SS/MBBS-I/PHY-I/01-22

**2022**

**(January)**

**First Professional MBBS Examination**

**PHYSIOLOGY**

**Paper-I**

**Full Marks: 100**

**Time: 3 hours**

**The figures in the margin indicate**

**full marks for the questions**

**Write the answers to the two Halves in separate books**

**Answer all questions**

**FIRST HALF**

1. Define immunity with its types. Describe the steps involved in development of acquired immune defense system. What are primary and secondary antibody responses? Write briefly about immunological surveillance.

[3 + 6 + 4 + 2 = 15]

2. Write short notes on the following : 5 × 4 = 20

(a) Regulation of secretion of pancreatic juice

(b) Fick's principle in measuring cardiac output

(c) Countercurrent multiplier system

(d) Obesity

3. Describe and discuss the commitment to lifelong learning as an important part of physician growth. 5

4. Choose the correct option from the following : 1 × 10 = 10

(i) Stimulation of sympathetic nerve to intestinal smooth muscle results in

(a) increase in muscle tension

(b) muscle relaxation

(c) increase in rhythmic muscle contraction

(d) increased secretions

(ii) Pre-load of the heart is determined by

(a) ejection systolic volume

(b) end systolic volume

(c) systolic vascular resistance

(d) end diastolic volume

(iii) Level of hypoxia is independent of

(a) hemoglobin

(b) arterial $pCO_2$

(c) toxic agents

(d) altitude



(iv) Main aim of various blood pressure regulatory mechanisms is to maintain the normal

(a) systolic blood pressure

(b) diastolic blood pressure

(c) mean blood pressure

(d) pulse pressure

(v) After excessive blood transfusion, electrolyte imbalance that can occur is

(a) hypokalemia

(b) hyperkalemia

(c) hypocalcemia

(d) hypernatremia

(vi) Hypoxia of kidney causes immediate release of

(a) renin

(b) renal erythropoietic factor

(c) erythropoietinogen

(d) erythropoietin

(vii) Morphological blood picture in acute blood loss anaemia is

(a) microcytic and hypochromic

(b) macrocytic and normochromic

(c) normocytic and normochromic

(d) microcytic and normochromic



(viii) Measurement of compliance of lungs assesses

(a) expansion of lungs alone

(b) expansion of lungs and chest wall

(c) expansion of chest wall alone

(d) restrictive lung disorders

(ix) Removal of the entire colon would be expected to cause

(a) death

(b) electrolyte imbalance

(c) megaloblastic anaemia

(d) severe malnutrition

(x) If efferent arteriolar constriction is more than afferent arteriolar constriction, GFR

(a) will be increased

(b) will be decreased

(c) tend to be maintained

(d) will be first increased and then decreased

**SECOND HALF**

5. Name the neural centres that control respiration. Describe in detail the chemical regulation of respiration. What is Cheyne-Stokes breathing?

[4 + 6 + 5 = 15]

6. Write short notes on the following : [5 × 3 = 15]

(a) Mechanism of HCl secretion

(b) Benefits of yoga and meditation

(c) Infant respiratory distress syndrome



7. Give the physiological basis of : [2 × 3 = 6]

(a) Rh negative blood is transfused during exchange transfusion to neonates

(b) Lung compliance increases in old age

(c) Capillaries are less prone to rupture

8. Compare and contrast the following : [2 × 2 = 4]

(a) Liver bile and gall bladder bile

(b) Obligatory and facultative reabsorption of water

9. A 60-year-old man has come to the emergency department with the complaints of severe retrosternal pain with radiation to the left arm and mild sweating for almost half an hour. He is taking medicine for high blood pressure but not regularly. He is also diabetic and admits to smoking occasionally. On physical examination, vital signs are pulse-110/min, BP-140/96 mm of Hg, respiratory rate -22/min and $SPO_2$-97% in room air. Laboratory investigation reveal CKMB is high, Troponin I is high and ECG showed ST elevation in leads $V_2$-$V_6$. Based on the above—

(a) what is your likely diagnosis?

(b) what is the pathophysiology behind this condition?

(c) describe the mechanism of action of aspirin in ischemic heart disease.

[2 + 5 + 3 = 10]

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