SEAT No._____ No. of Printed Pages: 3

[130/145] SARDAR PATEL UNIVERSITY

M.Sc (III Semester) Biochemistry/Zoology Examination (CBCS)

Friday, 1st January 2021, 2:00 pm to 4:00 pm

PS03CBIC21/PS03CZOO21 – Human Physiology

TOTAL MARKS: 70

Q.1 (A) Choose the most correct answer for the following and write in your answer sheet. **(08 Marks)**

1. Most of the body's compensatory homeostatic mechanisms function by
   (a) Positive feedback system
   (b) Sensory division of PNS
   (c) Negative feedback system
   (d) CNS
2. The liver is a unique organ as it receives a dual blood supply from
   (a) Hepatic artery and hepatic duct
   (b) Hepatic artery and hepatic portal vein
   (c) Hepatic portal triad
   (d) The liver does not receive dual blood supply
3. Which of the following valve prevents gastric juices from flowing back out of the stomach into the oesophagus
   (a) Cardiac sphincter
   (b) Pharyngeal valve
   (c) Pyloric sphincter
   (d) None of these
4. In which organ of the digestive system, food is thoroughly mixed with its own digestive juices by a vigorous, to-and-fro churning motions caused by contractions of strong muscle in its wall?
   (a) small intestine (b) large intestine (c) liver (d) stomach
5. Which of the following Ion Channel is opened by neurotransmitters in the membrane of a neuron cells?
   (a) K^+ Leakage channel
   (b) A ligand-gated channel
   (c) A mechanically gated channel
   (d) A voltage gated channel
6. In the resting state of the neural membrane, diffusion due to concentration gradient, if allowed would drive,
   (a) K+ into the cell (b) K+ and Na+ out of the cell (c) Na+ into the cell (d) None
7. Angiotensinogen is a protein produced and secreted by
   (a) Liver cells
   (b) Endothelial cells
   (c) Macula Dansa cells
   (d) JuxtaGlomerular cells
8. Which of the following increases GFR?
   (a) Atrial natriuretic peptide (ANP)
   (b) Constriction of the afferent arterioles
   (c) Increased sympathetic stimulation to the afferent arterioles
   (d) ADH

Q. 1 (B) **Fill in the blanks.** **(16 marks)**

1. _____ produced by parietal cells forms a complex with Vitamin B12, which is necessary for its absorption in ileum.
2. Under normal resting conditions, _____, _____, and _____ receive excess blood because of their importance in maintaining homeostasis.

3. The products of lipid digestion are coated with proteins and transported into lymphatic capillaries called _____.
4. Action potentials has two main phases, _____ and _____.
5. Each day within the mucosa of the gastric walls in the GI tract secrete a total of about _____ of digestive juice.
6. A period of time after an action potential begins during which an excitable cell can not generate another action potential in response to a normal threshold stimulus is called the _____.
7. As food reaches the pylorus, each mixing wave periodically forces about 3 ml of chyme into the duodenum, a phenomenon known as _____.
8. Gastric emptying is slowest after a _____ meal because it stimulates cholecystokinin, which slows stomach emptying.

Q. 1 (B) **Mark the following statements as TRUE of FALSE.**

1. With increase in age, the blood supply to the digestive tract decreases.
2. Unmyelinated axons exhibit continuous conduction; whereas myelinated axons exhibit saltatory conduction of nerve impulses.
3. The pressure generated by left ventricular contraction is the driving force for the flow of blood through the entire systemic as well as pulmonary circulation.
4. Renin is a proteolytic enzyme that converts an inactive angiotensinogen, into angiotensin I.
5. The length of the GI tract is about 5 -7 meters in a living person and 7-9 meters in cadavers.
6. The histamine receptors on the parietal cells are called H2 receptors, and are different from H1 receptors involved in allergic reactions.
7. Glomerular filtrate has the same ratio of water and solute particles as blood.
8. Under normal physiological conditions, hematocrit and blood viscosity do not vary considerably within an individual.

Q.2 (A) Answer **any SEVEN** of the following questions briefly: (14 marks)

1. Human body is constantly challenged with altering external environmental conditions, how the cells and tissues in the various systems maintain internal order to function efficiently?
2. Through which type of blood capillaries and how the exchange of blood constituents takes place between blood and interstitial fluid?
3. Name major secretary cells in the stomach along with their secretion.
4. What is the significance of high and low WBC counts? Do WBCs live longer in healthy individuals or infected individuals?
5. Which pathway of blood coagulation occurs faster?
6. Narrate the functions of liver.
7. Differentiate between phagocytosis by neutrophils and phagocytosis by macrophages.
8. What is the role of ADH in urine formation?
9. Which cells form myelin sheath on axons? How?

Q.3 Describe the functions, life cycle and regulation of formation red blood cells. (08)

OR

Q.3 What is mean arterial pressure (MAP)? Discuss how cardiac output and total peripheral resistance affect MAP. (08)

Q.4 Describe the mechanical and chemical digestion in the stomach. (08)

OR

Q.4 Describe the major hormones that regulate digestive activities. (08)

Q.5 What is countercurrent multiplication? How does a kidney produce concentrated urine in summer? (08)

OR

Q.5 Describe the routes and mechanisms of tubular reabsorption and secretion. Which substances are reabsorbed most and which substance is not reabsorbed at all? (08)

Q. 6 What are the roles of FSH, LH, oestrogen and progesteron in the female reproductive system? (08)

OR

Q.6 Explain the propagation of action potential (AP). (08)

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