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Roll No.....

B.Tech –I yr (EE/ME)

Final Exam,March 2019

CB102: Biology

Time: 2:00 Hours **Max. Marks: 50**

Notes: 1. Attempt all Parts of the question paper.

2. Assume suitable missing data, if required.

Part-A (All questions compulsory)

I. Answer, if the followings are **True or False?** Also, justify your answer **(Any Five)** **(5X2 = 10)**

7. In eukaryotes, post transcriptional processing of mRNA is required.
8. Gram-negative bacteria are more susceptible to antibiotics as compared to Gram-positive.
9. Cellulose is a polymer of glucose molecules linked through ***β 1–4 and α 1–4*** linkage.
10. Glycolysis occurs in cytoplasm, whereas TCA cycle takes place in mitochondria, irrespective of cell type.
11. In nature, microbial doubling times may be much longer than those obtained in laboratory culture
12. Both anabolic and catabolic reactions take place in cytoplasm.

II. Choose the correct answer **(5X2 = 10)**

6. What should be the total number of amino acids in the peptide synthesized from the Gene sequence " ***TAC-GGA-TAC-ACT-AAT-ACT-GCT-TGT-ATT-AGC***"

a. 10 **b.** 8 **c.** 5, **d.** 9

7. Nucleotides are always added to the growing DNA strand at the 3' end, at which the DNA has a free _____ on the 3' carbon of its terminal deoxyribose

a. Phosphate group **b.** Hydroxyl group **c.** Nitrogen base **d.** Methyl group

8. In mRNA, 3 bases together makes a "Codon". If only 2 bases are required to make a codon, then the maximum number of codon would be _____.

a. 16 **b.** 64 **c.** 9 **d.** 20

9. The function of "tethering proteins" is to

a. Separate two DNA strands, **b.** RNA primer synthesis,
c. Stabilize polymerase **d.** None of the above

10. Aerotolerant are the organism those __

a. don't care about O_2. **b.** cannot survive in O_2. **c.** require O_2 in order to grow,
d. grow better in O_2

Part-B (Attempt Any Three)

1. Discuss the process of "Gene Expression in prokaryotic cells" in details with all steps and enzymes involved **(10)**

2. (A) Discuss the classification of microorganism based on their carbon and energy source requirements **(B)** An aerobic bacteria grow in presence of oxygen but anaerobic bacteria cannot survive under oxygenic environment, Why? **(6+4)**

P.T.O

3.(A) Based on specific functions, list the various classes of proteins. **(B)** What is Zwitterionic form of amino acid? How the pH affects the charge on a given amino acid? Discuss with the help of suitable graph/diagram. **(C)** Briefly discuss the different protein structures. **(3+4+3)**

4.An yeast DNA has $4.6x10^6$bp; transcription (one strand only) progresses at about 1000 nucleotides/sec and the rate of mRNA to protein translation is around 500 nucleotides/sec. Calculate the total time required to complete the gene expression from DNA to protein. Assume that there are exons and introns in the mRNA and the splicing takes 20% of the total time during the DNA to protein expression.

5.(A) A vessel containing 5 liters of liquid media is to be treated under autoclaving (at 121°C and 15 p to kill the bacteria present in it. The initial concentration of bacteria in the media is 10^5 cells/mL. If the growth rate and death rate of the bacteria during treatment are 10^3 cells/hr and 10^5 cells/hr, respectively, how much time it will take to ensure complete killing of the bacteria from the media? Assume first order kinetic for growth and death during treatment.

(B) Draw (in a graph) various phases of microbial growth cycle. For growth through binary fission, define the following: (a) generation (n); (b) generation time (g) and mathematical expression for bacterial growth. For bacteria, following data was given: $N = 10^{12}$, $N_o = 5 \times 10^7$, and $t = 4h$. Calculate the generation time for the bacteria.

(4+6)

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