

001/24

The West Bengal University of Health Sciences
MBBS 1st Professional Examination (New Regulation),
November - December 2024

Subject: Physiology
Paper: II

Full Marks: 100
Time: 3 hours

Attempt all questions. The figures in the margin indicate full marks.

1. a) A 8 year old boy complains of weakness and repeated episodes of chest infections. He also has polyuria, polydipsia and polyphagia. Urine dipstick test shows glycosuria. Blood tests reveal hyperglycemia and hypertriglyceridemia. The child is suffering from juvenile diabetes mellitus. 4+2+6+3
 - i. Name the 4 types of cells of endocrine pancreas and what are their functions?
 - ii. What are the types of diabetes mellitus?
 - iii. What are the metabolic functions of insulin?
 - iv. How would you treat a patient of juvenile diabetes mellitus?

b) A 36 years old woman presents to her gynecologist with complaints of amenorrhea and hirsutism. She has also noticed an increase in her weight (especially in the trunk region) and easy fatigability. She denies any medical problems. Her periods were always normal until 6 months ago and her hirsutism has been gradual in onset. On examination, she has a round hirsute face with central obesity. Her blood pressure is elevated as is her weight compared with previous visits. On abdominal examination, she is noted to have striae.

 - i) What is the most likely diagnosis?
 - ii) What will be the biochemical picture to confirm the diagnosis?
 - iii) Briefly explain the physiological basis of the symptoms mentioned above.
 - iv) What is the permissive action of this hormone?
 - v) Enumerate the features of Addison's disease. 1+2+7+2+3
2. a) What is GFR? How is GFR measured? Describe the mechanism of auto regulation of GFR. 2+3+5

b) Define phototransduction. What do you mean by 'dark current'? Explain in details the mechanism of phototransduction with a suitable diagram. 1+3+6

c) Define puberty. What is precocious puberty? What are the hormonal changes occurring in puberty? What are the theories regarding the onset of puberty? 1+2+4+3
3. Write short notes on the following: 2x5
 - a) Endocochlear potential.
 - b) Sertoli cell.
4. Explain the following statements: 5x4
 - a) People with severe conductive deafness can follow very loud conversations.
 - b) Cryptorchidism may lead to infertility.
 - c) Kidney can be considered as an endocrine organ.
 - d) Stretch reflex maintains resting muscle strength.
 - e) Myelinated nerve has high conduction velocity.

5. Choose the correct option for each of the following:

10x1

i) All of the following are true for ADH, except:

- a) Increase in secretion occurs post operatively.
- b) A high protein diet increase the ability of the kidneys to concentrate the urine.
- c) Secretion increased when plasma osmolality is low.
- d) It acts on collecting duct.

ii) Which of the following EEG waves is found during REM sleep:

- a) Delta waves.
- b) Alpha waves.
- c) Beta waves.
- d) Sleep spindles.

iii) 'Iodide trapping mechanism' in thyroid involves:

- a) Active transport.
- b) Secondary active transport.
- c) Facilitated diffusion.
- d) Simple diffusion.

iv) Which of the following synaptic transmitters is not a peptide polypeptide or protein?

- a) Substance P.
- b) Metencephalin.
- c) Serotonin.
- d) Dynorphin.

v) Hypocalcaemia does not produce:

- a) Spasm of skeletal muscle.
- b) Laryngospasm.
- c) Increase in phosphate excretion in urine.
- d) Defective clotting.

vi) Nightmares are found in:

- a) REM sleep.
- b) NREM stage 1.
- c) NREM stage 2.
- d) NREM stage 3.

vii) Sperms become motile in:

- a) Prostate.
- b) Seminal Vesicle.
- c) Epididymis.
- d) Vas deferens.

viii) Before the onset of puberty the GnRH are under the inhibitory control of:

- a) Glycine.
- b) Glutamate.
- c) GABA.
- d) Beta-endorphin

ix) Which of the following is main center of motivation?

- a) Nucleus accumbens.
- b) Amygdala.
- c) Hippocampus.
- d) Septum.

x) In UMN type of seventh nerve palsy in the side of hemiplegia the lesion is at:

- a) Mid Pons.
- b) Above pons.
- c) Below pons.
- d) Midbrain.