

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, APRIL/MAY-2021**PHYSIOLOGY****PAPER - FIRST****[Time allotted: Three hours]****SET - A****[Max Marks: 100]****Q. 1. Multiple choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet) (1 x 20 = 20)**

1. Clathrin is used in:
 - a. Receptor-mediated endocytosis
 - b. Exocytosis
 - c. Cell to cell adhesion
 - d. Facilitated diffusion
2. Auerbach's plexus in intestine lies
 - a. Beneath the mucosa
 - b. Within submucosa
 - c. Between longitudinal and circular muscles
 - d. Beneath the serosal coat
3. Increase in gamma-globulin fraction of plasma proteins is seen in which of the following?
 - a. Infections
 - b. Severe malnutrition
 - c. Fasting
 - d. Malabsorption
4. In a cystometrogram, the intravesical rises steeply at what intravesical volume:
 - a. 100 ml
 - b. 400 ml
 - c. 250 ml
 - d. 600 ml
5. Rejection of tissue transplant is mainly attributed to which component of our immunity?
 - a. Humoral immunity
 - b. Cellular immunity
 - c. Complement system
 - d. Natural Killer cells
6. Which of the immunoglobulins can cross the placenta?
 - a. Ig A
 - b. Ig G
 - c. Ig M
 - d. Ig D
7. End-diastolic volume increases when:
 - a. Intra-pericardial pressure rises
 - b. Ventricular distensibility reduces
 - c. Blood volume decreases
 - d. Intrathoracic pressure becomes more negative
8. Which of the following reflexes on activation produce tachycardia?
 - a. Baroreceptor reflex
 - b. Bainbridge reflex
 - c. Bezold-Jarisch reflex
 - d. Cushing's reflex
9. Which organ has the highest blood flow expressed per unit gram of tissue/ minute?
 - a. Heart
 - b. Kidney
 - c. Carotid body
 - d. Brain
10. Cardiac muscle remains absolutely refractory for:
 - a. Latent phase
 - b. Contraction phase
 - c. Relaxation phase
 - d. None of the above
11. Sympathetic stimulation causes all except:
 - a. Tachycardia
 - b. Increased Stroke volume
 - c. Increased Blood pressure
 - d. Increased venous capacitance
12. Which of the following correctly describes restrictive lung disease?
 - a. Increased FRC and increased compliance
 - b. Increased FEV1 / FVC ratio and reduced compliance
 - c. Decreased FEV1 / FVC ratio and reduced compliance
 - d. Increased Total Lung Capacity and reduced Residual Volume
13. Reabsorption of glucose occurs from which part of the tubule?
 - a. Proximal tubule
 - b. Distal tubule
 - c. Loop of Henle
 - d. Collecting duct
14. The partial pressure of oxygen in venous blood is:
 - a. 46 mm Hg
 - b. 40 mm Hg
 - c. 32 mm Hg
 - d. 95 mm Hg
15. Parasympathetic stimulation of the salivary glands causes:
 - a. Viscid secretion
 - b. Decreased secretion
 - c. Increased secretion rich in enzymes and mucin
 - d. Secretion is unaffected
16. T_H-Helper cells induce:
 - a. Cellular immunity
 - b. Allergic reactions
 - c. Humoral immunity
 - d. Plasma cells
17. The enzyme salivary amylase is inactivated by:
 - a. Enteropeptidase
 - b. Low pH of the stomach
 - c. High pH of the intestine
 - d. Intestinal mucus
18. Ejection fraction is defined as:
 - a. Stroke volume / End-diastolic volume
 - b. End-diastolic volume / Stroke volume
 - c. Stroke volume / End-systolic volume
 - d. End-systolic volume / End-diastolic volume
19. All are true about MMC except:
 - a. Occurs every 90 minutes
 - b. Starts in stomach and ends in terminal part of ileum
 - c. They are strong propulsive movements
 - d. Facilitates migration of colonic bacteria into ileum
20. Turbulent flow of blood occurs in one of the following situations?
 - a. Reynold's number more than 3000
 - b. Dilatation of an artery
 - c. Polycythemia
 - d. Velocities below the critical velocity

PHYSIOLOGY
PAPER- FIRST

Note: Attempt all questions.
Draw suitable diagrams (wherever necessary)

Q. 2. Give reasons:

(2 x 5 = 10)

- a. Anemia is seen in patients of Chronic Kidney Disease.
- b. Patients with liver disease tend to have deranged blood clotting.
- c. Stool becomes clay-coloured and urine deep yellow in obstructive jaundice.
- d. Proton-pump inhibitors like Omeprazole are given in treatment of peptic ulcer.
- e. Total Lung Capacity cannot be measured by spirometry.

Q. 3. Problem based question:

(2+2+4+2 = 10)

A 28 years old patient sustains severe blood loss following a road traffic accident. He is immediately rushed to the nearest hospital. The doctor examining the patient records a heart rate of 128 bpm, BP of 80/56 mm Hg, pallor, cold skin and altered sensorium.

- a. What is your provisional diagnosis and why?
- b. Enumerate the rapid compensatory mechanisms of the body in such a case.
- c. Draw a labelled diagram of the neural circuit of baroreceptor reflex.
- d. Enumerate the mechanisms involved in regulation of blood pressure?

Q. 4. Write briefly on:

(6 x 4 = 24)

- a. Cardiac output.
- b. Enumerate the various phases of a typical neuronal action potential and show the ionic movements or fluxes during them with the help of a suitable diagram
- c. Digestion and absorption of fats.
- d. The COVID-19 pandemic has underlined the role of the medical fraternity in the society. Taking this as an example, briefly describe the various roles and responsibilities of a doctor.

Q. 5. Structured questions:

(i) Enumerate the different mechanisms of respiratory control of the body. Enlist the different centres involved in neural regulation of respiration along with their locations. Discuss the scheme of neural regulation of respiration with a suitable diagram/ flowchart. (2+3+5 = 10)

(ii) Describe the process of urinary concentration by counter-current mechanism with a suitable diagram. Why does high protein diet make the urine concentrated? Add a note on aquaporins. (6+2+2= 10)

Q. 6. Answer as indicated:

(4 x 4 = 16)

- a. Draw a schematic diagram of a normal ECG depicting the various normal waves, segments and intervals and also write the physiological activity which they represent.
- b. Write a short note on Fibrinolytic system
- c. Functions of liver
- d. Resistance vessels

PHYSIOLOGY
PAPER - SECOND

[Time allotted: Three hours]

SET - A

[Max Marks: 100]

Q. 1. Multiple choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet) (1 x 20 = 20)

1. The receptors for thyroid hormone are present mainly on:
 - a. Cell membrane
 - b. Cytoplasm
 - c. Mitochondria
 - d. Nucleus
2. Which of the following is an example of adrenergic neuron?
 - a. Postganglionic parasympathetic endings
 - b. Postganglionic sympathetic endings
 - c. Preganglionic parasympathetic endings
 - d. Preganglionic sympathetic ending
3. The normal duration of light adaptation in a healthy person is about _____ minutes.
 - a. 0.5
 - b. 5
 - c. 20
 - d. 25
4. In sensorineural deafness of right ear the finding of hearing test will be:
 - a. Weber's test lateralised to left ear
 - b. Weber's test lateralized to right ear
 - c. Weber's test is heard equally by both ears & Rinne's test is negative in right ear
 - d. Weber's test lateralized to right ear & Rinne's test is negative in right ear
5. Dyslexia occurs due to lesion in:
 - a. Wernicke's area
 - b. Broca's area
 - c. Auditory area
 - d. Angular gyrus
6. The sweet taste eliciting substances include all except:
 - a. Aldehydes
 - b. Amides
 - c. L-Glutamate
 - d. Ketones
7. Cerebellar disease is characterized by:
 - a. Akinesia, rigidity and intention tremors
 - b. Ataxia, hypotonia and intension tremors
 - c. Dysdiadochokinesia, cogwheel rigidity and resting tremors at
 - d. Decomposition of movement, Dysdiadochokinesia and resting tremors
8. Increased neural activity before a skilled voluntary movement is first seen in the:
 - a. Cerebellum
 - b. Cortical association areas
 - c. Precentral motor cortex
 - d. Spinal motor neurons
9. Which part of the eye has the greatest concentration of rods?
 - a. Ciliary body
 - b. Fovea
 - c. Optic disk
 - d. Parafoveal region
10. The main hormone responsible for milk ejection is:
 - a. Growth hormone
 - b. Thyroid hormone
 - c. Oxytocin
 - d. Prolactin
11. The circadian rhythms of body are controlled by _____ nucleus of hypothalamus.
 - a. Anterior
 - b. Arcuate
 - c. Supraoptic
 - d. Suprachiasmatic
12. Abnormal color vision is 20 times more common in men than women because most cases are caused by an abnormal:
 - a. Dominant gene on Y chromosome
 - b. Recessive gene on Y chromosome
 - c. Dominant gene on X chromosome
 - d. Recessive gene on X chromosome
13. The representational hemisphere:
 - a. Is the left cerebral hemisphere in most left-handed individuals
 - b. Is the right cerebral hemisphere in most right-handed individuals
 - c. Includes the part of brain concerned with language functions
 - d. Is the site of lesion in most patients with aphasia
14. Hypocalcemia causes tetany due to:
 - a. Increased membrane permeability for potassium ions
 - b. Increased membrane permeability for sodium ions
 - c. Decreased membrane permeability for potassium ions
 - d. Decreased membrane permeability for chloride ions
15. Bleeding from uterus between periods is referred to as:
 - a. Hypomenorrhea
 - b. Metrorhagia
 - c. Menorrhagia
 - d. Oligomenorrhea
16. Which of the following is **not true** about Cushing syndrome?
 - a. Produced by prolonged excess of glucocorticoids in plasma
 - b. Affected individuals are protein depleted with poorly developed muscles
 - c. Individuals tend to become hypoglycaemic
 - d. Accompanying osteoporosis may be present
17. True statement about Somatostatin include all except:
 - a. It is secreted by alpha cells of islets of Langerhans
 - b. It inhibits growth hormone secretion from anterior pituitary
 - c. It inhibits insulin and glucagon secretion
 - d. It decreases the motility of stomach
18. The primary stimulus for secretion of testosterone by interstitial cells of Leydig in testis is:
 - a. Follicle stimulating hormone
 - b. Luteinizing hormone
 - c. Prolactin
 - d. Thyroid stimulating hormone
19. Odorant receptors are located:
 - a. In the olfactory bulb
 - b. On dendrites of mitral and tufted cells
 - c. On neurons that project directly to olfactory cortex
 - d. On neurons in olfactory epithelium that project to mitral cells & from there directly to olfactory cortex.
20. The mechanism responsible for onset of labor include all except:
 - a. Increase in circulating estrogens
 - b. CRH secretion by fetal hypothalamus
 - c. Increase in plasma progesterone
 - d. Increase in number of Oxytocin receptors in myometrium of uterus

PHYSIOLOGY
PAPER- SECOND

Note: Attempt all questions.
Draw suitable diagrams (wherever necessary)

- Q. 2. Give reasons:** (2 x 5 = 10)
- a. Hypothyroid patients prefer hot environment
 - b. Babinski sign is normally seen in infants
 - c. Plasma FSH is markedly increased in menopausal females
 - d. Consensual light reflex
 - e. Blockage of hypothalamic- hypophysial portal system increases prolactin secretion.
- Q. 3. Problem based question:** (2 x 5 = 10)
- A retired lady 72 year old & known diabetic for about 20 years, presented to a physician for health check-up with chief complaints of- numbness in both upper and lower extremity with diminished sense of touch. On neurological examination- Decreased perception of vibration and fine touch in both upper and lower extremity. She was diagnosed as a case of Diabetic neuropathy and treated accordingly. Based on above case scenario answer the following questions:
- a. Name any two receptors for the modality of touch sensation.
 - b. Which sensory pathway is most likely to be affected? Define Muller's doctrine of specific nerve energies
 - c. What is the difference between a sensory unit and sense organ?
 - d. What is a rapidly adapting (phasic) receptor? Give an example.
 - e. Define law of projection with example.
- Q. 4. Write briefly on:** (6 x 4 = 24)
- a. Metabolic effects of insulin on various tissues
 - b. Ionic basis of different phases of a typical nerve action potential
 - c. Mechanisms involved in control of sleep-waking cycle
 - d. Professional qualities of a physician
- Q. 5. Structured questions:**
- (i) Enlist the primary thyroid hormones. Describe the formation and secretion of thyroid hormones and give an account of regulation of thyroid hormone secretion (2+5+3 = 10)
 - (ii) Describe the mechanism of hearing. Draw and explain the organ of Corti. What is travelling wave theory of Bekesy? (5+3+2 = 10)
- Q. 6. Explain with labelled diagram:** (4 x 4 = 16)
- a. Milk ejection reflex
 - b. Events at neuromuscular junction that lead to an action potential in muscle fiber membrane.
 - c. Hormonal changes during menstrual cycle
 - d. Formation and absorption of cerebrospinal fluid