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B. Tech –I yr (Group 1)

Final Exam, May 2018

CB102: Biology

Time: 2:00 Hours **Max. Marks: 70**

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

2. Assume suitable missing data, if required.

Part-A

I. Fill in the blanks **(1.5X10 = 15)**

1. Genome (DNA) of _____ cell has only single origin site for DNA replication whereas _____ genome may have multiple origin sites (***Plant, bacterial***)
2. Naturally occurring symbiotic relationship of algae and fungi is also known as _____
3. Cellulose is a polymer of glucose molecules linked through _____ linkage. (***β 1–4; α 1–4; β 1–6 or α 1–6***)
4. Pores on nucleus, consists of several proteins and serves as gateway for transfer of material between nucleus and cytosol are called _____.
5. In dsDNA , A is always paired with _____ and G is always paired with ____.
6. Arrange the following classification tools for characterization of living organisms in correct order : ***Kingdom, Phylum, Class, Family, Genus, Order, Species***
7. Gram positive bacteria contain thick layer of _____ which is responsible for retaining the crystal violet dye during Gram's staining.
8. Bond between amine group of one amino acids with carboxylic group of another amino acid is called _____ bond (***polypeptide bond, phosphodiester bond, peptide or di-sulfide bond***)
9. Monomers are made into polymers via _____ reactions whereas; polymers are broken down into monomers via _____ reactions. *(hydrolysis, hydrogenesis, glycolysis, dehydration synthesis)*
10. For a DNA with the following base sequence "GCATCCAGGTTACA", the complementary DNA sequence will be _____ and mRNA sequences will be _____

II. Choose the correct answer **(2.0X7 = 14)**

1. Which of the following cells has flagella
   a. sperm, **b.** yeast, **c.** fungi, **d.** virus
2. What should be the total number of amino acids in the peptide synthesized from the mRNA sequence "***AUG-CCU-ATG-TGA-TTA-UGA-CGA-ACA-UAA-TCG***"
   a. 10 **b.** 8, **c.** 5, **d.** 9

3. In mRNA, 3 bases together makes a "Codon". If there are 5 different types of bases in mRNA instead of 4, then the maximum number of codon would be _____.
   a. 125 **b.** 64 **c.** 243, **d.** 20

P.T.O

4. The function of enzyme "Helicase" is to
   a. Separate two DNA strands, **b.** RNA primer synthesis,
   c. stabilize polymerase **d.** all the above
5. Which is the following may have stored energy equivalent to that in ATP
   a. ADP **b.** GTP **c.** GDP **d.** GMP
6. Nucleotide has Phosphate, one base and one _____ sugar molecule.
   a. hexose **b.** methylated **c.** amine **d.** mono **e.** pentose
7. Facultative anaerobes 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

Subjective answer type questions

1. Discusses (with neat and clean diagram) in detail the structure and specific features of prokaryotic cells. Also, tabulate the differences between prokaryotic and eukaryotic cells. **(8+4)**

2. (A) Discuss the Binary fission for bacterial growth and reproduction. **(B)** How the cell division in case of eukaryotic cells is different from prokaryotic cells? **(C)** Assume, in microbiology lab, you have started culturing with 10^6 bacterial cells. If the generation time for the bacteria is 30 min, how much cells will be there after 4 hours. **(4+4+4)**

3. (A) Based on the specific functions, what are the different classes of protein? Briefly discuss the levels (types) of protein structures. **(B)** Phospholipids are lipid containing a phosphate group in their molecule. Discuss the role of phospholipids in biological systems. **(8+4)**

Part-C

Write the brief notes on ANY THREE (*Maximum word limit: 150*) (5 X 3 = 15)

1. Recombinant DNA technology
2. Bacterial conjugation
3. Mitochondria
4. DNA Replication
5. Types of RNA
6. RNA Splicing
7. Gram staining methods
8. Relation of biology with other branches of engineering

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