M.Sc.

2016

4th Semester Examination

HUMAN PHYSIOLOGY

PAPER—PHY-403

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Special Paper

(Microbiology & Immunology)

(Unit—41)

Answer all questions from the following :

1. (a) Give an experimental evidence in support of DNA as a genetic material.

(b) What is 'transforming principle'? 4+1

Or

(a) What is meant by genetic recombination?

(b) What is transduction? Mention its significance.

(c) Differentiate 'Generalized' and 'Specialized' transduction. 1+(1+1)+(1+1)

2. (a) Mention the different DNA sequences for eukaryotic chromosomal replication and segregation.

(b) Give a brief account of the Nucleosome structure for chromosomal organization. 2+3

Or

(a) Discuss in brief on Telomeric DNA sequences peculiarities and activity of Telomerase.

(b) What is Telomere Capping? (2+2)+1

3. Discuss in brief the regulation of gene expression in a catabolic operon with intervention of Inducer. 5

Or

(a) Mention the structural peculiarity of Intrinsic terminator of transcription including the mechanism of termination.

(b) What is attenuation? 3+2

4. (a) What is 'Mobile DNA'?

(b) Mention the structural basis of 'IS elements'.

(c) What are conservative transposons? 1+2+2

Or

(a) What is meant by Anti-sense RNA?

(b) Explain with an example the mechanism of gene silencing by Anti-sense RNA. 2+3

(Unit—42)

1. Indicate how Mycobacterium tuberculosis subverts the killing mechanisms of macrophage? 5

Or

(a) Can you explain why both CD_4^+ and CD_8^+ T-cells are needed to protect against plasmodial infection?

(b) Are erythrocyte infected by parasites lysed by cytotoxic T-cells? Explain your view. 3+2

2. Differentiate between type I and type IV hypersensitive reaction. 5

Or

Write notes on: $2\frac{1}{2}+2\frac{1}{2}$

(i) Graves Disease.

(ii) Multiple Sclerosis.

3. Discuss the various approaches of cancer-immunotherapy. 5

Or

(a) Why is an allograft rejected by a recipient?

(b) Explain the immune mechanisms involved in the graft rejection. 2+3

4. Write a brief note on FACS mentioning its application. 5

Or

Discuss the different types of vaccines used to cure tumors. 5

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Special Paper

(Ergonomics and sports physiology)

(Unit—41)

1. (a) What are system goals in ergonomics?

(b) Discuss briefly different features of system design. 2+3

Or

What is cognitive ergonomics? How cognitive ergonomics can be applied in human-computer interaction and supervisory control? 1+4

2. (a) Mention the importance of kinensiology in improving performance.

(b) State different fundamental motions in osteokinematics. 1+4

Or

Discuss different principles of coding of controls. 5

3. (a) Mention the factors affecting illuminance.

(b) How object size affect the visual performance ?

2+3

Or

(a) A person exposed to 105 dBA noise source for 4 hours. What is the noise dose ?

(b) State the effects of continuous noise on performance.

2+3

4. What is WBGT index? Discuss the determination of WBGT index in a hot-humid work station. 1+4

Or

State the effects of sulphuric acid when it

(a) comes in contact with the body, and

(b) is inhaled in work places. 2+3

(Unit—42)

1. (a) What do you mean by 'design for extreme individual' ?

(b) State the importance of percentile values of body dimensions in designing. 2+3

Or

(a) What is work space envelope?

(b) State the principle of determining work surface height during standing.

(c) Why inclined desk top is recommended? 1+2+2

2. (a) What do you mean by kyphosis and lordosis?

(b) How do you determine seat depth of a chair?

(c) What are the drawbacks of prolong sitting?

2+2+1

Or

(a) What do you mean by poor body posture?

(b) "Proper shape of handles gives better hand-arm posture" – explain.

(c) How body part discomfort scale is used for assessing body posture? 1+2+2

3. (a) State the causes of musculo-skeletal injury and back pain due to manual material handling (MMH).

(b) Mention the load characteristics that are treated as risk factors of MMH. 3+2

Or

(a) What is CTD ? State the common causes of CTD.

(b) What is tendonitis ? 4+1

4. (a) What are the causes of visual discomfort of VDT workers ?

(b) State the control measures for reducing visual discomfort of VDT workers. 2+3

Or

(a) How is circadian rhythm related to shift work ?

(b) State the effect of shift work on the performance of the workers. 2+3

Special Paper

(Endocrinology, Reproductive Physiology & Family Welfare)

(Unit—41)

1. (a) Mention the different components of renin-angiotensin system.

(b) Describe critically the AT_1 and AT_2 receptor mediated functions of angiotensin II. $1\frac{1}{2}+3\frac{1}{2}$

Or

(a) With proper evidences describe how obesity and type 2 diabetes are inter-related.

(b) Explain the proatherosclerotic and antiatherosclerotic actions of insulin on vascular cells. $2\frac{1}{2}+2\frac{1}{2}$

2. (a) "Adiponectin is a link among adiposity, insulin resistance and lipid metabolism." – justify.

(b) State the importance of StAR protein in cholesterol biosynthesis. 4+1

Or

(a) What kind of drugs are abused?

(b) Mention the mode of action of caffeine and its effects on human body. 2+(1+2)

3. (a) Write critically the effects of alcohol intake on the liver and bone of adolescents.

(b) What is 'alcohol withdrawal syndrome' ? 3+2

Or

(a) What do you know about 'Sertoli and Leydig Cell aging' ?

(b) State critically how testosterone production and sexual function are affected in aging. 2+3

4. Elaborate the synthesis of human insulin using *E.Coli* by recombinant DNA technology. State its importance. 4+1

Or

(a) Describe the underlying and basic causes of neonatal morbidity and mortality.

(b) What are the methods for the reducing the above said problems ? 3+2

(Unit—42)

1. (a) Discuss critically the molecular mechanisms of sperm binding to the zona pellucida.

(b) What is mZP3 ? 4+1

Or

(a) What is endometrial receptivity?

(b) Mention the role of E-Cadherin in the process of implantation. 2+3

2. (a) State diagramatically the steroidogenesis in the maternal-foetal-placental unit.

(b) Elaborate the process of placental progesterone biosynthesis. $2\frac{1}{2}+2\frac{1}{2}$

Or

(a) "Without Sertoli Cell functioning spermatogenesis is not possible in spite of normal hormonal millien in the testis." – Justify.

(b) Mention the functions of glycoproteins secretd by the Sertoli Cells. 2+3

3. (a) Discuss the mechanism of action of Emergency Contraceptive pills.

(b) What is LNG ECPs? 4+1

Or

(a) What do you mean by pedigree analysis? What is proband?

(b) Write a note on autosomal recessive inheritance. 1+1+3

4. (a) What are the steps in maintaining specific primary cell lines?

(b) How will you decide that cultured cells are in healthy environment? 2+3

Or

(a) What is sperm-mediated gene transfer (SMGT)? Describe the SMGT in the pig.

(b) Write the types of embryonic Stem Cells. (2+2)+1

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