

B.TECH DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

Seventh Semester

BIOTECHNOLOGY

BTY121: Bioinformatics

Time: Three Hours

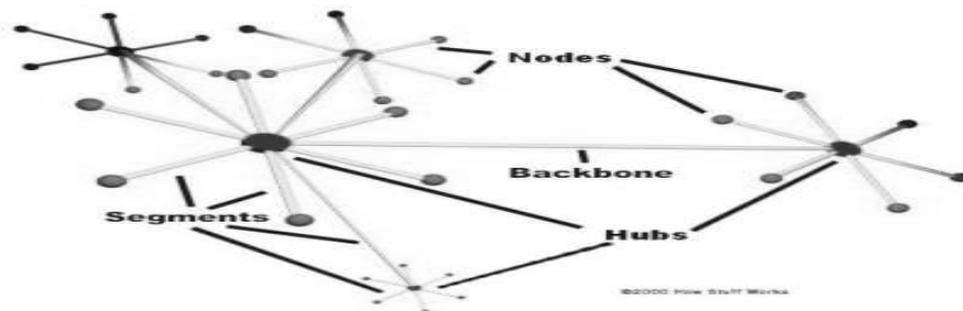
Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

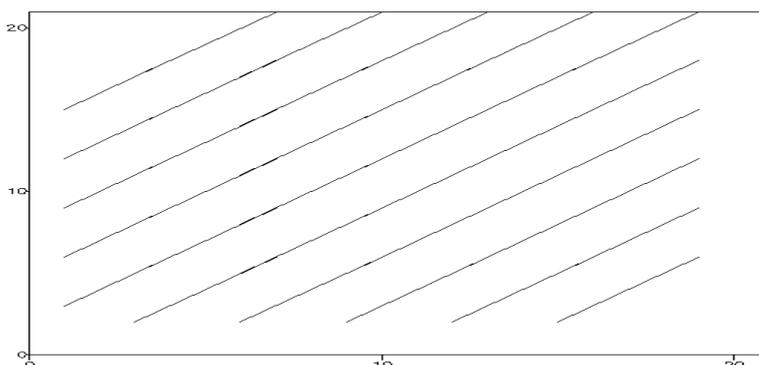
1. How many layers are present in the TCP/ IP protocol?

| | |
|------|------|
| a) 2 | b) 3 |
| c) 1 | d) 4 |
2. Recall and identify the following network topology:



- | | |
|--------------|--------------|
| a) Star tree | b) Star |
| c) Star Bus | d) Star Ring |
3. **“Twilight zone is zone of sequence similarity in alignments that is NOT statistically significant”** What could be the identity (%) at this zone?

| | |
|-------|-------|
| a) 20 | b) 30 |
| c) 40 | d) 50 |
 4. Observe the following dot plot generated by the program **“DOT MATCHER”** and pick the correct choice given below:



15. What is E(): value?
 16. Calculate the number of match and mismatch scores in the given below specific column
 (Hint: PAM 250 scores: F-F = +9; S-S = +2; F-S = -3)

| |
|----------|
| Column X |
| F |
| F |
| F |
| F |
| S |
| S |

17. Draw a multifurcated rooted tree and indicate its multifurcation.
 18. The following distance table has been created from a set of nucleotide sequences. Use Fitch-Margoliasch algorithm to calculate the branch length(s).

| | | | |
|----------|----------|-----------|-----------|
| | A | B | C |
| A | - | 34 | 27 |
| B | - | - | 41 |
| C | - | - | - |

19. Define a direct labeling.
 20. What is systems biology?

PART C (5 x 14 = 70 Marks)

21. a) **“Network communication is an extremely complex task and need cooperative efforts from all nodes involved”**. Substantiate the statement in your perspective with a suitable network protocol model.
 (OR)
 b) (i) Give a detailed account on various network topologies with suitable sketches. (10)
 (ii) Write a short note on search engines. (4)
22. a) Align the two nucleotide strings using Needleman-Wunsch algorithm with the following base conditions: gap penalty of **-2**, match as **+2** and mismatch as **-1**. Also calculate the overall score.
ACGTCT and **ACCT**
 (OR)
 b) Explain in brief the algorithm of dot matrix analysis with an example and also add a note on applications.
23. a) (i) Prepare the hashing look up table (word size = 3) and find the hotspot/ diagonal run for the given below sequences to run a FASTA program: (10)

| | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| R | F | E | T | Y | H | M | I | G |
| E | D | E | T | Y | P | M | I | S |

