Printed Pages : 3

EBM601

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 101606

Roll No.

B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15

PHYSIOLOGICAL CONTROL SYSTEM & SIMULATION MODELING

Time : **3** Hours] [Total Marks : **100**

Note : Answer all five questions.

1 Answer any four parts of the following : **4×5=20**

(a) Define open loop and close loop control systems with suitable examples.

(b) What are the advantages of state space techniques.

(c) Define Eigen values and Eigen vectors.

(d) Define controllability and observability.

(e) What is state transition matrix ?

(f) Define biophysical tools for calculating transmembrane potential.

2 Answer any four parts of the following : **4×5=20**

(a) Give limitations of compartmental modeling.

(b) Briefly explain about Fick's Law of diffusion.

(c) Compute e^{At} when

$$A = \begin{bmatrix} 0 & 1 \\ -3 & -4 \end{bmatrix}$$

(d) Define Homeostasis with examples.

(e) Give a brief account on different types of eye movements.

(f) Give examples of positive and negative feedback physiological control system.

3 Answer any four parts of the following : **4×5=20**

(a) What is respiratory control system ?

(b) Derive the resultant equation of palse input model.

(c) Give details about applications of pharmakokinetics.

(d) Define biological receptors and their characteristics.

(e) Define thermoregulation and its process.

(f) Differentiate between cold bloodeness and warm bloodeness.

4 Answer any two parts of the following : **10×2=20**

(a) What is compartmental modelling ? Differentiate between single and multiple compartment models with help of transfer equations.

(b) What is iron wire model ? Explain its similarities with nerve impulse propagation and conduction system.

(c) Explain the thermoregulation control model of human system. How model validation is done ? What are its industrial applications ?

5 Answer any two parts of the following : **10×2=20**

(a) Explain the role of inter neurons and gama fibres in Human Neuro muscular control.

(b) Write short notes on :

(i) Cardio vascular control

(ii) Zero order chemical kinetic behaviour in the biological system.

(c) What is stretch reflex ? Explain with help of diagram.