

**First Professional MBBS Degree Supplementary (SAY) Examinations
October 2024
Physiology Paper I**

Time: 3 Hours

Total Marks: 100

- Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers
- Indicate the question number correctly for the answer in the margin space
- Answer all parts of a single question together • Leave sufficient space between answers
- Draw table/diagrams/flow charts wherever necessary

1. Multiple Choice Questions

(20x1=20)

The Answers to MCQ questions (Q.No. i to Q.No. xx) shall be written continuously on the first two writing sheets (ie Page No. 3 & 4) only

Question numbers i-v are case scenario-based questions:

A 53 year male executive having erratic working hours and food habits complains of epigastric pain, nausea and bloating frequently which is relieved by food. As suggested by gastro enterologist, the patient underwent endoscopy which showed inflammation of gastric mucosa.

Answer the following questions based on this scenario.

- The probable cause of acid peptic disease in this case would be
 - Stress induced excess acid production
 - Stress induced excess intrinsic factor production
 - Increased lipase secretion due to erratic food habits
 - Increased somatostatin secretion due to erratic working hours
- The gastric mucosal cell that secretes HCl.
 - Gastric cells
 - Peptic cells
 - Chief cells
 - Parietal cells
- The proton pump that plays a major role in acid secretion is
 - Na+K+ ATP ase
 - H+K+ ATPase
 - Na+H+ATPase
 - H+Ca+ATPase
- Peptic ulcer disease is strongly associated with infection of gut with the following bacterium
 - Helicobacter pylori.
 - Helicobacter. baculiformis
 - Helicobacter. Suis
 - Helicobacter. equorum
- The factor that inhibits HCl secretion in stomach
 - Vagal stimulation
 - Somatostatin
 - Gastrin
 - Histamine

For Questions vi-x there are two statements marked as - Assertion (A) and Reason (R). Mark your answer as per options provided

- (A): Mountain dwellers in high altitude have polycythemia as compensatory mechanism
(R): Low partial pressure of oxygen in high altitude (hypoxic hypoxia) promotes erythropoiesis
 - A is incorrect R is correct
 - Both A & R are correct but R is not reason for A
 - A is correct R is incorrect
 - Both A & R are correct and R is the reason for A
- (A): Achalasia cardia is a lower esophageal sphincter disorder which presents with dysphagia.
(R): The cause for it is excess secretion of neuro transmitters like VIP and Nitrous oxide
 - Both A & R are correct but R is not reason for A
 - Both A & R are correct and R is the reason for A
 - A is correct R is incorrect
 - A is incorrect R is correct
- (A): Auto regulation of GFR is maintained within systemic arterial blood pressure range of 80-160 mmHg
(R): Myogenic theory mechanism controls renal blood flow and GFR
 - Both A & R are correct and R is the reason for A
 - Both A & R are correct but R is not reason for A
 - A is correct R is incorrect
 - A is incorrect R is correct
- (A): During isovolumetric contraction phase, the ventricular pressure raises steeply
(R): At the end of isovolumetric contraction phase, semilunar valves open
 - Both A & R are correct and R is the reason for A
 - Both A & R are correct but R is not reason for A
 - A is correct R is incorrect
 - A is incorrect R is correct
- (A): Bronchial asthma is an obstructive lung disorder
(R): FEV1/ FVC ratio is increased in Bronchial Asthma
 - Both A & R are correct and R is the reason for A
 - Both A & R are correct but R is not reason for A
 - A is correct R is incorrect
 - A is incorrect R is correct

(PTO)

Question numbers xi-xv are multiple response type questions. Read the statements and mark the answers appropriately.

- xi. The following waves are seen in Jugular venous pressure tracing
 - 1) p 2) a 3) c 4) v
 - a) 1, 2 and 3 b) 1, 2 and 4 c) 1, 3 and 4 d) 2, 3 and 4
- xii. The protein splitting enzymes of pancreas are
 - 1) Carboxy peptidase 2) Elastase 3) Cholestrol esterase 4) Trypsin
 - a) 1, 2 and 4 b) 2, 3 and 4 c) 1, 3 and 4 d) 1, 2 and 3
- xiii. The following factors cause a shift of oxygen –Hemoglobin dissociation curve to the right
 - 1) Hypercapnia 2) Increased 2,3 DPG 3) Increased temperature 4) Increased pH
 - a) 1, 2 and 4 b) 2, 3 and 4 c) 1, 3 and 4 d) 1, 2 and 3
- xiv. Functions of eosinophil include
 - 1) Anti allergic 2) Clotting 3) Anti parasitic 4) Mild phagocytosis
 - a) 1, 2 and 3 b) 2, 3 and 4 c) 1, 3 and 4 d) 1, 2 and 4
- xv. Renal medullary hyperosmolarity is due to
 - 1) Increased Na⁺ 2) Increased urea 3) Increased K⁺ 4) Increased glucose
 - a) 1, 2 and 3 b) 2, 3 and 4 c) 1, 3 and 4 d) 1, 2 and 4

Question numbers xvi-xx are single response type questions

- xvi. The major regulator of immune system in humans
 - a) Natural killer cells b) Cytotoxic T cells c) Helper T cells d) Suppressor T cells
- xvii. Duration of A-V nodal delay, during conduction of impulse from atria to ventricle
 - a) 0.1 sec b) 0.5 sec c) 0.3 sec d) 0.4 sec
- xviii. Pernicious anemia is caused due to deficiency of
 - a) Vitamin B₆ b) Vitamin B₁₂ c) Vitamin B₂ d) Vitamin B₁
- xix. The force that oppose filtration in glomerulus is
 - a) Decreased hydrostatic pressure inside the Bowman's capsule
 - b) Decreased colloid pressure of glomerular capillaries
 - c) Increased filtration coefficient
 - d) Decreased hydrostatic pressure inside glomerular capillaries
- xx. The basic respiratory rhythm is generated in
 - a) Apneustic center b) Ventral medulla c) Pneumotaxic center d) Cerebrum

Long essays

(2x10=20)

2. A 7 year old boy was brought to emergency room by his mother with the complaints of profuse bleeding from mouth, right shoulder joint swelling and pain following a fall while playing. She gives past history of similar episodes of bleeding with trivial injuries and further added that his cousin brother also has similar problem. Blood investigations showed – platelet count – 3.5 lakhs, bleeding time - 3mins, clotting time 25 mins, Prothrombin time – 11 secs. Partial thromboplastin time - 42 secs
 - a) What is the most probable clinical condition & substantiate with finding of blood investigation
 - b) Discuss the pathophysiology of above condition
 - c) Describe the intrinsic pathway of blood coagulation
3. Define cardiac output. Give the formula for cardiac index & mention the normal value. Describe the various factors maintaining cardiac output.

Short Essays:

(6x6=36)

4. Describe the special features of coronary circulation
5. Describe the physiological basis of cystometrogram with a graph
6. Describe the pathophysiology of nitrogen narcosis. Add a note on its management
7. Classify hypoxia. Explain the causes of the different types of hypoxia.
8. Discuss the aspects of verbal and non- verbal communication during patient encounters
9. A 35 year old male met with a road traffic accident and lost substantial amount of blood which lead to signs of fall in blood pressure, tachycardia and rapid breathing. Name the probable type of shock in this patient and discuss the pathophysiology and management of the same.

Short Answers

(6x4=24)

10. Describe the role of hypothalamus in temperature regulation
11. Draw and label the ionic basis of the ventricular action potential. Describe the physiological basis of A-V- nodal delay
12. Pancreatic failure causes steatorrhea; describe the physiological basis
13. Draw and label the juxta-glomerular apparatus. Describe the physiological basis for renal splay
14. Describe the role of colonic bacteria.
15. Describe the factors regulating erythropoiesis
