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**PG/III/ H.PHY-303/15**

**M.Sc. 3rd Semester Examination, 2015**

**HUMAN PHYSIOLOGY**

**PAPER – H.PHY-303(Unit-29 & 30)**

*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 – 29**

1. What do you know about 'Mathematical modelling of metabolism' in system biology? How 'Metabolic networks analysis' can accomplished? 2 + 3

*( Turn Over )*

( 2 )

*Or*

Write a note on 'Cell Signalling Pathways Models'. State the 'Functional Modules in Signalling Pathways'. 3 + 2

2. What is intrinsic heart rate? Describe the effects of four equal doses of atropine and propranolol on the heart rate with a suitable diagram. 2 + 3

*Or*

What is respiratory sinus arrhythmia? Describe its generation with proper diagram. 2 + 3

3. State the vasoactive roles of prostaglandins and thromboxanes, nitric oxide and endothelins. 5

*Or*

Describe flow and diffusion-limited transport from capillaries to tissue.  $2\frac{1}{2} + 2\frac{1}{2}$

4. Discuss the role of lungs as a lymphoid tissue. 5

( 3 )

*Or*

**Describe the role of lungs in muco-ciliary clearance. What is pneumoconiosis ?** 3 + 2

**UNIT – 30**

1. (a) What is aversion learning ? Why it is called one-trial learning ?
- (b) Discuss the molecular basis of habituation in *Aplysia* ? 1 + 1 + 3

*Or*

- (a) Discuss the molecular and cellular basis of memory formation in the hippocampus.
  - (b) How does the NMDA-receptor act as a coincidence-detector during long-term potentiation (LTP) ? 3 + 2
2. (a) What are REM-ON and REM-OFF cells ?
  - (b) What are PGO waves ? What is its physiological significance ?

( 4 )

(c) What is narcolepsy? 2 + 2 + 1

*Or*

(a) Discuss in brief the molecular mechanisms governing circadian clocks in mammals.

(b) What are Zeitgebers? 3 + 2

3. (a) What are "Pleasure Centres" and "Punishing Centres" ?

(b) State Kluver-Bucy syndrome ?

(c) What is septum pellucidum ? 2 + 2 + 1

*Or*

(a) Describe the role of tight junction proteins at the blood-brain barrier.

(b) Discuss the different types of transport mechanisms at the blood-brain barrier. 2 + 3

4. (a) Discuss how cerebellum is involved in motor learning.

( 5 )

(b) Discuss the role of cerebellum in adaptability of vestibulo-ocular reflex. 3 + 2

Or

Discuss briefly the anatomical organization and functions of medial column of reticular nuclei. What is raphe nuclei? (2 + 2) + 1

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