



All India Institute of Medical Sciences, Kalyani
First Professional MBBS Examination, October 2023

Time: 3 Hrs.

Physiology (Paper-II)

Marks: 100

INSTRUCTIONS:

- Answer all questions.
- Illustrate your answers with well labelled diagram wherever necessary.
- Answer each section in a separate answer book.

SECTION - A (50 MARKS)

1. A 50-year-old individual is admitted to the emergency room with a fractured tibia. The fracture occurred while this person was lifting light boxes. Bone scans of the spine and hip reveal low bone density. Laboratory tests show low plasma calcium, elevated PTH levels, and low vitamin D levels. The patient indicates that she is on a balanced diet with sufficient fruits and vegetables. However, the patient's plasma creatinine and blood urea nitrogen (BUN) levels are elevated markedly. Which of the following is the most likely reason for the hypocalcemia and reduced bone mass?

(1+2+2+5=10)

- a. Low dietary calcium
- b. Excessive urinary secretion of calcium
- c. Reduced renal activity of 1 α -hydroxylase activity (which converts the inactive form of vitamin D to the active form)
- d. A parathyroid gland tumor generating excessive amounts of PTH

Identify the right choice with explanation. Enumerate the important hormones which control calcium regulation. Describe the role of Vitamin D in regulation of calcium balance.

2. Briefly describe the oral glucose tolerance test. (5)
3. What is second messenger? Briefly describe the salient mechanism of action of G protein. (1+4)
4. Describe the counter current multiplier mechanism occurring in the kidneys. (5)
5. Describe the functions of placenta? Enumerate placental hormones with a brief description of one hormone (2+3)
6. With the help of a labelled diagram describe the nervous supply to a urinary bladder. Describe briefly the effects of deafferentation of the bladder (3+2)
7. With the help of a flowchart explain the Hormonal control of spermatogenesis. Describe the blood testes barrier and its functional significance (3+2)
8. Enlist the various methods of contraception. Add a note on physiological basis of hormonal contraceptives. (3+2)
9. Discuss briefly the various clinical tests for Ovulation. (5)

SECTION – B (50 MARKS)

1. A 53-year-old man is brought to the emergency department by ambulance because he is having difficulty speaking. The patient tried to explain to his wife that something was wrong, but he was unable to speak clearly. He is, however, able to communicate in writing. He has been on beta blockers to control hypertension and has type 2 diabetes, which is being managed with diet and exercise.

(1+4+5=10)

- Vitals: T 36.5°C, P 85/min, R 18/min, BP 134/88 mm Hg, BMI 34
- Physical Examination: The patient is anxious but able to respond to spoken commands. Reflexes are intact.
- CT: Occlusion in the left hemisphere of a branch of the anterior main division of the middle cerebral artery supplying the frontal cortex.

- a. What is the probable diagnosis?
- b. Write the difference between sensory aphasia and motor aphasia.
- c. Describe the origin, course, termination and functions of pyramidal tract with neat labelled diagram

2. Describe the various functions of the middle ear. (5)

3. Explain the mechanism of long term memory (5)

4. Give a description about the Synaptic mechanism of habituation and sensitization. (2.5+2.5)

5. Briefly explain the principle of the on-centre and off-centre responses of the ganglion cell in visual processing. (2.5+2.5)

6. What is the role of yoga in achieving a positive mental health status (5)

7. Draw a labelled diagram showing the stretch reflex. (5)

8. Elucidate the role of cerebellum in Comparator servo mechanism. (5)

9. What do you mean by Circadian Rhythm? Briefly elaborate with a suitable example. (2.5+2.5)
