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The West Bengal University of Health Sciences
MBBS 1st Professional Examination (New Regulations),
August 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 60 year old hypertensive male has presented with weakness and inability to move his right upper and lower extremities since last 2 hours. After admission in nearby hospital, clinical examination revealed increased muscle tone, exaggerated tendon jerks and extensor plantar response on his right side.
 - i) What can be the probable diagnosis?
 - ii) Explain the reason behind the increased muscle tone and exaggerated tendon jerks in this patient.
 - iii) Why the planter response is altered here?
 - iv) Describe the corticospinal tract with a suitable diagram. 1+4+3+5+2
- b) A middle aged woman complains of gradual weight loss, fatigue and frequent micturition since last six months. Her fasting and post-prandial blood glucose levels were 180mg/dl and 300mg/dl respectively.
 - i) What is the probable diagnosis?
 - ii) Explain the symptoms of this patient.
 - iii) Justify the beneficial role of regular exercise in this patient.
 - iv) Enumerate the hormones synthesized from the endocrine pancreas. 1+7+4+3
2. a) Define menstrual cycle. Describe ovarian cycle with the help of diagram. Discuss about indicators of ovulation. Explain the basis of pregnancy test. 2+4+2+2
- b) What are the advantages of acidic urine? Explain the role of kidney in maintaining the acid-base balance in the body? Write down the differences between cortical and juxta-medullary nephron. 2+5+3
- c) Describe the travelling wave concept for frequency discrimination. Enumerate the functions of middle ear. 5+5
3. Write short notes on the following: 2x5
 - a) Dark adaptation.
 - b) Explain the mechanism of regulating body temperature by hypothalamus.
4. Explain the following statements: 5x4
 - a) Parturition is achieved by a positive cycle.
 - b) Dissociated anaesthesia occurs in syringomyelia.
 - c) Pain can be inhibited by shaking of the joints.
 - d) A high protein diet increases the ability of the kidneys to concentrate the urine.
 - e) People with severe conductive deafness can follow very loud conversations.

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5. Choose the correct option for each of the following: 10x1
- i) Male Pseudohermaphroditism is caused by all except:
- 5 α -reductase deficiency.
 - Cholesterol desmolase deficiency.
 - 17 α Hydroxylase deficiency.
 - 21 β Hydroxylase deficiency.
- ii) Cerebellar connection to other parts of the brain is projected through which cell?
- Golgi.
 - Basket.
 - Purkinje.
 - Stellate.
- iii) All are true regarding visual receptors except:
- Cones are meant for acuity of vision.
 - Rods are meant for dim light vision.
 - Rods are more sensitive than cones.
 - Action potentials are generated in them.
- iv) Which of the following statements is correct?
- The motor protein for inner hair cell is prestin.
 - The loudness of a sound is directly correlated with the amplitude of a sound wave and pitch is inversely related to the frequency of sound wave.
 - Conduction of sound wave through the fluid of the inner ear is called bone conduction.
 - High-pitched sounds generate waves that reach maximum height near the base of the cochlea.
- v) In girls sequence of events during adolescence is:
- Menarche, Adrenarche, Puberche, Thelarche.
 - Thelarche, Menarche, Puberche, Adrenarche.
 - Adrenarche, Puberche, Menarche, Thelarche.
 - Thelarche, Puberche, Adrenarche, Menarche.
- vi) Pure word deafness is likely due to bilateral defect in:
- Angular gyrus.
 - Frontal cortex.
 - Superior frontal gyrus.
 - Visual cortex.
- vii) About paradoxical sleep, which of the following statement is true?
- Prominent beta waves.
 - Prominent alpha waves.
 - Also known as NREM sleep.
 - Low amplitude and mixed frequency waves.
- viii) A 10 year old boy cuts his finger with a pocketknife and immediately applies pressure to the damaged area with his other hand to partially alleviate the pain. Inhibition of pain signals by tactile stimulation of the skin is mediated by which type of afferent neurons from mechanoreceptors?
- α -type A.
 - β -type A.
 - δ -type A.
 - Type C.
- ix) What will be the renal clearance of such a substance which is freely filtered at the glomerulus and fully reabsorbed by the tubules?
- Zero
 - Equal to GFR
 - Less than GFR
 - Greater than GFR
- x) Exercise is also prescribed as an adjuvant treatment of depression, most probably it acts by:
- Increasing pulse pressure.
 - Improving hemodynamics.
 - Raising endorphins levels.
 - Inducing good sleep.