

M.B.B.S. 1st Prof.

(New Scheme w.e.f. 2019 admission onwards)

BF/2022/06

Physiology – A

M.M. : 100

Time : 3 Hours(First30 Min. for MCQs)

- Note: 1. **Use OMR Sheet to answer Multiple Choice Questions(MCQs).**
2. Attempt all questions. Illustrate your answers with suitable diagrams
3. **NO SUPPLEMENTARY SHEET SHALL BE ALLOWED/PROVIDED**
4. **The student must write Q.P. Code in the space provided on OMR Sheet and the Title page of the Answer Book.**

Q.1 MCQs (Attempt on OMR sheet) [1x20]

- In a young lady with normal menstrual cycle, the estradiol levels in blood increases for 6–8 days after menstruation. What is the source of the estradiol?
 - Corpus luteum
 - Endometrium
 - Developing follicles
 - Ovarian stromal cells
- A 25-year-old woman presents to the physician with weight loss, nervousness, sweating, and hyperphagia. On examination her pulse rate is 110 per minute, high pulse pressure, tremor, a mass in neck which moves on swallowing and mild exophthalmia. On thyroid function tests it is observed that Serum TSH low, and a high Total thyroxine (TT4) level. Which of the following diseases best fits this patient's clinical presentation?
 - Conn's disease
 - Cushing's disease
 - Graves' disease
 - Hashimoto's disease
- A 42-year-old man working for last 15 years in a thermal plant presents to his doctor saying that he is having difficulty in hearing for quite some time. He informs that he is working in an area where he is exposed to loud noise for long hours and that he avoids using ear protection. Which of the following terms best characterizes his noise-induced hearing loss?
 - Conductive hearing loss
 - Sensorineural hearing loss
 - Mixed hearing loss
 - Presbycusis
- While working out with a trainer, an 18-year old girl performs biceps curls with progressively heavier weights. When she reaches 25 kg, she begins to lift the weight then suddenly drops it. Activation of which of the following is most directly responsible for the sudden muscle relaxation that caused her to drop the weight?
 - α -adrenergic receptor
 - β -adrenergic receptor
 - Golgi tendon organ
 - Muscle spindle
- A 12-year school child complains that he cannot see what is written on the blackboard though he is able to read the books. His optometrist checks his vision. What is the probable refractive error, and the corrective measure prescribed for the child
 - Myopia- biconcave lens
 - Hyperopia – convex lens
 - Astigmatism- cylindrical lens
 - Myopia- convex lens
- A patient has a generalised brain destruction. What type of Aphasia would the patient present with
 - Fluent Aphasia
 - Non-fluent Aphasia
 - Global Aphasia
 - Anomic Aphasia
- A 15-year boy falls during a horse-riding event in school sustaining head injuries. After his recovery it is seen that he has some memory deficits. Which of the following brain area is correctly paired with the type of memory.
 - Hippocampus and implicit memory
 - Neocortex and associative learning
 - Angular gyrus and procedural memory
 - Hippocampus and declarative memory

8. An Electroencephalogram (EEG) recorded in an adult man awake at rest with eyes closed and mind wandering would show the following rhythm when electrodes are placed on occipital lobe
- Alpha (8-13 Hz)
 - Beta (18-30 Hz)
 - Theta (4-7 Hz)
 - Delta (0.5-4 Hz)
9. A patient diagnosed to be suffering from Parkinsonism, He asks his neurologist what the disease is about. The doctor tells him about the signs and symptoms and also explains the about neurotransmitters in the Basal Ganglia. Match the neurotransmitters to the nuclei of the basal ganglia

Basal Nuclei	Neurotransmitter
1.Globus pallidus	a.Dopamine
2.Substantia nigra- pars compacta	b.Glutamate
3.Striatum	c.GABA
4.Subthalamic nucleus	d.Acetylcholine

- 1-c,2-a,3-d,4-b
 - 1-c,2-d,3-a,4-b
 - 1-a,2-b,3-c,4-d
 - 1-b,2-a,3-c,4-d
10. A middle-aged labourer presents to a clinic , on examination it is seen there is flaccid paralysis, muscular atrophy, fasciculations, hypotonia, and hyporeflexia. He could be suffering from a lesion of :
- Upper motor neuron
 - Lower motor neuron
 - Basal ganglia
 - Cerebellum
11. A 3 year old child was suffering from diarrhea for the last 2 days. On examination signs of dehydration i.e. sunken eyes, dry mouth and drowsiness were present. Which of the following is the reason for rapid and more severe development of dehydration in children as compared to adults:
- ECFV/ICFV ratio is smaller
 - ECFV/ICFV ratio is larger
 - Total body water is larger
 - Total ECFV is smaller
12. A 40-year-old lady undergoes thyroidectomy and inadvertently her parathyroid gland is damaged. subsequently she develops parathyroid deficiency and would have
- Low plasma phosphate and Ca²⁺ levels and tetany.
 - Low plasma phosphate and Ca²⁺ levels and tetanus.
 - A low plasma Ca²⁺ level, increased muscular excitability, and spasm of the muscles of the upper extremity
 - High plasma phosphate and Ca²⁺ levels and bone demineralization.
13. A newly married woman consults her gynaecologist for contraception. She is prescribed an only estrogen pill. This pill would prevent pregnancy by
- Increasing uterine contractility
 - Preventing Implantation
 - Reducing sperm motility
 - Inhibiting ovulation
14. A patient present with Symptoms of fatigue, dehydration, hyponatremia, and hypotension and melanin pigmentation of the mucous membranes and skin. He is most probably suffering from
- Primary Adrenal Insufficiency
 - Secondary Adrenal Insufficiency
 - Hyperaldosteronism
 - Cushing's Syndrome
15. A scientist is studying the Nerve conduction. Four neurons have axons of the same length, but different states of myelination and axon diameter. What combination of axon myelination and nerve fiber diameter would produce the fastest nerve conduction speed

	Axon myelination	Axon diameter (um)
Nerve 1	Myelinated	15
Nerve2	Myelinated	10
Nerve 3	Un Myelinated	15
Nerve 4	Unmyelinated	10

- Nerve 1
- Nerve 2
- Nerve 3
- Nerve 4

16. A teenager does a strenuous exercise for about 10 minutes. After the exercise, he continues to breathe hard and to consume large amounts of oxygen for minutes. The additional oxygen is used for the following EXCEPT
- Reconvert the lactic acid that has accumulated during exercise back into glucose.
 - Replenish the ATP and phosphoryl creatine stores.
 - Recovery from exhaustive muscle glycogen depletion
 - Re-establish the normal concentrations of oxygen bound with myoglobin
17. A research scholar joins a neurophysiology lab to study the excitability of neurons. The experimental model is the spinal motor neuron. He stimulates the neuron at four different sites and monitors the production of action potentials at the axon. At which of the following regions does he need the lowest strength of stimulus to induce an action potential?
- Cell body
 - Myelin sheath
 - Initial segment
 - Axon terminal
18. A child born with male internal genitalia including testes but have female external genitalia, at puberty, develop male body contours and male libido. His parents then changes his gender identity to a 'boy'. This is caused due to congenital deficiency of :
- 5 α -Reductase
 - Testosterone
 - Leutinizing hormone
 - 21 hydroxylase
19. A fertility clinic is running a project on sperm capacitation. Where does the capacitation take place?
- Epididymis
 - Ovaries
 - Seminal vesicles
 - Uterus
20. A patient presents with features of Diabetes Mellitus. The doctor asks for a lipid profile in addition to other tests. The principal abnormalities of fat metabolism in Diabetes are associated with all EXCEPT:
- Accelerated lipid catabolism
 - Increased formation of Ketone bodies
 - Decreased synthesis of fatty acids
 - Increased synthesis of Triglycerides
- Q.2. Name the pyramidal tract. Write their functions and effect of lesions on sensory and motor function. [4+4+4]
- Q.3. **Write short notes on:-** [5x4]
- Write about calorogenic action of thyroid hormone
 - Importance of pitch and loudness of sound heard
 - Write about functions of glucagon
 - Write about the factors affecting diffusion across a cell membrane
- Q.4. **Explain why:-** [3x5]
- On giving a threshold stimulus a small response is observed
 - It is difficult to measure intra cellular fluid volume
 - Osteoporosis can occur post menopause
 - High doses of sedatives are harmful
 - Vitamin A deficiency can influence vision
- Q.5. **Short notes on(applied aspect):-** [6x3]
- Enumerate and discuss about functions of hypothalamus
 - Write about pacemaker potential of smooth muscle and its importance
 - Describe the functions of placenta
- Q.6. **Short notes:-** [5x3]
- Write about the function of melatonin in health and disease
 - Write about the physiological changes occurring at puberty
 - Role of physician towards society and community