PG/IIIS/H.PHY-301/14

M.Sc. 3rd Semester Examination, 2014

HUMAN PHYSIOLOGY

PAPER – PHY-301

Full Marks : 40

Time : 2 hours

Answer **all** questions

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

1. Write the main steps for deducing 'Nernst equation'. 5

Or

How does active transport mechanism help to maintain resting membrane potential ? 5

2. Discuss briefly the principle of voltage-clamp experiment. 5

Or

What is Michaelis equation ? How Michaelis equation can be used to explain stimulus-receptor relationship ? 1 + 4

3. What do you mean by 'mean electrical axis of heart' ? State the method for determining it from the ECG records of bipolar leads. 1 + 4

Or

State the electrophysiological mechanism of ST segment deviation in myocardial infarction. 5

4. State, in brief, how rythmic EEG pattern is formed. 5

Or

State the characteristics of the following EEG waves, which are formed during sleep : (*a*) slow wave (*b*) sleep spindle (*c*) V-wave. 2 + 2 + 1

UNIT – 26

1. Describe the receptor mediated spinal pain transduction mechanism within the dorsal horn. What is silent nociceptors. 4 + 1

Or

Write the connections and functions of the anterior thalamic neuclei with suitable diagram. "Intensity of sensation is determined by the code of sensation." – Explain. $3\frac{1}{2}+1\frac{1}{2}$

2. According to Georg Von Bekesy, explain the travelling wave theory of hearing. Write the mechanical aspect of cochlea. 3 + 2

Or

What do you mean by perception of pitch ? Write the mechanism of sound amplification by outer hair cells. What is motor protein ? 1 + 3 + 1

3. "During olfaction primary olfactory cortex and limbic system become dependent on each other." How ? What is electro-olfactogram (EOG) ? 3 + 2

Or

Discuss the signal transduction mechanism of bitter sensation. What causes taste disorders ? 4 + 1

4. What are bipolar cells ? Discuss in brief the role played by bipolar cells in visual transmission. Write the mechanism of generation of hyper-polarisation in the visual receptor cells. $1+1\frac{1}{2}+2\frac{1}{2}$

Or

Mention the localization of primary visual cortex. Why it is called striate cortex ? How individual retinal representation is maintained in lateral geniculate nucleus ? What is geniculo calcarine radiation ? (1 + 1) + 2 + 1