Q.P. Code : 78946

(2½ Hours) **[Total Marks : 75**

N.B. : (1) **All** questions are **compulsory**.
(2) **Choice** is **internal**.
(3) **Draw diagrams** wherever **necessary**.
(4) Non-programmable **calculators** are **permitted**.
(5) **Figures** to the **right** indicate **full marks**.

1. (a) Fill in the blanks by choosing an appropriate answer from the given options. 3
(Answer **any three**) :

(i) 1 Calorie is equal to _____.
(a) 4.184 J (b) 4.184Kj (c) 0.1 Kcals

(ii) Animal Proteins are better than plant proteins because they - _____.
(a) provide additional vitamins and carbohydrates
(b) the BV of plant protein is high so they are unfit for human consumption
(c) they provide most if not all essential amino acids

(iii) Pellagra is caused due to deficiency of _____.
(a) thiamine (b) riboflavin (c) niacin

(iv) For the given data set (10, 6, 4, 7, 8, 10, 9, 10) _____ is the mean.
(a) 10 (b) 8.5 (c) 8.0

(v) _____ exhibit highest SDA.
(a) Lipids (b) Proteins (c) Carbohydrates

(vi) In the data set provided (32, 27, 16, 04, 44, 18, 22, 16, 32) the range is _____.
(a) 0-44 (b) 04-44 (c) 16-32

(b) Define or explain **any one** : 2
(i) Body Mass Index (ii) Mode

(c) Answer **any one** of the following : 4
(i) Write a note on nutritional importance of proteins and lipids.
(ii) With a neat labeled diagram explain the working of a bomb calorimeter. Add a note on it's significance.

TURN OVER

(d) Answer **any one** of the following : 6

(i) Write briefly on :

(a) Any two measures of central tendency

(b) Any two measures of variance

(ii) Define BMR and state its clinical significance and elaborate on the factors influencing BMR.

2. (a) Fill in the blanks by choosing an appropriate answer from the given options. 3
(Answer **any three**) :

(i) Ribose 5 - phosphate and NADPH are generated in _____.

(a) HMP shunt (b) glycolysis (c) glyoxylate cycle

(ii) Glycogenesis is _____.

(a) formation of glucose

(b) formation of glycogen

(c) breakdown of glycogen

(iii) Thiokinase catalyzes a reaction in _____.

(a) HMP shunt

(b) glyoxylate pathway

(c) TCA cycle

(iv) The net ATP formed when 1 mole of glucose forms lactate (2 moles) in an actively respiring muscle is _____moles.

(a) 2 (b) 6 (c) 8

(v) Glycolysis occurs in the _____.

(a) cytoplasm

(b) mitochondria

(c) cytoplasm & mitochondria

(vi) The following enzymes (in man) use GTP _____.

(a) pyruvate kinase and hexokinase

(b) succinyl CoA synthetase and pyruvate kinase

(c) PEP carboxy kinase and succinyl CoA synthetase

(b) Define or explain **any one** : 2

(i) The importance of HMP shunt in biosynthetic processes.

(ii) "Anaplerotic reactions are essential for the continuous functioning of the TCA cycle". Justify.

(c) Answer **any one** of the following : 4

(i) Schematically depict the glyoxylate pathway and state it's significance (no structures).

(ii) Schematically depict the gluconeogenesis pathway and state its significance (no structures).

(d) Answer **any one** of the following : 6

(i) Write detailed reactions (with structures) for conversion of oxaloacetate to alpha- keto glutaric acid.

(ii) Write detailed reactions (with structures) for irreversible reactions of glycolysis.

3. (a) Fill in the blanks by choosing an appropriate answer from the given options. 3
(Answer **any three**) :

(i) Decarboxylation of glutamate yields _____.

(a) glutamic acid

(b) γ amino butyric acid

(c) α - keto glutaric acid

(ii) NH_3 is transported in blood largely in the form of _____.

(a) free NH_3 (b) glutamine (c) ornithine

(iii) _____ catalyze non oxidative deamination.

(a) Glutamate dehydrogenase

(b) L - amino acid oxidase

(c) Aspartate ammonia lyase

(iv) _____ act as antigen presenting cell.

(a) Dendritic cells (b) T - cells (c) Basophils

(v) _____ function as phagocytes.

(a) B - cells (b) Neutrophils (c) Eosinophils

(vi) A _____ is a small foreign molecule that does not generate an immune response until it is attached to a macromolecule.

(a) hapten (b) antigen (c) antibody

822C27AFC1FCADEAA4D1E94559B406FC

(b) Define or explain **any one** : 2

(i) Write biochemical reaction (with structures, enzymes etc) for deamination of glutamate.

(ii) Immunity.

(c) Answer **any one** of the following : 4

(i) Write detailed reactions (with structures, enzymes, coenzymes, etc) for the mitochondrial reactions of urea cycle.

(ii) Distinguish between primary and secondary lymphoid organs.

(d) Answer **any one** of the following : 6

(i) Write detailed reactions (with structures) for the mechanism of transamination of an amino acid.

(ii) Draw a neat and labelled diagram of an lgG molecule. Add a note on it's functions.

4. (a) Fill in the blanks by choosing an appropriate answer from the given options. 3
(Answer **any three**) :

(i) In *E. coli*, peptidyl transferase is _____.

(a) a protein in the 50S ribosomal subunit

(b) a 23S rRNA in the 50S ribosomal subunit

(c) a 16S rRNA in the 30S ribosomal subunit

(ii) A wobble base allows _____.

(a) DNA and RNA to interact

(b) tRNA and ribosome to interact

(c) one tRNA to bind more than one codon

(iii) _____ is a medium used for plant tissue culture.

(a) Potato dextrose agar

(b) MS medium

(c) Nutrient agar

(iv) The tissue obtained from a plant to be cultured is called _____.

(a) transplant (b) explant (c) implant

(v) Type II DNA topoisomerase is _____.

(a) DNA ligase (b) DNA gyrase (c) DNA polymerase

822C27AFC1FCADEAA4D1E94559B406FC

(vi) The hormone pair required for a callus to differentiate are _____.
  (a) auxin and cytokinin
  (b) auxin and ethylene
  (c) gibberellins and abscisic acid

(b) Define or explain **any one** : 2
  (i) State any two applications of plant tissue culture.
  (ii) Okazaki fragments.

(c) Answer **any one** of the following : 4
  (i) Explain the role of each of the following in protein synthesis :
    (a) IF_1 (b) EF- Tu
    (c) EF- G (d) RF_1
  (ii) Write a brief note on initiation of transcription in prokaryotes.

(d) Answer **any one** of the following : 6
  (i) State the various modes of DNA replication. Explain Meselson and Stahl's contribution.
  (ii) Draw a typical fermentor and label its parts. State the function of each part.

5. (a) Answer **any one** of the following : 3
  (i) Write briefly on importance of minerals in humans.
  (ii) Explain the following terms :
    (a) Normal distribution
    (b) Biologial value

(b) Answer **any one** of the following : 3
  (i) "TCA cycle is an amphibolic pathway". Justify.
  (ii) Write the reaction catalyzed by PDH complex. List the enzymes of the complex.

822C27AFC1FCADEAA4D1E94559B406FC

(c) Answer **any one** of the following : 3

(i) Write a brief note on precipitation reactions.

(ii) Physiologically important decarboxylation products of amino acids.

(d) Answer **any one** of the following : 3

(i) Explain the activation step in protein synthesis.

(ii) Give a schematic representation of production of alcohol.

(e) State True or False (**any three**) : 3

(i) Plant cells are totipotent.

(ii) Gelatin is a complete protein.

(iii) Primase unwinds DNA double helix at the replication fork.

(iv) Hematopoiesis is the process of creating new blood cells in the body.

(v) A sparger in a fermenter helps in aeration.

(vi) Tricarboxylic acid cycle takes place in mitochondria.

822C27AFC1FCADEAA4D1E94559B406FC