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PES University, Bangalore

(Established under Karnataka Act 16 of 2013)

UE18BT101

MAY 2019: END SEMESTER ASSESSMENT (ESA) B.TECH II SEMESTER
UE18BT101: ENGINEERING BIOLOGY

Time: 2 hours **Max Marks: 60**

Answer All Questions

1. a) "Extremophiles are the organisms which thrive in extremely harsh conditions". Justify the statement giving suitable examples. [3]

   b) In the 1990s, Mercedes Benz sought to design a vehicle with impressive characteristics. What was the bio-mimetic inspiration for this? Write the organism's properties which were employed. [5]

   c) Proteins exist in different hierarchial levels of structure before taking up the final functional form. Enlist and highlight these levels of structure. [4]

2. a) Enzymes are organic catalysts which increase the rate of a reaction. But there are substances which tend to decrease the rate of an enzyme catalyzed reaction. Highlight the types of mechanisms by which they do so. [3]

   b) Virtually all organic material on Earth has been produced by cells that convert energy from the Sun into energy-containing macromolecules through photosynthesis. Write the balanced equation of photosynthesis and elaborate on the photosystems. [4]

   c) Lungs work in the direction of taking up oxygen and expelling carbon dioxide out of the body. What is the role of alveoli in this? [2]

3. a) Blood is a connective tissue made up of several formed components. Enlist them. [3]

   b) Elaborate the theory which justifies the muscle contraction. [6]

c) Illustrate on the subcomponents of ATP synthase. [3]

4. a) Electroencephalography (EEG) is an electrophysiological monitoring method to record electrical activity of the brain. Different types of waves are produced as output of this technique. Name the waves, their frequency and condition at which they arise. [6]

b) Explain the general architecture of artificial neural networks. [6]

5. a) Sketch a schematic diagram of the components of a biosensor. [5]

b) Elucidate the two types of diabetes. [3]

c) A decade ago, Chris Lipinski introduced certain rules which set down the properties which a molecule must possess to increase its chances of becoming a drug. Enlist the rules. [4]

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