2007

HUMAN PHYSIOLOGY

PAPER -H

Full Marks :100

Time : 4 hours

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

Write answers to Questions of each Unit in separate books

UNIT III

Answer Q. No.1 and any *two* from the rest

Write short notes on *any two* of the following : 5x2

U) Limitations of Linweaver-Burk plot

(ti) Mechanism of protein folding *in vivo*

(d) Membrane Phospholipids

(iv) *K* and V **series** of enzymes.

(v) Tyrosine **as a precursor of dopamine and norepinephrine.**

2. **(a) State and distinctive features** of active site of **an enzyme.**

(b) Why are **enzyme molecules so large** compared to the **structure of substrate molecule?**

(c) Discuss the characteristics of allosteric modulations, **mentioning the roles of** positive and **negative** coopertivitics **in them.**

(d) Describe **the sigmoid kinetics of allosteric enzymes** and the linear t**ransformation** of its Hill **equation**. 4+2+8+6

3. (a) Mention the differences between parallel and antiparallel ti-pleated sheet structure.

(b) How an a-helix structure is stabilized ?

(c) Write **two major differences between** f**ibrous and globular proteins.**

(d) Give a brief account of the structure of collagen. 4+7+3+6

4. (a) How does the Davson-Danicli model for cell membrane structure differ from Singer-Nicolson's fluid-mosaic model?

(b) "Cell membrane is a dynamic two-dimensional fluid"–explain the statement.

(c) Discuss the mechanism of action of receptor-tyrosine kinase signal transduction pathways.

(d) WhatarelRS-s. 4+6+7+3

5. (a) State the role of glucocorticoids in carbohydrate and Lipid metabolism with special reference to the signaling system.

(b) Mention the bioenergetic significance of free energy value of hydrolysis of ATP compared to that of hydrolysis of other organic phosphates.

(c) How oligomycin acts on oxidative phosphorylation ? 7+6+4+3

UNrr-W

Answer Q.No. 1 and any two from the rest

(a) What are the principal conditions of Hardy-Weinberg law?

(b) Why population genetics is also called evolutionary genetics ?

(c) What is meant by the statement that an allele is fixed in a population. **4+3+3**

Or

(a) Why restriction **enzymes are so crucial to the** ability to clone DNA?

(b) What is the difference between genotype and phenotype.

(**c) State some of the important applications of 'Recombinant DNA technology'.** 3+3+4

2. (a) What properties of DNA polymerase III make it a more appropriate enzyme than DNA polymerase **I for the primary role in** E. coli DNA **replication ?**

(b) Why is the action of DNA **polymerase I called 'nick translation'?**

(c) What category of enzyme is the DNAB protein? What is its role in the initiation of DNA **replication.**

(d) How is 5'-. 3' exonuclease activity different from 3'-' 5' proofreading activity.

(e) What is the function of the enzyme telomerase. 4+3+4+4+5

3. (a) Are introns. essential components of eukaryotic genes ?

(b) In which region of the eukaryotic **chromosome** , the highly repetitive **segments are located and in what** cellular functions **are these sequences** involved?

(c) During which phase of eukaryotic cell cycle is **the chromosomal material the most** condensed? Why?

(d) Why **histones have such high percentages of basic amino acids ?**

(e) **What is polyribosomes and what are its functions** ? 3+5+4+3+5

4. (a) **What are the functions of 'cap' and** 'poly-A-tail' ?

(b) How DNA can be removed from the **interior of** the cell.

(c) **What is the relationship between oncogenes and protooncogenes ?**

(d) **Suggest why there is only one initiation codon, but three termination codon.**

(e) **What do you mean by degeneracy of codon?** 5 +5+4+3+3

5. **Write short notes on any *four* of the following:** **5x4**

(i) **Western blotting**

(ii) **Plasmid**

(iii) **Principle** of DNA **sequencing by enzymatic method**

(iv) Avery's **Experiment**

(v) Xeroderma pigmentosa

(vi) t-RNA

(11U) Mobile **genetic element.**