Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **B.Tech.**

PBT3I101

3rd Semester Regular/Back Examination 2017-18

BIOCHEMISTRY

BRANCH : BIOTECH

Time: 3 Hours

Max Marks: 100

Q.CODE: B956

Answer Question No.1 and 2 which are compulsory and any four from the rest.

The figures in the right hand margin indicate marks.

Q1 Answer the following questions: **(2x10)**

a) Which of the following statements about amino acids is correct?
i) Amino acids are classified according to the structures and properties of their side chains.
ii) Amino acids are uncharged at neutral pH.
iii) Amino acids in proteins are mainly in the D-configuration.
iv) Twenty four amino acids are commonly used in protein synthesis.

b) Which type of bonding is responsible for the secondary structure of proteins?
i) Disulphide bridges between cysteine residues.
ii) Hydrogen bonding between the C=O and N-H groups of peptide bonds.
iii) Peptide bonds between amino acids.
iv) Salt bridges between charged side chains of amino acids.

c) Which amino acid can form disulphide bonds?
i) Glycine. ii) Proline.
iii) Glutamate. iv) Cysteine.

d) Ribose is pentose sugar found in
i) NAD ii) FAD iii) RNA iv) All of the above

e) Which of the following statements about the TCA cycle is correct?
i) Oxygen is used to oxidise the acetyl group carbons of acetyl-CoA in the TCA cycle.
ii) Three molecules of NADH and one molecule of FADH2 are produced in one turn of the TCA cycle.
iii) Oxygen is not used in the TCA cycle, so the cycle can occur in anaerobic conditions.
iv) The TCA cycle produces the water that is formed during the complete oxidation of glucose.

f) Which of the following statements about the electron transport chain is correct?
i) The electron transport chain is made up of a chain of electron carriers with decreasing electron affinity.
ii) The electron transport chain is made up of a chain of electron carriers with increasing redox potential.
iii) The electron transport chain is made up of a chain of electron carriers with decreasing oxidising power.
iv) The electrons transferred from carrier to carrier in the electron transport chain gain energy.

g) Which of the following statements about gluconeogenesis is correct?
i) Muscles have a large glycogen store which gives rise to blood glucose during prolonged starvation.
ii) Fatty acids are plentiful in the blood during starvation and are used for glucose synthesis.
iii) The enzyme glucose-6-phosphatase hydrolyses glucose-6-phosphate and is present in most cells.
iv) Gluconeogenesis enables the liver to maintain blood glucose levels during starvation.

h) Which of the following statements about the competitive inhibition of an enzyme-catalyzed reaction is correct?
i) A competitive inhibitor and substrate can bind simultaneously to the enzyme.
ii) The Vmax and Km (Michaelis constant) for a reaction are unchanged in the presence of a competitive inhibitor.
iii) The Vmax for a reaction remains unchanged in the presence of a competitive inhibitor.
iv) The Km for a reaction remains unchanged in the presence of a competitive inhibitor.

i) Which of the following statements about the nature of enzyme catalysis is correct?
i) The rate of formation of the transition state intermediate determines the overall free energy change of the reaction.
ii) The active site of an enzyme is perfectly complementary to the substrate in its ground state.
iii) The rate of formation of the transition state intermediate determines the overall reaction rate.
iv) Natural substrates bind to enzymes more tightly than transition state analogues.

j) Which of the following statements about the oxidation of fatty acids is correct?
i) Fatty acid oxidation in peroxisomes does not generate ATP.
ii) Fatty acids are oxidised on the outer mitochondrial membrane.
iii) Most fatty acids are oxidised in peroxisomes.
iv) Fatty acid oxidation forms $FADH_2$ in the cytoplasm.

Q2 **Answer the following questions: *Short answer type*** **(2x10)**

a) Classify the different types of vitamin B.
b) What is salvage pathway?
c) Classify carbohydrates.
d) Why it is beneficial to use tri-acylglycerols as stored fuels, rather than polysaccharides such as glycogen and starch?
e) Draw the general structure of proteins.
f) Why RNA is more unstable?
g) What is chemiosmosis?
h) Write the importance of activation energy?
i) What is suicide irreversible inhibitor?
j) What are the different properties of enzymes?

Q3 **a)** Discuss the double helix model of DNA. **(10)**
b) Classify different lipids with suitable examples. **(5)**

Q4 **a)** Write the chemiosmotic model? **(10)**
b) Discuss the different types of vitamins and their role. **(5)**

Q5 **a)** Discuss in detail about the different complexes involved in electron transport chain. **(10)**
b) Discuss the Ramachandran Plot and its importance. **(5)**

Q6 **a)** Discuss the TCA cycle with its energetic. **(10)**
b) Discuss the fate of pyruvate. **(5)**

Q7 **a)** Discuss the different reactions involved in β-oxidation of fatty acid. **(10)**
b) Discuss the different steps of glycolysis reactions. **(5)**

Q8 **a)** Discuss the different pathways of nucleic acid synthesis. **(10)**
b) Discuss the dark reaction of photosynthesis. **(5)**

Q9 **a)** Discuss the mechanism of action of enzymes. What are the different forms enzyme inhibitions? Discuss the Competitive reversible inhibition. **(10)**
b) Discuss Michaelis–Menten equation. **(5)**