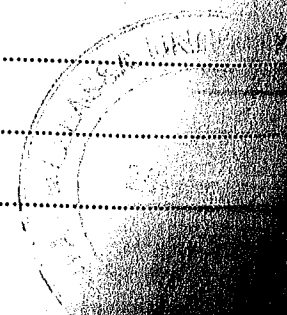
- (i) .....
- (ii) .....
- (iii) .....

(c). Name two (02) places where you can find natural nano particles. (03 marks)

- (i) .....
- (ii) .....

(d). Briefly explain the procedure for the synthesis of nano-silica from Sri Lankan vein quartz (06 marks)

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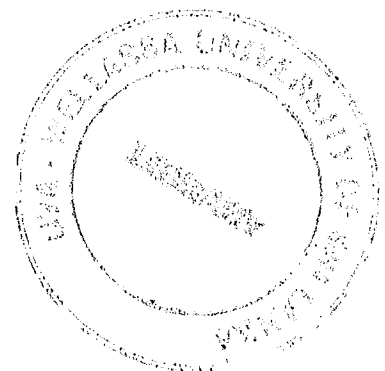


(e). State three **(03)** applications of SiO<sub>2</sub> nanoparticles and give two **(02)** advantages of adding SiO<sub>2</sub> nanoparticles for each application. (12 marks)

Application of SiO <sub>2</sub> nanoparticles		Advantages of adding SiO <sub>2</sub> nanoparticles	
1.		(i)	
		(ii)	
2.		(i)	
		(ii)	
3.		(i)	
		(ii)	

(f). State three **(03)** applications of hydroxyapatite nanoparticles. (03 marks)

- (i) .....
- (ii) .....
- (iii) .....



**Part B**

1.

a. State the differences between global and local alignment.

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(05 marks)

b. Consider a blast output of a sequence similarity search, and answer the following questions.

i) What is meant by the e-value?

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(05 marks)

ii) Briefly explain the reason of using e-value in comparing sequence similarity.

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(05 marks)

2.

a. What is an Open Reading Frame?

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(05 marks)



b. State the importance of sequence analysis.

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(10 marks)

c. What is the importance of sequence editing before similarity search?

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(10 marks)

d. 'Two different protein sequences are said to be homologous if they have at least 25% identical characters. However, in order to categorize two different DNA sequences under homologous category, at least 70% identical characters have to be shared between two DNA sequences'. Briefly explain the background of the aforementioned statement.

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(10 marks)



3.

a . Proteins are considered as dynamic molecules whereas genome is relatively static. Justify this statement.

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(05 marks)

b. What type of data you can obtained from the databases related to bioinformatics?

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(05 marks)

c. What is 'American Standard Code' for Information Interchange?

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(05 marks)

**Essay Question**

1. Explain how a specific DNA sequence (gene) expresses it's characters as a cellular activity.

(15 marks)

