

M.Sc. 1st Semester Examination, 2015

HUMAN PHYSIOLOGY

PAPER – PHY-101 (Unit-I & II)

Full Marks : 40

Time : 2 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 the answers to questions of each Unit in separate books

UNIT—I

1. (a) Why oxidative phosphorylation is called a coupled reaction ?

(b) What is mitochondrial electron transport chain ? Write down its composition along with mode of electron transport through it.

2+(1+2)

(Turn Over)

(2)

Or

- (a) Write down the chemiosmotic hypothesis for ATP synthesis.
- (b) Give an evidence in support of proton pumping for ATP synthesis.
- (c) What is meant by *T* conformation of β subunit of ATP synthase? 1 + 2 + (1 + 1)
2. (a) State how would you derive Michaelis-Menten equation.
- (b) An enzyme catalyzed reaction has a K_m of 1 mM and a V_{max} of $5 \text{ nM} \cdot \text{S}^{-1}$. What is the reaction velocity when the substrate concentration is 1.5 mM. 3 + 2

Or

- (a) Citing an example diseases how enzyme activity is controlled by reversible covalent modification.
- (b) Briefly discuss the thermodynamic analysis of enzyme catalysis. 2 + 3

(3)

3. (a) Mention the basic principles of protein folding. What is assisted folding?
- (b) Write down the role of DnaJ-DnaK system in assisted protein folding. (2 + 1) + 2

Or

- (a) Discuss the process of antiport uptake of nucleotide sugars into Golgi cisternae.
- (b) How does prenylation occurs as a post-translational process? 2 + 3
4. (a) Discuss how NADH/NAD⁺ ratio takes a major role in TCA cycle regulation.
- (b) State the main steps of eicosanoid biosynthesis. 2 + 3

Or

Write down the role of glucocorticoids in maintaining blood glucose level during fasting. 5

(4)

UNIT-II

1. (a) What do you mean by tautomers ?
- (b) What background material did Watson and Crick utilise for developing a model of DNA? 1 + 4

Or

Write the structure and functions of chromosome. 5

2. (a) What is proto-oncogene ?
- (b) Describe the role of oncogene in cancer. 1 + 4

Or

- (a) How crossing over frequency can be measured ?
- (b) Construct a chromosome map using the following crossing over frequencies (COF's): 2 + 3

$$WX = 5, XY = 2, YW = 7, ZW = 8, YZ = 1$$

(5)

3. Discuss briefly the mechanism of eukaryotic transcription. 5

Or

- (a) What is spliceosome ?
(b) Describe the splicing mechanism of mRNA with suitable diagram. 1 + 4

4. How does the genetic information in mRNA get translated into amino acid sequence of polypeptide chain ? 5

Or

State the significance of degeneracy of genetic code. 5
