PG/IIIS/H.PHY-301/13

M. Sc. 3rd Semester Examination, 2013

HUMAN PHYSIOLOGY

PAPER—PHY-301

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

UNIT – 25

Answer any **two** questions

1. (*a*) Discuss the ionic basis of genesis of pacemaker potential that trigger the next impulse to maintain the autorhythmicity of the heart.

(*b*) Discuss the lead configuration of standard bipolar and augmented unipolar limb leads for ECG recording. 5 + 5

2. (*a*) Describe the ultrastructure of an ion channel.

(*b*) Discuss briefly the gating kinetics of Na^+ channel.

(*c*) Discuss the action of different neurotoxins on Na^+ channel. 3 + 3 + 4

3. (*a*) State the general mechanism of transduction of a receptor.

(*b*) Explain how adaptation takes place in pacinian corpuscle. 6 + 4

4. Answer the following questions : $2\frac{1}{2} \times 4$

(*a*) State the characteristics of 'mu' rhythm of EEG.

(*b*) Why $Na^+ - K^+$ pump is called electrogenic pump ?

(*c*) What is somatosensory evoked potential ?

(*d*) Why compound action potential is multipeaked ?

UNIT – 26

Answer any **two** questions

1. (*a*) Give description of different types of ganglionic cells present in retinal neural circuitry along with their functions.

(*b*) Distinguish between importance of primary and secondary visual cortex with evidence.

(*c*) What do you understand by dorsal stream ?

4 + 4 + 2

2. (*a*) With specific diagram describe the histological structure of stria vascularise and spiral ligament on Cochlea K^+ circulation.

(*b*) Describe the role of Cochlea in frequency analysis on the basis of electrophysiological behaviour.

(*c*) Why Eustachian Tube is called – "the equalizer" ? 4 + 4 + 2

3. (*a*) Describe the chemical characteristic of Umami and sweet taste sensation.

(*b*) Explain the across-fibre pattern coding model of gustation.

(*c*) Discuss the Wilder-Penfield pattern of homunculus of cerebral cortex. $\left(1\frac{1}{2}+1\frac{1}{2}\right)+4+3$

4. (*a*) Describe the structure of olfactory receptor.

(*b*) Discuss the molecular mechanism of transduction at the olfactory receptor.

(*c*) "The duration of a sensation is determined in part by the adaptation rates of receptors." – explain it. 3 + 4 + 3