

(Time: 3 Hours)

Total Marks: 80

Instructions :

1. Q. No. 1 is compulsory.
2. Attempt any three from Q. No. 2 to Q. No. 6
3. Draw Neat Figures wherever necessary
4. Use legible handwriting



- Q. 1. A) Explain all four basic biophysics tools. (05)  
 B) How is thermogenesis different from thermolysis? (05)  
 C) Difference between Compartmental and Non-Compartmental model. (05)  
 D) Explain the types of Eye Movements. (05)

Q. 2. A) Derive Nernst equation for a bivalent ion. (06)

B)

Ion	ICF	ECF
K <sup>+</sup>	397	20
Na <sup>+</sup>	50	437
Cl <sup>-</sup>	40	556

For the given table obtain the transmembrane potential of ions. Assume  $\frac{RT}{F} = 26mV$ .  
 The resting value of conductances are  $g_K = 0.415ms/cm^2$ ,  $g_{Na} = 0.010ms/cm^2$  and  $g_{Cl} = 0.582ms/cm^2$ . Find the resting potential for given condition of cell. (06)

C) With the help of neat labelled diagram explain the Electrical model of a Cell Membrane. (08)

Q. 3. A) With the help of neat labeled diagram explain the Electrical model of thermoregulatory Plant. (12)  
 B) Explain the Controller Model in Thermoregulatory system. (08)

Q. 4. A) What is Stretch Reflex? Explain in detail. (10)  
 B) Explain the Open loop and Closed loop strategy in a neuromuscular control system with Anatomical connections and relevant block diagrams. (10)

Q. 5. A) Explain in detail the Immune System response model. (08)  
 B) Derive an expression for Peak time and Peak velocity of Weisthemer's eye model. (12)

Q. 6. Write short notes on (any four) : (20)  
 i) Glissades  
 ii) Rigor Mortis  
 iii) Parkinsons Syndrome  
 iv) Lumped and Distributed Parameter  
 v) Role of Protein and thyroxin in thermoregulatory system

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