

B/L/TX

Reg. No: 24BKT0086



VIT

Vellore Institute of Technology

Final Assessment Test – November 2024
Course: BBIT100L - Biology

Time: Three Hours

Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
➤ DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer ALL Questions
(10 X 10 = 100 Marks)

1. a) In context to the four key evolutionary processes namely *natural selection*, [8]
genetic drift, *gene flow* and *mutation*; answer the following questions:
 - i. Define them.
 - ii. Mention the effect of each on genetic variation.
 - iii. How it influence Average fitness?b) Explain Miller Urey's experiment regarding earth's evolution? [2]
2. Sketch an animal cell and explain the basic function of its organelles and differentiate it from a bacterial cell.
3. a) Which are the sulfur containing amino acids? Can all the sulfur containing [6]
amino acids form disulfide bond(s) in peptides and proteins? Briefly rationalize your answer.
b) Explain how the amphipathic nature of phospholipids is critical to membrane [4]
structure and function and describe how disruptions in membrane lipids can lead to cell dysfunction.
4. Explain the concept of energy coupling in cells and describe how ATP is used to drive endergonic reactions. Provide an example of a specific cellular process that rely on ATP energy coupling?
5. a) An organism has four pair of chromosomes (i.e., chromosome number= 8). [6]
Diagrammatically represent the chromosomal arrangement during different phases of meiosis with proper labeling.
b) What is the role of 'promoter sequences' in central dogma of molecular [4]
biology?

6. a) How can you differentiate parenchymatous, collenchymatous and sclerenchymatous cells in a plant? [6]

b) What is the role of integumentary system and name the vital organs of this system? [4]

7. Let round seed and blue color flower be the dominant traits of a particular plant. And, let wrinkled seed and white color flower be the recessive traits of the same plant. What can be the nature of offsprings upon crossing a homozygous dominant plant in both these traits and a heterozygous dominant plant in both these traits? Explain your answer by Punnett square illustration. Also, appropriately define the symbols that you choose.

8. State reasons why the chemical pesticides pose environmental and health hazards and explain why bio-pesticides are increasingly being adopted in agriculture?

9.a) Compare and contrast the structure of DNA and RNA, and explain how these structural differences are related to their respective functions in replication and transcription.

OR

9.b) Describe the functions of:

- (i) Gyrase (ii) RNA polymerase (iii) DNA polymerase
(iv) tRNA (v) UAA in codon square .

10.a) i. During physical exercise, the process where body cells break down sugars to provide ATP for muscle contractions is called _____. _____ is the process is where muscle cells repair muscle tissues damaged by exercise by building new muscle. [Catabolism/ Anabolism]. [2]

ii. How many molecules of FADH₂, NADH and ATP (via substrate level phosphorylation) are produced by the TCA cycle, if 23 molecules of glucose are catabolized? Explain your answer in a stepwise presentation. [8]

OR

10.b) In which phase of aerobic respiration is the oxygen utilized? Explain the main steps of that particular phase.

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