Exam Date & Time: 05-Aug-2024 (09:30 AM - 12:30 PM)

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

Physiology Paper 1 [PHY1]

Marks: 100 **Duration: 180 mins.**

MCQ 20 X 1 = 20

Answer all the questions. Section Duration: 30 mins

1 Which of the following is an example of secondary active transport? (1)

1)	Na^+ K^+ ATPase pump		2)	H^+ K^+ pump		3)	Na^+ glucose symport		4)	Na^+ pump	

2 The Golgi complex is an organelle that participates in the (1)

1)	Breakdown of proteins and lipids		2)	Post translational processing of proteins		3)	Energy production		4)	Transcription and translation	

3 A 40 year old female presented with polymenorrhoea and generalised weakness. She also complained of palpitations and irritability. On examination nails were spoon shaped and signs of anemia were present. Blood picture showed microcytic hypochromic anemia. The type of anaemia in this case is (1)

1)	Iron deficieny anaemia		2)	Pernicious anaemia		3)	Megaloblastic anaemia		4)	Vitamin B_{12} deficiency anaemia.	

4 The extrinsic pathway of coagulation is primarily initiated by which of the following? (1)

1)	Tissue Factor		2)	Collagen Exposure		3)	Activated Platelets		4)	Thrombin	

5 What is the primary antibody class involved in ABO blood group incompatibility reactions? (1)

1)	IgM		2)	IgG		3)	IgD		4)	IgA	

6 Lung compliance is increased in (1)

1)	Lung fibrosis		2)	Emphysema		3)	Cancer of bronchus		4)	Pulmonary edema	

7 Inspiratory muscles during normal tidal breathing are (1)

1)	Diaphragm and internal intercostals		2)	Diaphragm and external intercostals		3)	Diaphragm and abdominal muscles		4)	External intercostals and abdominal muscles	

8 **Majority** of the CO_2 transported in blood is (1)

1)	Dissolved in plasma		2)	Bound to Chloride		3)	In carbamino form		4)	In bicarbonate form	

9 At rest the co-efficient of oxygen utilization of whole body is (1)

1)	5%		2)	25%		3)	50%		4)	75%	

10 A 34-year-old man sustains a bullet wound to the chest that causes a pneumothorax. What best describes the changes in lung volume and thoracic volume in this man compared with normal? (1)

1)	Decreased lung volume and decreased thoracic volume		2)	Decreased lung volume and Increased thoracic volume		3)	Increased lung volume and decreased thoracic volume		4)	Increased lung volume and Increased thoracic volume	

11			Emulsification of dietary lipids is brought by (1)

1)	Secretin		2)	Bile salts		3)	Cholecystokinin	4)	Pepsin

12			A boy returns home after school and the sight smell and thought of food increases gastric juice secretion . Which phase of gastric secretion is seen in this boy? (1)

1)	Gastric phase		2)	Cephalic phase		3)	Intestinal phase	4)	Interdigestive phase

13			Renal threshold for glucose is (1)

1)	180mg/dl		2)	325mg/dl		3)	180mg/min	4)	325mg/min

14			The hormone produced by the kidney is (1)

1)	Angiotensin II		2)	Aldosterone		3)	Erythropoietin	4)	Calcitonin

15			Action of loop-diuretic is inhibition of this mechanism (1)

1)	Na+-glucose cotransport		2)	Na+-K+-2CI- cotransport		3)	Na+-CL- cotransport	4)	Na+-K+ exchange

16			A 22 year old woman runs a 10 km race on a hot day and becomes dehydrated .Her kidneys are normal and ADH levels are high.What type of water reabsorption is seen in this woman? (1)

1)	Obligatory reabsorption of water		2)	Obligatory output of water		3)	Facultative reabsorption of water	4)	Osmotic diuresis

17			Conduction velocity is least in (1)

1)	AV node		2)	Purkinje fibres		3)	Bundle of His	4)	Ventricular myocardial fibres

18			Phasic coronary blood flow refers to (1)

1)	Blood flow only during systole		2)	Blood flow only during diastole		3)	Maximum blood flow during diastole	4)	Maximum blood flow during systole

19			The heart stops in diastole during (1)

1)	Hyperkalemia		2)	Hypokalemia		3)	Hypercalcemia	4)	Hypocalcemia

20			A 65-year-old man had an ECG at a local emergency department after a biking accident. His weight was 80 kilograms and his aortic blood pressure was 160/90 mm Hg. The QRS voltage was 0.5 millivolt in lead I and 1.5 millivolts in lead III. What is the QRS voltage in lead II? (1)

1)	0.5 millivolt		2)	1.0 millivolt		3)	2.0 millivolt	4)	1.5 millivolt

Long Essay 10 X 2 = 20

Answer all the questions.

21			Describe the composition, functions & regulation of Gastric Juice with experimental evidences.(2+2+6) (10)
22			A 58-year old woman presents with severe precordial chest pain and shortness of breath. ECG findings were suggestive of Myocardial infarction involving the left ventricle resulting in left bundle branch block. Questions: a) Draw a labelled diagram of conducting system of the heart. (2 marks) b) Explain the origin of cardiac impulse and how its conduction occurs from SA node to ventricles in a normal heart. (4 marks) c) Discuss the different degrees of heart blocks. (4 marks) (10)

Short Essay Questions 9 X 5 = 45

Answer all the questions.

23			Define Homeostasis. Explain positive feedback mechanism with one example.	(5)
24			Describe mechanism of humoral immunity.	(5)
25			Describe the fibrinolytic system and its regulation by protein C.	(5)
26			A man fell asleep in his running car. He was unconscious and brought to emergency department and is diagnosed as carbonmonoxide (CO) poisoning. 1 Name the type of hypoxia seen in this case. (1mark) 2 Draw a neat diagram of Oxygen Dissociation Curve (ODC) and mention the factors affecting it. (3 marks) 3 Explain the ODC with respect to CO poisoning. (1 mark)	(5)
27			Define Lung compliance with normal value . Explain the physiological basis of lung compliance being more in Emphysema and low in lung fibrosis.	(5)
28			Describe second stage of deglutition. Mention about Achalasia cardia. (3+2)	(5)
29			A 42-year-old male with End-Stage Renal Disease (ESRD) goes for dialysis at the hospital out-patient clinic **three** times per week for 3 to 4 hours per visit. a. List the **three** components of dialysis unit. (1 mark) b. Which of the substances may diffuse out of the blood compartment into the dialysis fluid compartment? (2 marks) c. Should the dialysis fluid be iso-osmotic, hypo-osmotic, or hyper-osmotic compared to the plasma? Justify. (2 marks)	(5)
30			Describe pacemaker potential with its ionic basis.	(5)
31			Describe the regulation of blood pressure by Renin Angiotensin mechanism.	(5)

Short Answer Questions 3 X 5 = 15

Answer all the questions.

32			Explain Gibbs Donnan Equilibrium.	(3)
33			Explain the physiological basis of Erythroblastosis foetalis.	(3)
34			Discuss the merits of Haldane and Bohr effect on respiration.	(3)
35			Explain Renal Splay.	(3)
36			List the factors involved in the level of empathy to the doctor patient relationship.	(3)

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KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

Physiology Paper 2 [PHY2]

Marks: 100 **Duration: 180 mins.**

MCQ 20 X 1 = 20

Answer all the questions. Section Duration: 30 mins

1 In the fetal testis, testosterone is secreted by (1)

1)	Leydig cells		2)	Sertoli cells		3)	Stromal cells		4)	Germinal epithelial cells	

2 The oral contraceptive pills involving administration of high dose of oestrogen for 15 days followed by 5 days of oestrogen plus progesterone is a type of (1)

1)	Classical pill		2)	Micro pill		3)	Sequential pill		4)	Combined pill	

3 A 30-year-old woman is breast-feeding her infant. During suckling, which of the following hormonal responses is expected (1)

1)	Increased secretion of antidiuretic hormone (ADH) from the supraoptic nuclei		2)	Increased secretion of ADH from the paraventricular nuclei		3)	Increased secretion of oxytocin from the paraventricular nuclei		4)	Decreased secretion of neurophysin	

4 Foot plate of stapes covers (1)

1)	Round window		2)	Oval window		3)	Auditory Canal		4)	Eustachuain Tube	

5 Optic disc contains (1)

1)	Rods		2)	Cones		3)	Both Rods & Cones		4)	No rods and cones	

6 Central point of lens is known as (1)

1)	Visual point		2)	Principal focus		3)	Principal Axis		4)	Nodal point	

7 Following a road traffic accident a 45 year old woman complained of loss of sensations and MRI revealed lesion in the spinal cord at the level of C5-C6. Which tract is damaged? (1)

1)	Dorsal column		2)	Cortico spinal		3)	Lateral spinothalamic		4)	Vestibulo cerebellar	

8 The adrenal gland androgens are produced by the (1)

1)	Zona glomerusa		2)	Zona fasciculata		3)	Zona reticularis		4)	Zona medulla	

9 Pineal gland secretes (1)

1)	Thyroid stimulating hormone		2)	Follicle stimulating hormone		3)	Melatonin		4)	Prolactin	

10 A 36-year-old female biochemist reflects on the action of insulin as she is eating toast at breakfast. Insulin action on target cells results in which of the following? (1)

1)	Activation of a tyrosine kinase		2)	Activation of adenyl cyclase		3)	Increased glucagon		4)	Increased gluconeogenesis	

								secretion					

11 Weber-Fechner law deals with (1)

1)	Frequency discrimination		2)	Receptive field organisation		3)	Intensity discrimination		4)	Two point discrimination	

12 Crossed extensor reflex is mediated at the level of (1)

1)	Spinal cord		2)	Medulla		3)	Cerebellum		4)	Cerebral cortex	

13 Non Rapid Eye Movement sleep is associated with (1)

1)	Alpha waves		2)	Beta waves		3)	Theta waves		4)	Delta waves	

14 Climbing fibres of the cerebellar cortex come from (1)

1)	Red nucleus		2)	Vestibular nucleus		3)	Inferior olivary nucleus		4)	Midline raphe nucleus	

15 Reward and punishment centers are located in which part of brain (1)

1)	Spinal cord		2)	Brainstem		3)	Limbic system		4)	Cerebellum	

16 Blood brain barrier is made up of (1)

1)	Microglia		2)	Oligodendrites		3)	Astrocytes		4)	Small neurons	

17 Which protein prevents contraction by covering binding sites on action and myosin? (1)

1)	Troponin		2)	Tropomyosin		3)	Calmodulin		4)	Thymosin	

18 A Patient complains of muscle weakness which disappears on administration of neostigmine. Its mechanism of action is (1)

1)	It blocks the action of acetylcholine		2)	It interferes with the action of acetylcholine esterase		3)	It interferes with action of amine oxidase		4)	It interferes with the action of carbonic anhydrase	

19 Phase of depolarization in action potential of a motor nerve is due to (1)

1)	Entry of potassium ion		2)	Entry of sodium ion		3)	Exit of potassium ion		4)	Entry of calcium ion	

20 A 40 year woman presents with sudden hearing loss and vertigo. Audiometry reveals a significant loss of hearing in high frequency range. Which of the following is damaged (1)

1)	Cochlear nerve		2)	Vestibulocochlear nerve		3)	Facial nerve		4)	Auditory cortex	

Long Essay 10 X 2 = 20

Answer all the questions.

21 A 7 years old boy had history of stunted growth, with no other symptoms. His IQ was completely normal for his age. No history of any birth injury. On examination all the organ systems were normal. The blood investigations showed blood glucose level of 120mg/dl and growth hormone levels were 5ng/ml.
1. Identify the above condition. (1 mark)
2. Explain the actions of hormones involved in the given case (6 marks)
3. Compare and contrast between Pituitary dwarfism & Thyroid dwarfism. (3 marks) (10)

22 Name the nuclei of Basal Ganglia. Describe the connections and functions of Basal Ganglia. Explain the pathophysiology of Parkinsonism and physiological basis of its treatment. [1+3+3+3] (10)

Short Essay Questions 9 X 5 = 45

Answer all the questions.

23			State the normal serum Calcium level. Describe the hormonal regulation of serum Calcium levels.	(5)
24			A 35 year old male patient presented with history of poor wound healing, hypertension & excessive hair growth on the face. Patient had moon shaped face, buffalo hump and central obesity. On examination, purple straie were present over the lower abdomen, thighs & upper arms. Investigations revealed increased blood glucose levels. CBC revealed decrease in eosinophil & lymphocyte count with increase in red blood cell count. 1. What is the most probable diagnosis? (1 Mark) 2. What is the etiology? (1 Mark) 3.Discuss the mechanism of action of the hormone in the above case. (3 Marks)	(5)
25			Describe the mechanism of Ovulation. List the indicators of Ovulation.	(5)
26			Explain the functions of Placenta.	(5)
27			A 16-year old college boy consults an ophthalmologist, he is not able to see the letters written on the black board. He is able to read the text book. 1) What is the diagnosis? What are the causes for it? 2) Discuss treatment. (1+1+3)	(5)
28			Describe the pathway of taste sensation.	(5)
29			Compare and contrast fast and slow pain patway.	(5)
30			A 26-year old women presented to a neurologist with imbalance while walking, with tendency to fall in an unpredictable direction, along with in-coordination of both hands causing difficulty in writing, eating and handling objects. She also has ataxia of gait, slurred speech and nystagmus. Examination revealed that she had intention tremors in fingers when she was asked to touch her nose, and she had difficulty in making pronation and supination movements. 1) The motor problems of this patient are due to lesion in which part of the brain? [1 Mark] 2) If her stretch reflexes in lower limbs were tested, what are the likely characteristics? [1 Mark] 3) What are intention tremors? Explain its physiological basis. [2 Marks] 4) What happens to the muscle tone in this patient and why? [1 Mark]	(5)
31			Describe the process of muscle fatigue and the factors that contribute to its development.	(5)

Short Answer Questions 3 X 5 = 15

Answer all the questions.

32			Enlist the clinical features of Grave's Disease.	(3)
33			Describe functions of Sertoli and Leydig cells.	(3)
34			List types and functions of Neuroglia.	(3)
35			Explain Wallerian degeneration in a nerve fibre.	(3)
36			Mention **two** models of communication that can facilitate a doctor patient relationship.	(3)

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