Roll No.----------

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

O.M.R. Serial No. | | | | | | | |

K-1364

B.Sc. (Biotech.) (Second Semester) Examination, 2025-26

(NEP)

(BBT2001) BACK PAPER

MAMMALIAN PHYSIOLOGY

Paper Code
BBT2001

(To be filled in the OMR Sheet)

प्रश्नपुस्तिका सीरीज
Question Booklet Series
A

Time : 1:30 Hours] **[Maximum Marks-75**

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

(Remaining instructions on the last page)

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न–पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न–पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर–शीट पर ही हल करना है, प्रश्न–पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न–पुस्तिका तथा OMR आन्सर–शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न–पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हो या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(शेष निर्देश अन्तिम पृष्ठ पर)

1. Which enzyme is responsible for the initial hydrolysis of dietary starch in the oral cavity?

   (A) Pancreatic amylase

   (B) Salivary α-amylase

   (C) Maltase

   (D) Glucoamylase

2. In the stomach, what is the primary function of Hydrochloric Acid (HC1)?

   (A) To emulsify lipids for lipase action

   (B) To hydrolyze peptide bonds directly

   (C) To provide an acidic pH for pepsinogen activation

   (D) To facilitate the absorption of Vitamin B12

3. What is the physiological role of the "Chloride Shift" in systemic capillaries?

   (A) To balance the exit of bicarbonate ions from the erythrocyte

   (B) To increase the affinity of hemoglobin for oxygen

   (C) To facilitate the binding of CO_2 to the globin chain

   (D) To catalyze the formation of carbonic acid

4. Bile salts are essential for lipid digestion primarily because they:

   (A) Hydrolyze triglycerides into glycerol

   (B) Decrease the surface tension of fat globules (emulsification)

   (C) Transport chylomicrons into the lacteals

   (D) Activate pancreatic colipase

5. The sigmoid shape of the Oxygen Dissociation Curve is a result of:

   (A) The high solubility of oxygen in plasma

   (B) Cooperative binding of oxygen to hemoglobin subunits

   (C) The Bohr effect in peripheral tissues

   (D) Competitive inhibition by 2,3-BPG

6. Which component of pancreatic juice is responsible for neutralizing acidic chyme?

(A) Trypsinogen

(B) Pancreatic lipase

(C) Bicarbonate ions (HCO_3^-)

(D) Cholecystokinin

7. Absorption of glucose across the apical membrane of enterocytes occurs via:

(A) Simple diffusion

(B) Facilitated diffusion through GLUT2

(C) Secondary active transport (SGLT-1)

(D) Primary active transport via Na^+/K^+ ATPase

8. What is the fate of the majority of CO_2 transported in the blood?

(A) Dissolved in plasma

(B) Bound to the heme group of hemoglobin

(C) Converted to bicarbonate ions in RBCs

(D) Transported as carbamino compounds in plasma

9. Intrinsic Factor, secreted by gastric parietal cells, is required for the absorption of:

(A) Iron

(B) Calcium

(C) Vitamin B12

(D) Folic acid

10. The "Bohr Effect" describes the shift of the ODC to the right due to:

(A) Increased pH and decreased PCO_2

(B) Decreased pH and increased PCO_2

(C) Decreased temperature

(D) Increased PO_2 in the lungs

11. If a patient has a congenital deficiency in SGLT-1 transporters, which of the following would they fail to absorb efficiently?

(A) Fructose

(B) Galactose

(C) Dipeptides

(D) Long-chain fatty acids

12. During intense exercise, the local tissue temperature rises and lactic acid accumulates. How does this affect oxygen delivery?

(A) It shifts the ODC to the right, facilitating oxygen unloading.

(B) It shifts the ODC to the left, increasing oxygen uptake.

(C) It has no effect on the ODC.

(D) It decreases the P_{50} value of haemoglobin.

13. A researcher inhibits the enzyme Carbonic Anhydrase. Which process would be most significantly impaired?

(A) The breakdown of proteins by pepsin

(B) The rapid conversion of CO_2 and H_2O to HCO_3^-

(C) The emulsification of fats by bile

(D) The transport of glucose via GLUT2

14. In a case of pancreatic duct obstruction, which nutrient's digestion would be most severely compromised?

(A) Carbohydrates only

(B) Proteins only

(C) Lipids only

(D) All of the above

15. A climber at high altitude experiences respiratory alkalosis (increased pH). How would the body's hemoglobin affinity respond?

(A) Affinity increases, shifting the curve left.

(B) Affinity decreases, shifting the curve right.

(C) The curve becomes linear.

(D) No change occurs in affinity.

16. If the concentration of Sodium (Na^+) in the intestinal lumen is depleted, the absorption of which of the following will decrease?

(A) Fructose

(B) Fatty acids

(C) Amino acids

(D) Fat-soluble vitamins

17. A patient presents with steatorrhea (fatty stools). Which secretion is likely deficient?

(A) Gastrin

(B) Bile salts

(C) Salivary amylase

(D) Pepsin

18. Which transporter would be most active on the basolateral membrane of an enterocyte after a high-carbohydrate meal?

(A) SGLT-1

(B) GLUT5

(C) GLUT2

(D) Na^+ /H^+ exchanger

19. Calculate the effect of a 2,3-BPG increase: Does it increase or decrease the P_{50}?

(A) Decreases P_{50} (Higher affinity)

(B) Increases P_{50} (Lower affinity)

(C) P_{50} remains constant

(D) P_{50} drops to zero

20. During the "Reverse Chloride Shift" in the lungs, what occurs?

(A) Cl^- enters the RBC

(B) HCO_3^- enters the RBC

(C) O_2 leaves the RBC

(D) CO_2 enters the RBC

21. Analyze the relationship between Enterokinase and Protein digestion. What happens if Enterokinase is absent?

(A) Trypsinogen remains inactive, preventing the activation of all other pancreatic proteases.

(B) Pepsinogen cannot be converted to pepsin.

(C) Chymotrypsin will take over the role of trypsin.

(D) Protein digestion will occur normally in the stomach but stop in the intestine.

22. Compare the absorption of lipids and carbohydrates. Which statement is correct regarding their circulatory pathways?

(A) Both enter the portal vein directly.

(B) Both enter the lymphatic system first.

(C) Carbohydrates enter the portal vein, while large lipids enter the lacteals.

(D) Lipids enter the portal vein, while carbohydrates enter the lacteals.

23. How does the “Haldane Effect” differ from the “Bohr Effect”?

(A) Haldane involves O_2 affecting CO_2 transport; Bohr involves H^+/ CO_2 affecting O_2
transport.

(B) Haldane involves the lungs; Bohr involves the liver.

(C) Both describe the same phenomenon but in different gases.

(D) Haldane describes glucose transport; Bohr describes gas transport.

24. In a scenario of severe metabolic acidosis, how would the respiratory system compensate in terms of the ODC?

(A) It would shift the curve left to ensure the brain gets more oxygen.

(B) It would shift the curve right to enhance oxygen delivery to tissues.

(C) It would stabilize the curve to prevent gas exchange.

(D) It would increase the affinity of Hb for CO_2

25. Distinguish between the roles of Micelles and Chylomicrons.

(A) Micelles are for transport in the blood; chylomicrons are for digestion.

(B) Micelles are formed in the enterocyte; chylomicrons are formed in the lumen.

(C) Micelles contain proteins; chylomicrons do not.

(D) Micelles facilitate lipid movement across the aqueous lumen; chylomicrons facilitate lipid transport in the lymph/blood.

26. What is the significance of the “Alkaline Tide” observed after a large meal?

(A) It is the result of HCO_3^- being pumped into the blood in exchange for Cl^- during HC1 production.

(B) It indicates the failure of the pancreas to secrete bicarbonate.

(C) It is caused by the absorption of basic amino acids.

(D) It represents the neutralization of bile in the duodenum.

27. Analyze the impact of 2,3-BPG on fetal hemoglobin (HbF). Why does HbF have a left-shifted curve compared to adult HbA?

(A) HbF binds 2,3-BPG more strongly.

(B) HbF binds 2,3-BPG less effectively, resulting in higher oxygen affinity.

(C) HbF does not contain heme groups.

(D) HbF is more sensitive to temperature.

28. During the digestion of nucleic acids, what is the specific role of nucleosidases?

(A) To break DNA into nucleotides.

(B) To break nucleotides into nucleosides and phosphate.

(C) To break nucleosides into free bases and pentose sugars.

(D) To re-assemble DNA in the enterocyte.

29. What would be the effect of a mutation that permanently keeps the Chloride-Bicarbonate exchanger in the RBC open?

(A) O_2 transport would be enhanced.

(B) The RBC would lose its ability to maintain pH and osmotic balance during gas exchange.

(C) CO_2 would be permanently trapped in the plasma.

(D) The ODC would shift permanently to the left.

30. Analyze the composition of Saliva. Why is the presence of Cl^- ions critical?

(A) To maintain the salty taste of food.

(B) To facilitate the absorption of glucose in the oral mucosa.

(C) To kill bacteria in the mouth.

(D) To act as a cofactor for the activation of salivary amylase.

31. Which plasma protein is primarily responsible for maintaining the colloid osmotic pressure of the blood?

(A) Fibrinogen

(B) Gamma globulin

(C) Albumin

(D) Transferrin

32. In adult humans, what is the primary site of haematopoiesis?

(A) Spleen

(B) Yellow bone marrow

(C) Red bone marrow

(D) Liver

33. The "pacemaker" of the heart is the Sinoatrial (SA) node because it:

(A) Has the thickest layer of myocardium.

(B) Possesses the fastest intrinsic rate of spontaneous depolarization.

(C) Is the only structure connected to the vagus nerve.

(D) Connects directly to the Purkinje fibers.

34. What occurs during the "isovolumetric contraction" phase of the cardiac cycle?

(A) The AV valves are open and semilunar valves are closed.

(B) All four heart valves are closed as ventricular pressure rises.

(C) Blood is rapidly ejected into the aorta.

(D) Atrial pressure exceeds ventricular pressure.

35. Which coagulation factor is responsible for converting soluble fibrinogen into insoluble fibrin?

(A) Prothrombinase

(B) Factor XII

(C) Calcium (Ca^{2+})

(D) Thrombin

36. The first heart sound (S1 or ″lub″) is caused by:

(A) The closure of the atrioventricular (AV) valves.

(B) The opening of the semilunar valves.

(C) The contraction of the atria.

(D) The closure of the aortic valve.

37. What is the defining characteristic of a pluripotent stem cell in the bone marrow?

(A) It can only produce red blood cells.

(B) It has lost the ability to self-renew.

(C) It can differentiate into any type of blood cell lineage.

(D) It circulates freely in the plasma.

38. The extrinsic pathway of blood coagulation is initiated by:

(A) Activation of Factor XII by collagen.

(B) The release of Tissue Factor (Factor III) from damaged perivascular cells.

(C) Platelet aggregation.

(D) The conversion of prothrombin to thrombin.

39. Which white blood cell type is the most numerous and serves as the first line of defense against bacterial infection?

(A) Lymphocytes

(B) Monocytes

(C) Neutrophils

(D) Eosinophils

40. Cardiac Output (CO) is defined as the product of:

(A) Blood pressure and Heart rate.

(B) Stroke volume and Heart rate.

(C) End-diastolic volume and End-systolic volume.

(D) Total peripheral resistance and Stroke volume.

41. A patient has a liver disease that significantly reduces the production of plasma proteins. Which of the following clinical signs is most likely?

(A) Excessive blood clotting

(B) Peripheral edema (swelling)

(C) Increased blood viscosity

(D) Hypertension

42. During an EKG, if the delay at the Atrioventricular (AV) node is abnormally prolonged, which interval will be affected?

(A) The QRS complex

(B) The T wave

(C) The PR interval

(D) The ST segment

43. If a person's stroke volume is 75 ml and their heart rate is 80 bpm, what is their Cardiac Output?

(A) 5.0 L/min

(B) 6.0 L/min

(C) 4.5 L/min

(D) 7.2 L/min

44. A drug that blocks the action of Vitamin K would most directly interfere with:

(A) Erythropoiesis in the bone marrow.

(B) The synthesis of clotting factors II, VII, IX, and X in the liver.

(C) The activation of the SA node.

(D) The maintenance of the blood-brain barrier.

45. In a state of hypocalcemia (low blood calcium), how would the blood coagulation process be affected?

(A) Clotting would occur too rapidly.

(B) Fibrinogen would become insoluble spontaneously.

(C) Only the intrinsic pathway would be affected.

(D) Clotting would be inhibited because calcium is a required cofactor (Factor IV).

46. Following a massive hemorrhage, the kidneys secrete Erythropoietin (EPO). What is the expected physiological result?

(A) Increased production of platelets.

(B) Decreased maturation of reticulocytes.

(C) Accelerated differentiation of proerythroblasts into RBCs.

(D) Immediate vasoconstriction of the aorta.

47. If the vagus nerve (parasympathetic) stimulation to the heart is increased, what happens to the cardiac cycle?

(A) The duration of the cycle decreases.

(B) The heart rate increases.

(C) The duration of the cycle increases.

(D) Stroke volume doubles immediately.

48. A patient is found to have a "B-lymphocyte" deficiency. Which aspect of their blood function is most compromised?

(A) Oxygen transport

(B) Phagocytosis of debris

(C) Blood clotting

(D) Antibody-mediated (humoral) immunity

49. According to the Frank-Starling Law, if the venous return to the heart increases, what is the intrinsic response?

(A) Heart rate must decrease to compensate.

(B) Stroke volume increases due to increased stretching of the myocardial fibers.

(C) The SA node stops firing.

(D) The ventricles contract with less force.

50. During a laboratory test, a technician adds citrate to a blood sample to prevent clotting. Citrate works by chelating (binding) calcium. Which step is blocked?

(A) Platelet adhesion to collagen.

(B) The synthesis of albumin.

(C) The activation of Factor X and the conversion of prothrombin.

(D) The release of EPO.

51. Compare the Intrinsic and Extrinsic pathways of coagulation. Which statement accurately distinguishes them?

(A) The Intrinsic pathway is faster and requires Tissue Factor.

(B) The Extrinsic pathway is faster and is triggered by external tissue damage.

(C) Only the Intrinsic pathway involves Factor X.

(D) The Extrinsic pathway does not require Calcium.

52. How would a significant increase in total peripheral resistance (TPR) affect the heart's workload?

(A) It decreases the afterload, making ejection easier.

(B) It has no effect on ventricular pressure.

(C) It increases the heart rate via the Frank-Starling mechanism.

(D) It increases the afterload, requiring the left ventricle to generate higher pressure to open the aortic valve.

53. Analyze the Wiggers Diagram: At what point does the aortic valve open?

(A) When atrial pressure exceeds ventricular pressure.

(B) At the end of the P-wave.

(C) When ventricular pressure exceeds aortic pressure.

(D) When the second heart sound (S_2) is heard.

54. If the bundle of His is surgically blocked, how would the contraction of the atria and ventricles be affected?

(A) They would stop contracting entirely.

(B) The atria and ventricles would contract simultaneously.

(C) The ventricles would contract faster than the atria.

(D) The atria would contract at the SA node rate, but the ventricles would contract at a much slower, independent rhythm.

55. Distinguish between Plasma and Serum.

(A) Plasma contains clotting factors; serum is the fluid left after clotting has occurred.

(B) Serum contains red blood cells; plasma does not.

(C) Plasma is found in the interstitial space; serum is in the vessels.

(D) There is no biochemical difference between the two.

56. What is the significance of the "AV nodal delay" (0.1 seconds)?

(A) It allows time for the SA node to recharge.

(B) It ensures that atrial contraction is complete and ventricles are filled before ventricular systole begins.

(C) It prevents the blood from flowing backward into the veins.

(D) It speeds up the conduction to the Purkinje fibers.

57. Analyze the effect of high-altitude training on the blood composition of an athlete.

(A) It leads to a decrease in plasma proteins.

(B) It reduces the number of platelets to improve flow.

(C) It causes a permanent shift in the heart's pacemaker to the AV node.

(D) It triggers erythropoietin release, leading to polycythemia (increased RBC count).

58. In the case of Hemophilia A (deficiency of Factor VIII), which part of the coagulation mechanism is specifically failing?

(A) The Extrinsic pathway.

(B) The formation of the platelet plug.

(C) The Intrinsic pathway's ability to activate the common pathway.

(D) The production of Vitamin K.

59. Which of the following occurs if the End-Systolic Volume (ESV) increases while the End-Diastolic Volume (EDV) remains the same?

(A) Stroke volume increases.

(B) Stroke volume decreases.

(C) Cardiac output increases.

(D) Ejection fraction improves.

60. What would happen if the papillary muscles failed to contract during ventricular systole?

(A) The semilunar valves would not open.

(B) The SA node would stop firing.

(C) The AV valves would evert (bulge) into the atria, causing regurgitation.

(D) The heart rate would double.

61. Which structural feature of cardiac muscle allows it to function as a functional syncytium?

(A) Multiple nuclei per fiber

(B) Intercalated discs with gap junctions

(C) The presence of dense bodies

(D) Longitudinal arrangement of myofibrils

62. The "All-or-None Rule" in muscle physiology implies that:

(A) A whole muscle organ contracts fully or not at all.

(B) ATP is either fully present or entirely absent during contraction.

(C) All motor units in a muscle fire simultaneously.

(D) A single muscle fiber contracts to its maximum capability once the threshold is reached.

63. What is the primary nitrogenous waste product excreted by uricotelic animals?

(A) Ammonia

(B) Urea

(C) Uric acid

(D) Trimethylamine oxide

64. In the sliding filament theory, what is the specific role of Ca^{2+}

(A) Hydrolyzing ATP on the myosin head

(B) Binding to troponin to expose myosin-binding sites on actin

(C) Transporting Acetylcholine across the synaptic cleft

(D) Shifting the M-line toward the Z-disk

65. Which part of the nephron is responsible for the "obligatory" reabsorption of 100% of filtered glucose?

(A) Distal Convoluted Tubule

(B) Loop of Henle

(C) Proximal Convoluted Tubule

(D) Collecting Duct

66. "Muscle Tone" is best described as:

(A) The maximum force a muscle can generate.

(B) A state of complete muscle relaxation during sleep.

(C) A constant state of partial contraction maintained by spinal reflexes.

(D) The enlargement of muscle fibers due to exercise.

67. If a drug prevents the reuptake of Ca^{2+} into the sarcoplasmic reticulum, what would be the mechanical result?

(A) Immediate muscle flaccidity

(B) Prolonged muscle contraction or tetany

(C) Failure of the action potential to reach the T-tubules

(D) Faster ATP synthesis

68. During an isometric exercise, such as holding a heavy plank, what is happening to the muscle fibers?

(A) The muscle shortens while tension remains constant.

(B) The muscle length stays the same while internal tension increases.

(C) The sarcomeres do not attempt to shorten at all.

(D) The origin and insertion of the muscle move closer together.

69. A patient with a malfunctioning Ornithine Cycle is likely to present with high clinical levels of:

(A) Urea in the urine

(B) Uric acid in the joints

(C) Ammonia in the blood

(D) Glucose in the filtrate

70. How would an increase in Antidiuretic Hormone (ADH) secretion affect the urine's osmolarity?

(A) It would produce a large volume of dilute urine.

(B) It would produce a small volume of highly concentrated urine.

(C) It would increase the excretion of sodium ions.

(D) It would have no effect on urine concentration.

71. In the presence of an Acetylcholinesterase inhibitor (like certain nerve gases), what occurs at the neuromuscular junction?

(A) ACh is not released from the presynaptic neuron.

(B) Sodium channels on the sarcolemma are permanently blocked.

(C) The muscle becomes paralyzed in a relaxed state.

(D) ACh remains in the cleft, causing continuous stimulation of the muscle.

72. A researcher observes a muscle type with no visible striations and cells connected by dense bodies. Where was this tissue likely sampled?

(A) The Biceps brachii

(B) The Myocardium

(C) The wall of the Small Intestine

(D) The Diaphragm

73. Which hormone would the body release in response to a significant drop in blood pressure to increase Na^+ reabsorption?

(A) Insulin

(B) Aldosterone

(C) Glucagon

(D) Calcitonin

74. Analyze the role of the "Countercurrent Multiplier" in the Loop of Henle. What is its primary objective?

(A) To create a steep osmotic gradient in the medullary interstitium.

(B) To actively pump urea into the medulla.

(C) To decrease the blood pressure within the vasa recta.

(D) To ensure that the filtrate leaving the loop is always hypertonic.

75. Compare the "Latent Period" of a muscle twitch to the "Contraction Phase." What is occurring during the Latent Period?

(A) Myosin heads are performing the power stroke.

(B) ATP is being hydrolyzed into ADP.

(C) The action potential is traveling down T-tubules and Ca^{2+} is being released.

(D) The muscle is returning to its resting length.

76. In the Urea Cycle, what is the significance of the enzyme Arginase?

(A) It synthesizes Carbamoyl Phosphate from Ammonia.

(B) It cleaves Arginine to release Urea and regenerate Ornithine.

(C) It transports Citrulline out of the mitochondria.

(D) It requires ATP to bind Aspartate.

77. What would happen to the Glomerular Filtration Rate (GFR) if the efferent arteriole was significantly dilated?

(A) GFR would increase due to higher pressure.

(B) GFR would decrease because the "back pressure" in the glomerulus would drop.

(C) GFR would stay the same because of autoregulation.

(D) Filtration would stop entirely.

78. Contrast the role of ATP in contraction vs. relaxation.

(A) ATP is only needed for the power stroke.

(B) Relaxation is a passive process that requires no energy.

(C) ATP is only used to pump calcium back into the SR.

(D) ATP is needed for the power stroke AND for the detachment of myosin from actin.

79. Distinguish between the descending and ascending limbs of the Loop of Henle.

(A) The descending limb is permeable to ions; the ascending limb is permeable to water.

(B) Both limbs are permeable to water.

(C) The descending limb is permeable to water; the ascending limb is impermeable to water but transports ions.

(D) The descending limb uses active transport; the ascending limb uses simple diffusion.

80. Why do skeletal muscles enter a state of "Rigor Mortis" after death?

(A) Excessive Ca^{2+} is pumped out of the cell.

(B) of myosin Lack of ATP prevents the detachment heads from actin.

(C) The brain continues to send electrical impulses to the muscles.

(D) Lactic acid causes the proteins to permanently bond.

81. The resting membrane potential (RMP) of a neuron is primarily maintained by:

(A) The rapid influx of Sodium (Na^+) during a stimulus.

(B) The insulation provided by the myelin sheath.

(C) The release of Acetylcholine into the synaptic cleft.

(D) The Na^+/K^+ ATPase pump and passive K^+ leakage.

82. In a myelinated axon, the action potential "jumps" from one Node of Ranvier to the next. This process is called:

(A) Continuous conduction.

(B) Saltatory conduction.

(C) Synaptic summation.

(D) Refractory propagation.

83. Which of the following describes the mechanism of action for steroid hormones?

(A) They bind to surface receptors and activate cAMP.

(B) They utilize a G-protein coupled receptor system.

(C) They cross the plasma membrane and bind to intracellular or nuclear receptors.

(D) They trigger an immediate influx of Calcium (Ca^{2+}) to activate enzymes.

84. The hypothalamus controls the anterior pituitary gland primarily through:

(A) Direct electrical impulses via axons.

(B) The secretion of releasing and inhibiting hormones into the hypophyseal portal system.

(C) The release of neurotransmitters into the general circulation.

(D) Pressure changes in the cerebrospinal fluid.

85. Which gland is responsible for secreting Melatonin to regulate circadian rhythms?

(A) Thyroid

(B) Thymus

(C) Pineal

(D) Adrenal Medulla

86. A neurotransmitter that typically generates an Inhibitory Postsynaptic Potential (IPSP) by opening Cl^- channels is:

(A) Glutamate

(B) Acetylcholine

(C) GABA

(D) Epinephrine

87. A patient presents with a "Goiter" and a significantly low Basal Metabolic Rate (BMR). Which condition is most likely?

(A) Hyperthyroidism (Graves' Disease)

(B) Hypothyroidism due to Iodine deficiency

(C) Hyperparathyroidism

(D) Cushing's Syndrome

88. If a neurotoxin specifically blocks voltage-gated Ca^{2+} channels at the axon terminal, what will be the immediate result?

(A) The action potential will fail to reach the terminal.

(B) The neuron will remain in a permanent state of depolarization.

(C) Synaptic vesicles will fail to undergo exocytosis.

(D) The Na^+/K^+ pump will stop functioning.

89. During a "Fight or Flight" response, the Adrenal Medulla releases Epinephrine. This hormone acts on liver cells to:

(A) Convert glucose into glycogen for storage.

(B) Stimulate glycogenolysis to increase blood glucose levels.

(C) Decrease the heart rate to conserve energy.

(D) Stimulate the production of Insulin.

90. A researcher applies a drug that inhibits Adenylate Cyclase. The action of which hormone would be most significantly impaired?

(A) Estrogen

(B) Cortisol

(C) Insulin

(D) Glucagon

91. If a person suffers from "Diabetes Insipidus," they excrete large volumes of dilute urine. This is caused by a deficiency in:

(A) Insulin from the Pancreas.

(B) ADH (Vasopressin) from the Hypothalamus/Posterior Pituitary.

(C) Aldosterone from the Adrenal Cortex.

(D) Glucagon from the Islets of Langerhans.

92. In the case of hypocalcemic tetany, which gland is likely underperforming?

(A) Parathyroid

(B) Thyroid

(C) Thymus

(D) Adrenal

93. Which hormone would be elevated in a patient suffering from Cushing's Syndrome?

(A) Thyroxine

(B) Cortisol

(C) Growth Hormone

(D) Melatonin

94. Analyze the Absolute Refractory Period. Why is it physiologically necessary?

(A) It allows for the summation of multiple stimuli.

(B) It provides time for the myelin sheath to regenerate.

(C) It speeds up the opening of K^+ channels.

(D) It ensures the action potential is unidirectional and limits the frequency of firing.

95. Compare the Posterior Pituitary and the Anterior Pituitary.

(A) The Posterior Pituitary stores and releases hormones made in the Hypothalamus, while the Anterior Pituitary synthesizes its own.

(B) Both synthesize and secrete their own unique hormones.

(C) The Anterior Pituitary is part of the nervous system.

(D) Only the Posterior Pituitary is regulated by negative feedback.

96. What is the consequence of a mutation that makes the Insulin receptor constitutively active (always "on")?
(A) Permanent Hyperglycemia.
(B) Severe, persistent Hypoglycemia as cells continuously take up glucose.
(C) Increased secretion of Glucagon.
(D) Destruction of the Beta cells in the Pancreas.

97. Contrast the "Bohr Effect" in Respiration with "Negative Feedback" in Endocrinology.
(A) Both are examples of feed-forward mechanisms.
(B) One is purely chemical, while the other is purely electrical.
(C) Both serve to maintain homeostasis by responding to changes in the internal environment.
(D) They are unrelated and never occur in the same organism.

98. In a synaptic cleft, if Acetylcholinesterase is inhibited, what is the effect on the postsynaptic muscle or neuron?
(A) Continuous stimulation and potential tetany or desensitization.
(B) Immediate relaxation/repolarization.
(C) Failure of the neurotransmitter to bind to receptors.
(D) Increased synthesis of new synaptic vesicles.

99. How does the body distinguish between a light touch and a painful stimulus if all action potentials are "All-or-None"?
(A) By changing the amplitude (height) of the action potential.
(B) By changing the frequency of the action potentials and the number of neurons recruited.
(C) By using different types of Na^+ ions.
(D) Painful stimuli bypass the thalamus entirely.

100. Analyze the role of the Thymus gland in an adult versus a child.
(A) It is larger and more active in adults.
(B) It switches from endocrine function to digestive function in adulthood.
(C) It only begins to function after the age of 25.
(D) It is most active during childhood for T-cell "education" and undergoes atrophy after puberty.

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Rough Work / रफ कार्य

Rough Work / रफ कार्य

4. Four alternative answers are mentioned for each question as – A, B, C & D in the question booklet. The candidate has to choose the correct answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :

Q. 1 (A) ● (C) (D)

Q. 2 (A) (B) ● (D)

Q. 3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer Sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the Instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question booklet, then after showing it to the invigilator, get another question booklet of the same series.

4. प्रश्न–पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर– A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से एक सही उत्तर छाँटना है। उत्तर को OMR आन्सर–शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)

प्रश्न 2 (A) (B) ● (D)

प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उत्तर निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर–पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर–पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर–पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न–पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न–पुस्तिका के अन्त में, रफ–कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा–कक्ष में लॉग–बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न–पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न–पुस्तिका प्राप्त कर लें।