

**M.A. 3rd Semester Examination, 2012**

**HUMAN PHYSIOLOGY**

**PAPER—PHY-304**

*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*

**Special Paper : ( Microbiology and Immunology )**

**Unit – 31**

**Answer any two questions from the following :**

1. (a) Give a brief account of the major processes involved in cycling nitrogen in biosphere including the microbial interference.

( Turn Over )

- (b) Discuss the electron transport mechanism involved in biological nitrogen fixation reaction.
- (c) Mention the roles played by *nif D* and *nif K*.  
 $4 + 4 + (1 + 1)$
2. (a) What is PCR cycle ? Why it is called C-3 cycle ?
- (b) Discuss in brief the properties of major rate-limiting enzyme of this PCR cycle and regulatory mechanisms controlling it.  $(1 + 1) + (3 + 5)$
3. (a) What do you understand by "Bioleaching" ? What is its basic principle ?
- (b) Differentiate between 'direct' and 'indirect' mechanism involved in bioleaching.
- (c) Mention the characteristics of a major micro-organism involved in bioleaching.  $(2 + 2) + (2 + 2) + 2$
4. (a) What do you mean by microbial infection ?
- (b) How does a microbial infection develop in human host ?
- (c) Name two microorganisms present in each of the following :
- (i) Air

(ii) Water

(iii) Soil

(iv) Sewage.

2 + 4 + 4

Unit – 32

Answer any *two* questions

1. (a) What do you mean by immunological synapse ?  
(b) Describe the activation and effector function of Macrophage. 3 + 7
2. (a) Describe the structure and function of Toll-like receptor.  
(b) Write the different stages of B-cell development. 5 + 5
3. (a) How do T-cell and B-cell cooperate in antibody production ?  
(b) Discuss the experiment of Owen and Midwar. What is the inference of their experiment ? 5 + (4 + 1)
4. (a) What is an antigen ? How does it differ from an immunogen ?  
(b) What is membrane attack complex ? State the different properties of an adjuvant.

- (c) Demonstrate T-cell energy putting emphasis on the role of signal one and signal two.  $(1 + 1) + (1 + 2) + 5$

Special Paper : ( *Ergonomics and Sports Physiology* )

Unit – 31

Answer any *two* questions

1. (a) What is lactate threshold ? How it can be increased ?  
(b) Discuss the mechanism of changing lactate threshold due to training.  $(2 + 2) + 6$
2. (a) Why water replacement is necessary for endurance athletes ?  
(b) State the principle of supplementation of water before and during exercise.  
(c) Is salt intake necessary during exercise ?  
(d) State the advantage of ORS supplementation during endurance sports activities.  $2 + 4 + 2 + 2$
3. (a) What do you mean by exercise bradycardia ?  
(b) How bradycardia is developed in endurance athletes ?  
(c) What is RVFT ?  $3 + 5 + 2$

4. (a) How local genetic factor influence muscle fiber type ?
- (b) What is meant by static and dynamic balance test ? Describe briefly a static balance test for a human subject.
- (c) State the effect of exercise on pancreatic hormones.  $2 + (2 + 4) + 2$

Unit – 32

Answer any *two* questions

1. (a) What do you mean by traumatic and overuse injuries of sports ?
- (b) What are the common soccer injuries ? Discuss briefly the preventive measures of soccer injuries.  $4 + (3 + 3)$
2. (a) Mention the effects of weight training on adolescents. State the hazards of weight training on children and adolescents.
- (b) What do you understand by “sports for disables” ? What are the prosthetic devices used in sports for disables.  $(2 + 3) + (2 + 3)$

3. (a) How blood doping technique enhance endurance activity in athletes ?
- (b) Discuss the method and side effects of blood doping ? 4 + (3 + 3)
4. (a) What cautions should be undertaken for practicing yoga in childhood ?
- (b) What do you understand by AMI ?
- (c) How does caffeine mobilize free fatty acid in endurance athletes ?
- (d) What is RICE ?  $2\frac{1}{2} + 2\frac{1}{2} + 2\frac{1}{2} + 2\frac{1}{2}$

Special Paper : ( *Endocrinology, Reproductive Physiology and Family Welfare* )

Unit – 31

Answer any *two* of the following :

1. (a) With proper diagram elaborate the different types of chemical signaling in endocrine system.
- (b) State the importance of binding proteins for their endocrine ligands. 5 + 5

2. (a) State the principle of ELISA. How does noncompetitive binding ELISA assays differ from competitive binding assay ?
- (b) Mention the applications of ELISA.  $2 + 6 + 2$
3. (a) What are the hormones secreted from thymus gland ? Describe with diagram the major interactions between the central nervous system and the neuroendocrine thymus.
- (b) Describe the biological and molecular actions of these secretions.  $(2 + 4) + 4$
4. (a) Describe the mitochondrial pathways of apoptosis. How its signaling is controlled ?
- (b) State the significance of germ cell apoptosis during spermatogenesis.  $(3 + 4) + 3$

### Unit – 32

Answer any *two* questions

1. (a) Describe diagrammatically the conversion steps from spermatogonia to spermatids.

- (b) What is spermiogenesis ? State the different phases of sperm maturation with proper diagram. 4 + (2 + 4)
2. (a) Describe briefly the role of increased secretion of prolactin which occurs in response to stress.
- (b) 'Nutritional stress blocks the ability of GH to stimulate IGF-1 secretion by the liver.' – Justify the statement. 5 + 5
3. (a) State the role of estrogen on immune response.
- (b) "The genomic action of estrogen is mediated by estrogen receptor." – Explain it. 5 + 5
4. (a) Describe briefly the methods used in *in vitro* fertilization (IVF).
- (b) What are the complications in the IVF procedure ? 7 + 3
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