VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM

(Deemed to be University under section 3 of the UGC Act 1956)

Ph.D Entrance Test – November – 2025

Faculty of Medicine / Physiology

Instructions / Note:

1. Answer all the questions. Each question carries one mark.
2. No negative marks for wrong answers.
3. Read each question carefully and answer in the OMR sheet provided for each question with only blue/ black pen to fill the circles in the OMR Sheet.
4. Question number 1 - 35 questions belong to Research Methodology component and Question number 36-70 questions belong to the subject at PG level
5. Return the question paper along with the OMR sheet.

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36. Pneumatic center functions primarily to _____
    A. Limit inspiration
    B. Prolong expiration
    C. Decrease rate
    D. Discharge inspiratory action potentials

37. The Bainbridge reflex is triggered by _____
    A. Increased atrial filling
    B. Increased systemic pressure
    C. Decreased venous return
    D. Increased carotid sinus pressure

38. The Hering–Breuer inflation reflex prevents _____
    A. Apnea
    B. Over-inflation of the lungs
    C. Bronchoconstriction
    D. Hypoventilation

39. The rate-limiting step in steroid hormone synthesis is _____
    A. Conversion of cholesterol to pregnenolone
    B. Hydroxylation of progesterone
    C. Aromatization of testosterone
    D. ACTH stimulation of Camp

40. Insulin increases glucose uptake in muscle through _____
    A. SGLT1
    B. GLUT2
    C. GLUT4
    D. GLUT5

41. In anemia, cardiac output is increased mainly due to _____
    A. Increased venous return
    B. Decreased afterload
    C. Hypoxia-mediated sympathetic activation
    D. Increased viscosity

42. The earliest indicator of hypoxia in tissue is _____
    A. Cyanosis
    B. Lactic acidosis
    C. Tachypnea
    D. Bradycardia

43. Diabetic ketoacidosis is characterized by _____
    A. Respiratory acidosis
    B. Metabolic acidosis with respiratory compensation
    C. Metabolic alkalosis
    D. Mixed acid-base disorder

44. Hypocalcemia causes tetany due to _____
    A. Increased resting membrane potential
    B. Decreased threshold potential
    C. Reduced neuromuscular transmission
    D. Increased potassium conductance

45. Hyperventilation causes _____
    A. Respiratory acidosis
    B. Respiratory alkalosis
    C. Metabolic acidosis
    D. Metabolic alkalosis

46. In shock, the earliest physiological compensation is _____
    A. Tachycardia
    B. Vasodilation
    C. Increased urine output
    D. Metabolic acidosis

47. During acclimatization to high altitude, which adaptation occurs first?
    A. Increased RBC mass
    B. Hyperventilation
    C. Increased 2,3-BPG
    D. Increased Erythropoietin

48. REM sleep is characterized by _____
    A. Delta wave in EEG and decreased muscle tone
    B. Beta waves in EEG and muscle atonia
    C. Rapid eye movements and increased muscle tone
    D. Spindle waves and absence of dreaming

49. The most important buffer in extracellular fluid is _____
    A. Hemoglobin
    B. Bicarbonate
    C. Phosphate
    D. Proteins

50. Reticulocyte count reflects _____
    A. Iron absorption
    B. Bone-marrow activity
    C. RBC fragility
    D. Plasma volume

51. Excitation–contraction coupling in skeletal muscle requires _____
    A. Na^+ entry into muscle
    B. Ca^{2+} release from sarcoplasmic reticulum
    C. ATP hydrolysis by actin
    D. Increase in intracellular K^+

52. The lung volume that cannot be measured by spirometry is _____
    A. ERV
    B. IRV
    C. RV
    D. TV

53. Diffusion of gases across alveolar membrane follows _____
    A. Boyle's law
    B. Henry's law
    C. Fick's law
    D. Dalton's law

54. Bicarbonate is mainly reabsorbed in _____
    A. PCT
    B. DCT
    C. Loop of Henle
    D. Collecting duct

55. During dehydration, urine osmolality _____
    A. Increases
    B. Decreases
    C. Unchanged
    D. Approaches plasma

56. The main stimulus for thirst is _____
    A. Hypovolemia
    B. Hyperosmolarity
    C. Low sodium
    D. Hypoglycemia

57. Glucocorticoids cause _____
    A. Hypoglycemia
    B. Hyperglycemia
    C. Hypotension
    D. Hyponatremia

58. Prolonged fasting increases _____
    A. Insulin secretion
    B. Ketone body formation
    C. Lipogenesis
    D. Protein synthesis

59. During REM sleep, muscle tone is _____
    A. Increased
    B. Decreased
    C. Normal
    D. Unchanged

60. Hair cells of the cristae are stimulated by _____
    A. Bending of their stereocilia toward any direction
    B. Movement of endolymph in any direction
    C. Bending of stereocilia toward kinocilium
    D. Bending of stereocilia away from kinocilium

61. Cerebellar ataxia is manifested by all the following, except _____
    A. Dysdiadochokinesia
    B. Static tremors
    C. Dysmetria
    D. Staccato speech

62. The hypothalamic nucleus that act as a biological clock of the body is _____
    A. Supraoptic nucleus
    B. Preoptic nucleus
    C. Arcuate nucleus
    D. Suprachiasmatic nucleus

63. The first heart sound corresponds to which ECG wave?
    A. P wave
    B. QRS complex
    C. T wave
    D. PR segment

64. Juxtaglomerular cells secrete _____
    A. Angiotensin I
    B. Renin
    C. Aldosterone
    D. ADH

65. Micturition reflex is an example of _____
    A. Monosynaptic reflex
    B. Spinal autonomic reflex
    C. Brain-stem reflex
    D. Voluntary reflex

66. The Haldane effect refers to _____
    A. CO_2 binding enhanced by oxygenation
    B. O_2 release facilitated by CO_2 binding
    C. Enhanced CO_2 carriage in deoxygenated blood
    D. CO binding to Hb

67. Which fiber type conducts fastest?
    A. C
    B. B
    C. A-delta
    D. A-alpha

68. The renal threshold for glucose is ~180 mg/dL because _____
    A. Transport maximum of SGLT-1 is saturated
    B. Glucose is actively secreted
    C. Glucose transporters have uniform affinity
    D. GFR declines beyond this level

69. The hormone responsible for milk secretion is _____
    A. Prolactin
    B. Oxytocin
    C. Estrogen
    D. Progesterone

70. The sleep-wake cycle is regulated by _____
    A. Cerebellum
    B. Reticular activating system
    C. Spinal cord
    D. Pons only