

2017

M.Sc.

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) What are the major features of genetic material?
(b) Give an experimental evidence in support of RNA as genetic material.

1+4

(Turn Over)

Or

- (a) Differentiate 'conjugation' and 'transformation'.
- (b) What are 'hfr' cells? Write down their significance in genetic recombination. 2+(2+1)
2. (a) Mention the major levels of chromatin packaging in eukaryotic chromosome.
- (b) Describe in brief the third level of compaction of eukaryotic chromosome.
- (c) What are the features of histone proteins? 2+2+1

Or

- (a) Write a brief note on repetitive sequences in eukaryotic chromosomes.
- (b) What are minisatellites?
- (c) What are SINES? 3+1+1
3. (a) What is 'promoter'? Why is important?
- (b) Write down the major structural features of 'promoter' in prokaryotes.
- (c) What is meant by 'promoter consensus'? (1+1)+2+1

Or

- (a) Write down the importances of 'sigma factor' and 'rho factor' in transcription.
- (b) What is anti-termination ?
- (c) Describe briefly the mechanism involved in tryptophan biosynthesis through trp operon when tryptophan is absent in the system. (1+1)+1+2
4. (a) What is transposon? Write down its structural feature.
- (b) Write down the mechanism by which transposons get inserted into target site.
- (c) What is composite transposon ? (1+1)+2+1

Or

- (a) What is meant by RNA interference ?
- (b) Write briefly on the mechanism of gene silencing by SiRNA including its significance. 1+4

(Unit—42)

Answer all questions from the following :

1. (a) Write the different types of cell-adhesion molecules.
- (b) What are their importance in inflammation. 2+3

Or

- (a) Describe the structure and pathogenicity of influenza virus.
- (b) What do you mean by antigenic shift and antigenic drift? 3+2

2. (a) What is anaphylaxis?
- (b) Discuss the mechanism of mast cell degranulation. 1+4

Or

Write short notes on :

- (a) Myasthenia gravis.
- (b) Systemic Lupus Erythematosus. $2\frac{1}{2}+2\frac{1}{2}$

3. (a) Define immunosurveillance and cross priming.
- (b) Discuss the role of macrophage and NK cell in killing of tumor or cancer cell. $2\frac{1}{2}+2\frac{1}{2}$

Or

- (a) Differentiate autograft, isograft, allograft and xenograft.
- (b) Write the sensitized and effector phase of graft rejection. 2+3

4. (a) Explain active and passive immunization.
 (b) What is HERD immunity?
 (c) Why do some vaccines require boosters? 2+1+2

Or

Discuss the historical contributions of Edward Jenner and Louis Pasteur in the development of vaccine.

$2\frac{1}{2} + 2\frac{1}{2}$

Special Paper

(Sports Physiology & Ergonomics)

(Unit—41)

Answer all questions from the following :

1. (a) What do you mean by 'goal of safety'?
 (b) Discuss briefly about 'Human-machine' system.

$2\frac{1}{2} + 2\frac{1}{2}$

Or

- (a) What are the psychological factors that influence the activities of workers?

(b) What do you mean by positive Psychological well-being? $3\frac{1}{2}+$

2. (a) Name the muscles that contribute to the extension of spine in thoracic and lumbar region.
- (b) State the factors related to the loads of the human spine. 2

Or

State the principles of designing visual information displays. 5

3. (a) What do you mean by disability and discomfort glare?
- (b) State the methods of direct and indirect glare. 2+3

Or

- (a) What are the sources of hand-arm vibration?
- (b) Write the causes, symptoms and management of vibration induced white finger. 1+4

4. (a) What is P_4SR ? How do you determine P_4SR ?
- (b) What is wind-chill index? $(1+3)+1$

Or

- 1) Point out the routes of entry of toxic chemicals in human body.
- 2) Write briefly the effects of acute and chronic exposure of chlorine on industrial workers. 1+4

(Unit—42)

3+ Answer all questions from the following :

1. (a) What is dynamic anthropometry? What are the dynamic properties of human body that are measured in dynamic anthropometry?
- (b) What do you mean by principle of adjustable range for ergonomic design? 3+2
- Or
- (a) What do you mean by normal area and maximum area in relation to horizontal work surface?
- (b) Mention the importance of leg room in a sitting work station. 3+2
2. (a) Discuss briefly the role of back rest angle and lumbar support in designing the back rest of a chair.
- (b) What is cervical syndrome? 4+1

Or

- (a) Discuss the biomechanical principles of adopting good posture.
- (b) Mention the body parts that are taken into account in OWAS method. 4+1
3. (a) Discuss the factors affecting the energy cost of manual material handling.
- (b) State the NIOSH equation for lifting. 4+1

Or

- (a) State the common causes of carpal tunnel syndrome.
- (b) What are the preventive measures of carpal tunnel syndrome. 2+3
4. (a) Mention different categories of training methods for industrial workers.
- (b) How do you plan a training program for workers?
- (c) How do you evaluate training program? 2+2+1

Or

- (a) What are the common occupational diseases seen among mine workers?
- (b) What is coal worker's pneumoconiosis (CWP)? Differentiate between simple and complicated CWP? 2+(2+1)

Special Paper
**(Endocrinology, Reproductive Physiology &
Family Welfare)**

(Unit—41)

Answer all questions from the following :

1. (a) Classify different types of hypertension.
(b) Mention briefly the endocrine disorders in hypertensive individuals.
(c) Comments on 'Management of hypertension'.

1+2+2

Or

- (a) State how intramuscular triglyceride is correlated to insulin resistance.
(b) Discuss the abnormal endothelial cell function related microvascular complications in Type 2 diabetes mellitus.
2. (a) "Leptin : a regulator of excessive energy intake and lipid metabolism"—justify the statement.
(b) What is remnant Chylomicron ?

3+2

4+1

Or

- (a) Citing example mention the categories of drugs are being abused.
- (b) Describe the principal mechanism of action and acute effects of amphetamines in human body.

2+(1½+1½)

3. (a) State the novel markers of ovarian aging.
- (b) Mention the genetic risks seen in aged male.

4+1

Or

Mention the effect of alcohol on growth and endocrine system during puberty. 5

4. (a) State the drawback of using animal insulin.
- (b) How the production of recombinant insulin could be done from yeast? 1+4

Or

- (a) State the 'Millennium Development Goals' on maternal and child health.
- (b) What are the direct and indirect causes of maternal mortality? 2+(1½+1½)

(Unit—42)

Answer all questions from the following :

1. (a) Discuss the molecular mechanism of acrosomic reaction in sea urchin.
- (b) State the role of ADAM proteins and integrins in human during the interaction of sperm with eggs. 2+3

Or

- (a) What is WOI?
 - (b) Discuss the role of antiadhesion molecules during implantation. 1+4
2. (a) How placental estrogens are synthesized in pregnant mother ?
 - (b) State critically the importance of estrogens during pregnancy. 3+2

Or

- (a) Discuss the regulation of Sertoli cell function by germ cells and other testicular cells.
- (b) Mention the name of Leydig cell products which affect germ cells and Sertoli cells. $3\frac{1}{2}+1\frac{1}{2}$

3. (a) Elaborate critically the mechanism of action of LNCECPs. 5

Or

What do you know about 'Autosomal recessive', 'X-linked recessive' and 'X-linked dominant' in pedigree analysis? $2+1\frac{1}{2}+1\frac{1}{2}$

4. (a) State the functional characteristics of cultured cells.
(b) Discuss any two important areas where the cell culture used for. 3+2

Or

- (a) Discuss any two methods of producing transgenic mice.
(b) What is DNA microinjection technique? 3+2
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