

**M.Sc.**

**2015**

**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 )***

1. (a) What is meant by genetic material?
- (b) Give an experimental evidence in support of RNA as genetic material.

$1\frac{1}{2} + 3\frac{1}{2}$

*(Turn Over)*

Or

Write notes on:

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

- (i) Hfr cells.
- (ii) Transformation.

2. Give a brief account of packaging of chromatin fibres in eukaryotic chromosomes.

5

Or

- (a) Classify the repetitive sequences with brief description of each.
- (b) What is meant by DNA Renaturation kinetics?

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

3. (a) Describe in brief the events of promoter recognition stage in transcription.
- (b) How does transcription termination occur by Rho independent mechanism?
- (c) What is antitermination?

2+2+1

Or

- (a) Mention the organization of 'Promoter' of a gene in eukaryotes including the role played by each element.
- (b) Discuss in brief the role of 'enhancer' in eukaryotic gene expression. 3+2

4. (a) What is siRNA ?
- (b) Give a brief account of the role played by siRNA in gene silencing. 1+4

*Or*

- (a) What is composite transposon ?
- (b) Discuss the molecular mechanism of transposition. 2+3

**( Unit—42 )**

1. What is inflammation ? Describe the probable mechanism of inflammation. 1+4

*Or*

- (a) Describe "influenza virus".
- (b) What do you mean by antigenic shift and antigenic drift ? Illustrate your answer with suitable diagram. 2+3

2. What is anaphylaxis? What are the physiological events of mast cell degranulation? 1+4

*Or*

Write notes on:

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

(i) Myothenia gravis.

(ii) Type-I Diabetes.

3. (a) Describe the sensitized and effector phase of graft rejection.

(b) Write two immunosuppressive drugs with their mode of action. 3+2

*Or*

(a) What is cross presentation?

(b) Discuss the three types tumor cell based cancer vaccines. 2+3

4. (a) Write the immunization schedule for infants and children in India.

(b) What is the difference between "toxoid vaccines" and "live attenuated vaccines". 2+3

Or

- (a) What do you mean by "active" and "passive" immunization in terms of protection against infectious diseases.
- (b) Describe the factors that must be kept in mind in designing vaccines for active immunizations.

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

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**Special Paper**

**(Ergonomics and sports physiology)**

**(Unit—41)**

1. What is system design approach? Discuss how an efficient interactive system will depend on understanding between interdependent factor of a system. 2+3

Or

What do you mean by physiological well-being at work? State the key factors that influence physiological well-being. 1+4

2. What is Kinesiology? Discuss the basic movements of hand and wrist joints. 1+4

Or

State briefly different principles of visual information display. 5

3. What is brightness contrast? Discuss the effects of contrast on visual performance. 1+4

Or

What is hand-arm vibration? Discuss briefly different methods for controlling vibration. 1+4

4. State the effects of heat stress on human performance.

What is protective clothing?  $3\frac{1}{2}+1\frac{1}{2}$

Or

State the acute and chronic exposure of chlorine on industrial workers. Mention one safety measure against chlorine toxicity. 4+1

## ( Unit-42 )

1. (a) Which body dimension and percentile value should be considered for placing switch board in the wall ?
- (b) What is dynamic anthropometry ? 3+2

Or

- (a) "Working table should be arranged in right angle to the windows" — Justify.
- (b) "Work station should have both sitting and standing facilities" — Explain.  $2\frac{1}{2}+2\frac{1}{2}$

2. State the principles of designing the back rest of a chair ?  
What is cervical syndrome ?

Or

State the biomechanical principles of adopting good posture. 5

3. Discuss the factors related to the energy expenditure during manual material handling (MMH). Why static work is a risk factor for MMH ? 4+1

Or

What is carpal tunnel? State the causes and symptoms of carpal tunnel syndrome. 1+1

4. State the importance of training of workers. Write the steps of training process. 2+1

Or

What are the adverse consequences of shift work? What should be the length of shift work? 4+1

**Special Paper**

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

**(Unit—41)**

1. (a) What is essential hypertension?  
 (b) "Renin angiotensin - aldosterone loop is exquisitely sensitive to dietary sodium intake"—Justify the statement.  $1\frac{1}{2}+3$

Or



- (a) "Intramuscular triglyceride level and insulin resistance are strongly correlated" — Explain it.
- (b) Why test for glycosylated haemoglobin is important in the diagnosis of diabetes mellitus.
- (c) State critically about abnormal endothelial cell functions in type-II diabetes mellitus.  $2\frac{1}{2}+1+1\frac{1}{2}$

2. "Leptin is a regulator of excessive energy intake and lipid metabolism" — Justify the statement. 5

Or

Describe the principal mechanism of action of cocaine in the uptake of dopamine. 5

3. Discuss critically the effect of chronic alcohol intake on growth, endocrine system and brain. 1+2+2

Or

- (a) What is the implicit theory of aging?
- (b) What do you know about "Ovarian aging"?
- (c) State the novel markers for the detection of ovarian aging. 1+1+3

4. (a) What is transgenic animal?  
(b) Elaborate sperm – mediated gene transfer process.

1+4

*Or*

- (a) Mention the main causes of maternal mortality and morbidity.  
(b) Discuss the steps taken for improving the maternal health.

 $2\frac{1}{2}+2\frac{1}{2}$ **( Unit—42 )**

1. (a) What is acrosome reaction?  
(b) Mention the role of G protein signaling and ion channels in the induction of acrosome reaction.

1+(2+2)

*Or*

- (a) What is implantation window?  
(b) Describe the role of MUC-I in the molecular mechanism of implantation.

1+4

2. (a) "Secretion of hCG differs from that of many of the other placental proteins" — Justify the statement. 5  
 (b) Why hCG is called a physiological signal?

Or

- (a) What is meant by cell-to-cell cross talk in the testis?  
 (b) State briefly the effect of Leydig cell products on Sertoli cell functions and vice versa. 1+(2+2)
3. (a) Write the composition and mechanism of action of combined oral contraceptive pill (COCP).  
 (b) How cervical cancer is associated with COCP?

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

Or

- (a) What are IUDs? Describe the molecular mechanism of action of IUD as contraceptive.  
 (b) Discuss the morphological and biochemical endometrial change caused by IUD.  $(1+1\frac{1}{2})+2\frac{1}{2}$

4. (a) State the basic cell culture systems.
- (b) Discuss the functional characteristics of cultured cells.  $2\frac{1}{2}+2\frac{1}{2}$

Or

- (a) Describe the techniques of embryonic organ culture.
- (b) How would you culture pancreatic cells? 3+2