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Roll No.....

B. Tech –I yr (CB, CE, CSE)

Final Exam, May 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 (2X5= 10)

1. During DNA replication, RNA polymerase enzyme is not required.
2. Phospholipids are only found in the mitochondrial membrane.
3. One plant can have only one chloroplast at a time.
4. In nature, algae and bacteria always grow independently; their association is not possible.
5. Except for bacteria, no other cell can have flagella.

II. Write short notes (100 words) on ANY FOUR of the following (2.5X4 = 10)

1. Biofuel
2. ATP as a cellular energy molecule
3. Algae-fungi interaction in nature
4. Bacterial pili
5. Histones
6. Role of restriction enzymes in DNA replication

**Part-B (Attempt Any Three)**

1. (A) Discuss the growth and cell division cycles for both prokaryotic and eukaryotic cells in details with process schematic diagram. (B) Explain the batch growth kinetics of bacterial cells. (6 + 4)

2. What are the major parts/ organelles of animal cells? Discuss in details with suitable diagram, if applicable.

P.T.O

3. (A) A population of bacteria is undergoing exponential growth. After 5 hours, the population has grown by 30% to its initial value. Find the doubling time for this population.

(B) Assume, in a 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?

(7 + 3)

4. During biological treatment of sewage, the 1000 L continuous reactor (flow rate  $10 \text{ L h}^{-1}$ ) was started with inoculation (of bacteria) at  $10 \text{ mg/L}$ . If the growth rate of the bacteria is  $0.5 \text{ h}^{-1}$ , the death rate is  $1.0 \text{ h}^{-1}$  and the cells are being removed from the reactor with effluent at a rate of  $8 \text{ mg/L}$ . Calculate the bacterial cells mass accumulation in the reactor per day. Assume that the feed to the reactor is bacteria free. (Hint – overall mass balance: accumulation = mass input + mass generated - mass degraded - mass output)

(10)

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