(LD 122) **OCTOBER 2013** **Sub. Code: 2019**

M.D. DEGREE EXAMINATION
BRANCH V – PHYSIOLOGY
PAPER II – CIRCULATION, RESPIRATION, ENVIRONMENTAL PHYSIOLOGY, COMPARATIVE PHYSIOLOGY AND EXCRETION
Q.P. Code : 202019

Time: Three Hours **Maximum: 100 marks**

I. Essay: **(2X10=20)**

1. Define shock. What is the pathophysiology of the different types of shock? Describe the compensatory mechanisms involved in correction of hemorrhagic shock.
2. Describe the mechanisms which enable a mammal to excrete concentrated urine.

II. Short Questions: **(8X5=40)**

1. Describe the rhythm generating mechanisms in the mammalian heart that are responsible for the pace-maker action potential.
2. Describe the Windkessel effect of aorta. What happens to pulse pressure if this effect is diminished by disease processes?
3. What is the difference in arterial blood gas profile in type I versus type II respiratory failure? What are the pathophysiological phenomena leading to each of the two types of respiratory failure and why?
4. Describe the effects of carbon monoxide poisoning. Discuss real life situations in which CO poisoning can occur. How can it be treated?
5. What are chemoreceptors? Where are the ones that regulate respiration located? How do they bring about changes in respiration?
6. Describe the sodium transport processes in different segments of the nephron.
7. Describe the factors which regulate potassium excretion in the distal tubule.
8. List the differences that you know of, between the amphibian heart and the mammalian heart.

III. Reasoning Out: **(4X5=20)**

1. Rapid infusion of saline to an anesthetized dog resulted in tachycardia. Give reasons for the same.
2. Justify the following statement: ‘Surfactant keeps the lungs dry’.

(PTO)

3. The electrolyte and arterial blood gas profile in a patient is as follows: Sodium – 140 mmol/L, potassium – 4 mmol/L, Chloride 102 mmol/L, Bicarbonate – 35 mmol/L, pH – 7.47, PCO_2 – 50 mm Hg. Identify the abnormal values in this list and state what the condition is termed as clinically.
4. In an experimental animal, changes in mean arterial pressure in the range 80 mmHg to 110 mm Hg, does not alter glomerular filtration rate. Why? Explain the mechanisms involved.

IV. Very Short Answers: (10X2=20)

1. What are Ryanodine receptors?
2. Calculate the mean arterial pressure of a subject whose blood pressure record reads 130/70 mmHg.
3. Calculate cardiac output from the following data: Heart rate = 72 beats per minute; Echocardiogram data: End diastolic volume=120 ml; End-systolic volume=50 ml.
4. State Starling's law of the heart.
5. List two pulmonary function tests that can distinguish between obstructive versus restrictive lung diseases and state how.
6. List the normal partial pressures of oxygen in (a) atmosphere (b) alveolus (c) arteries (b) mixed venous blood at rest.
7. Two individuals A and B have hemoglobin concentrations as 15g/dL and 10 g/dL respectively. If they are similar in all other respects, compare arterial PO_2 in A and B and give reasons for your answer.
8. What is 'inulin clearance' indicative of and why?
9. What are the components of juxtaglomerular apparatus?
10. Which membrane transporters are targets of the following drugs: Frusemide; digoxin.

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