Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH.(BME)/SEM-8/BME-803B/2012

2012

BIOLOGICAL CONTROL SYSTEM

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

(i) O_2 carrying capacity of Hb is reduced at pH of

a) 7·4 b) 7·2

c) 7·0 d) 7·8 .

(ii) Atrial natriuretic peptide helps in the correction of

a) Hypertension b) Hypotension

c) Hypovolemia d) Hypervolemia.

(iii) H_2CO_3 formation from H_2O and CO_2 is helped by

a) Carbonic anhydrase b) Isomerase

c) Phosphatase d) Lypase .

(iv) In hypothalamus shievering centre is

a) Posterior group of nuclei

b) Anterior group of nuclei

c) NTS

d) Vaso motor centre.

(v) Non hormonal anti-insulin is

a) Renin b) Angiotensin

c) Insulin antibody d) IgG.

(vi) Renal threshold value is

a) 120 mg/100 ml b) 175 g/100 ml

c) 180 mg/100 ml d) 145 g/100 ml.

(vii) Influence of O_2 in reducing CO_2 carrying capacity of blood is called

a) Kreb's effect b) Both effect

c) CDH effect d) Hamberger effect.

(viii) VMC regulates blood pressure as

a) Sympathetic centre

b) Parasympathetic centre

c) Both (a) and (b)

d) None of these.

(ix) Primary active transport is

a) Energy dependent phenomenon

b) Energy independent phenomenon

c) Both (a) and (b)

d) None of these.

(x) Short term control of blood pressure is achieved via

a) renin-angiotensin system

b) neural mechanism

c) the activity of ANP

d) all of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What is cardiac cycle ? Briefly explain the interrelation of the events in the cardiac cycle. 2 + 3

3. Define Metabolic acidosis, Renal acidosis and Respiratory acidosis. What is acidotic coma ? 3 + 2

4. Identify the organ system component, input-output and describe the operation of the biological control system consisting of a human being reaching for an object.

5. How does Donnan effect regulate ionic diffusion through semi permeable cell membrane ?

6. Calculate the overall gain (M) if G is the forward path gain and F is the feedback path gain. What will be the sensitivity of this system ? 2 + 3

7. How are hypervolemia and hypovolemia controlled to restore normal pressure ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. What is insulin ? What are the common causes of diabetes mellitus ? What do you mean by glucosuria ? Briefly discuss the role of endocrines in controlling blood sugar level.

3 + 3 + 2 + 7

9. How does sinu-aortic reflex control blood pressure ? Explain the regulatory function of hypothalamus, limbic system and cerebral cortex in blood pressure regulation. 9 + 6

10. How do RBC and pulmonary capillaries control O_2 uptake in blood and tissues ? 7 + 8

11. Describe the regulatory process of acid-base balance. Mention the role of buffer in this process. 9 + 6

12. Describe three stage CO_2 transport mechanism in an adult person.

13. Write the different properties of transfer function. What do you mean by 'Long Term' and 'short term' controls of blood pressure in human ? Explain. 3 + 12