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

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

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

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

(NEP)

(BH100201T)

MAMMALIAN PHYSIOLOGY

K-1361

Paper Code
BH100201T

(To be filled in the OMR Sheet)

प्रश्नपुस्तिका सीरीज
Question Booklet Series
C

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. The process by which different body systems work together to maintain proper function is known as:

   (A) Digestion

   (B) Respiration

   (C) Integration

   (D) Circulation

2. A deficiency of oxygen supply to tissues results in which condition?

   (A) Hyperoxia

   (B) Hypoxia

   (C) Hypercapnia

   (D) Alkalosis

3. Which organ is primarily responsible for integrating and processing signals in the body?

   (A) Kidney

   (B) Liver

   (C) Lung

   (D) Brain

4. When blood glucose levels fall below normal, which hormone is mainly released to restore glucose levels?

   (A) Insulin

   (B) Glucagon

   (C) Cortisol

   (D) ADH

5. Which hormone primarily regulates the basal metabolic rate in the human body?

(A) Insulin

(B) Thyroxine

(C) Growth hormone

(D) Antidiuretic hormone

6. An increase in carbon dioxide (CO_2) concentration in the blood leads to which condition?

(A) Alkalosis

(B) Neutral pH

(C) Acidosis

(D) No change

7. Reflex actions such as withdrawal from a hot object are controlled by which system?

(A) Circulatory system

(B) Endocrine system

(C) Digestive system

(D) Nervous system

8. 'When ATP levels are low in muscle cells, what is the most likely effect on muscle function?

(A) Relaxes poorly

(B) Contracts continuously

(C) Increases force production

(D) Stores Ca^{2+}

9. Which body system is responsible for the fastest response to external or internal stimuli?

(A) Endocrine system

(B) Nervous system

(C) Immune system

(D) Digestive system

10. During conditions of hypoxia (low oxygen availability), what happens to red blood cell (RBC) production in the body?

(A) Increases

(B) Decreases

(C) Stops

(D) No change

11. Proper integration and coordination of different organ systems in the body is essential because it ultimately ensures:

(A) Survival of the organism

(B) Digestion only

(C) Growth only

(D) Reproduction only

12. When oxygen levels in the body decrease, physiological responses are activated to compensate, leading to:

(A) Slowing of heart rate

(B) Increase in heart rate

(C) Stopping of breathing

(D) Reduction in carbon dioxide

13. Regulation of blood glucose levels is primarily carried out by an organ that stores and releases glucose as needed:

(A) Liver

(B) Kidney

(C) Brain

(D) Heart

14. During physical exercise, the demand for oxygen increases, and to meet this demand the respiration rate:

(A) Decreases

(B) Increases

(C) Stops temporarily

(D) Remains unchanged

15. Maintenance of pH balance in the body is achieved through coordinated action of organs like kidneys and lungs, therefore it involves:

(A) Kidneys only

(B) Lungs only

(C) Both kidneys and lungs

(D) Heart

16. When body temperature rises above normal, the body responds through mechanisms that help in heat loss such as:

(A) Shivering

(B) Vasoconstriction

(C) Sweating

(D) Hormone stop

17. Regulation of body temperature involves coordination between different systems of the body, primarily:

(A) Nervous system only

(B) Endocrine system only

(C) Both nervous and endocrine systems

(D) Digestive system

18. During dehydration, the body activates compensatory mechanisms to conserve water by:

(A) Decreases ADH

(B) Stops urine

(C) Increases glucose

(D) Increases ADH

19. A negative feedback mechanism is essential in physiological systems because it helps in maintaining stability by:

(A) Amplifying the change

(B) Reducing deviation from normal

(C) Stopping metabolic processes

(D) Increasing hormone secretion continuously

20. Homeostasis is the process by which the body maintains a constant internal environment despite external changes. It mainly ensures:

(A) Internal stability

(B) External environment

(C) Only temperature control

(D) Only oxygen supply

21. What is the most general consequence of hormonal imbalance in the body?

(A) Disturbance in digestion

(B) Disruption of homeostasis

(C) Impairment of respiration

(D) Alteration in circulation

22. Which hormone is responsible for lowering calcium levels in the blood?

(A) Calcitonin

(B) Parathyroid hormone (PTH)

(C) Cortisol

(D) Growth hormone (GH)

23. By what mechanism do steroid hormones primarily exert their effects on target cells?

(A) Binding to membrane receptors

(B) Regulating gene expression

(C) Activating ion channels

(D) Stimulating enzyme activity

24. Hormones exert their effects only on target cells that possess which of the following?

(A) Enzymes

(B) Specific receptors

(C) DNA

(D) RNA

25. Which endocrine gland responds directly to stimulation by thyroid-stimulating hormone (TSH)?

(A) Thyroid gland

(B) Adrenal gland

(C) Pituitary gland

(D) Pancreas

26. What is the primary function of feedback inhibition in physiological systems?

(A) Regulation of growth

(B) Regulation of digestion

(C) Maintenance of homeostasis

(D) Regulation of respiration

27. What is the effect on the liver when glucagon levels increase in the bloodstream?

(A) The liver stores glucose

(B) The liver stores fat

(C) The liver reduces enzyme activity

(D) The liver releases glucose

28. Which hormone plays a major role in promoting protein synthesis in the body?

(A) Growth hormone (GH)

(B) Antidiuretic hormone (ADH)

(C) Cortisol

(D) Glucagon

29. What is the physiological consequence of insulin resistance in the body?

(A) Hyperglycemia

(B) Hypoglycemia

(C) Reduced metabolism

(D) Low blood pressure

30. During conditions of stress, which hormone is primarily released in increased amounts?

(A) Melatonin

(B) Cortisol

(C) Insulin

(D) Thyroxine

31. What does the sigmoid shape of the oxygen—hemoglobin dissociation curve indicate?

(A) Weak binding of oxygen

(B) Cooperative binding of oxygen

(C) Linear binding of oxygen

(D) Random binding of oxygen

32. Which condition leads to a reduction in oxygen delivery to body tissues?

(A) Rightward shift of the curve

(B) High carbon dioxide levels

(C) Carbon monoxide binding to hemoglobin

(D) High temperature

33. In which location is hemoglobin saturation with oxygen highest?

(A) Body tissues

(B) Lungs

(C) Veins

(D) Capillaries

34. To which part of hemoglobin does oxygen primarily bind?

(A) Globin protein

(B) Heme iron

(C) Plasma

(D) Platelets

35. What is the primary effect of carbon monoxide (CO) poisoning on blood physiology?

(A) Reduction in carbon dioxide transport

(B) Reduction in oxygen-carrying capacity

(C) Change in blood pH

(D) Reduction in red blood cell count

36. What does the Bohr effect describe in physiology?

(A) Binding of oxygen to hemoglobin

(B) Effect of carbon dioxide on oxygen release from hemoglobin

(C) Formation of red blood cells

(D) Synthesis of hemoglobin

37. In body tissues, which condition promotes the release of oxygen from hemoglobin?

(A) Low carbon dioxide levels

(B) High pH

(C) High carbon dioxide levels

(D) Low temperature

38. Which factor increases the affinity of hemoglobin (Hb) for oxygen?

(A) High carbon dioxide levels

(B) Low pH

(C) Low temperature

(D) High temperature

39. What is the effect of increased carbon dioxide (CO_2) levels on the oxygen—hemoglobin dissociation curve?

(A) It shifts to the left

(B) It shifts to the right

(C) There is no change

(D) It shifts downward

40. In which form is the majority of carbon dioxide (CO_2) transported in the blood?

(A) As dissolved gas

(B) As carbaminohemoglobin

(C) As bicarbonate ions

(D) As carbonic acid

41. Which of the following proteins forms the thick filament in muscle fibers?

(A) Actin

(B) Myosin

(C) Tropomyosin

(D) Troponin

42. What happens to the muscle during isotonic contraction?

(A) The muscle changes its length

(B) The muscle remains the same length

(C) The muscle stops functioning

(D) The muscle expands

43. What is the primary role of troponin in muscle contraction?

(A) It synthesizes ATP

(B) It binds calcium ions (Ca^{2+})

(C) It causes filament sliding

(D) It stores energy

44. Which type of muscle is both involuntary in action and striated in appearance?

(A) Skeletal muscle

(B) Smooth muscle

(C) Cardiac muscle

(D) Tendon

45. What is the effect on muscle contraction if calcium ions (Ca^{2+}) are removed from the muscle cell?

(A) Contraction stops

(B) Contraction increases

(C) Contraction slows

(D) There is no change

46. Which cellular structure is responsible for storing calcium ions (Ca^{2+}) in muscle cells?

(A) Nucleus

(B) Mitochondria

(C) Ribosome

(D) Sarcoplasmic reticulum

47. During muscle contraction, which band of the sarcomere remains constant in length?

(A) I band

(B) H zone

(C) Z line

(D) A band

48. Which protein blocks the binding sites on actin filaments in a resting muscle?

(A) Myosin

(B) Troponin

(C) Tropomyosin

(D) Actin

49. What happens to muscle fibers when ATP is absent during contraction?

(A) The muscles remain relaxed

(B) The muscles remain contracted

(C) The muscles become inactive

(D) The muscles detach

50. Which ion is directly responsible for initiating muscle contraction in muscle fibers?

(A) Na^{+}

(B) K^{+}

(C) $C1^{-}$

(D) Ca^{2+}

51. Urine formation involves multiple coordinated processes in nephron.

(A) Diffusion

(B) Osmosis

(C) Filtration

(D) Filtration + reabsorption + secretion

52. Apart from excretion, kidneys play a crucial role in maintaining internal chemical balance of the body.

(A) pH

(B) Temperature

(C) Digestion

(D) Respiration

53. ADH increases water reabsorption, leading to change in urine concentration.

(A) Dilution

(B) Filtration

(C) Secretion

(D) Concentration

54. Most useful substances are reabsorbed in a specific nephron segment.

(A) DCT

(B) Loop

(C) PCT

(D) CD

55. The first step of urine formation takes place in a specialized capillary network of the nephron.

(A) Glomerulus

(B) Loop

(C) DCT

(D) CD

56. Lipase converts complex molecules into fatty acids and glycerol.

(A) Protein

(B) Carb

(C) DNA

(D) Lipid

57. Most nutrients from digested food are absorbed in a specialized region of the alimentary canal with large surface area.

(A) Stomach

(B) Small intestine

(C) Colon

(D) Mouth

58. Bile, produced by the liver, plays an important role in digestion by aiding the breakdown of large fat globules.

(A) Protein digestion

(B) Carb digestion

(C) Enzyme action

(D) Fat emulsification

59. Pepsin is a gastric enzyme that specifically acts on complex food molecules and breaks them into simpler units.

(A) Fat

(B) Protein

(C) Carbs

(D) DNA

60. Carbohydrate digestion begins where salivary enzymes initiate the breakdown of starch into simpler sugars.

(A) Mouth

(B) Stomach

(C) Intestine

(D) Colon

61. Growth hormone mainly promotes growth and elongation of skeletal structures during development.

(A) Blood

(B) Nerves

(C) RBCs

(D) Bones

62. The hypothalamus regulates the endocrine system by controlling the activity of the master gland of the body.

(A) Kidney

(B) Pituitary

(C) Liver

(D) Heart

63. Calcitonin helps in maintaining mineral balance by lowering blood calcium levels.

(A) Oxygen

(B) Sodium

(C) Glucose

(D) Calcium

64. Oxytocin plays an important role in reproductive functions, especially during lactation.

(A) Milk ejection

(B) Digestion

(C) Growth

(D) Respiration

65. Endocrine glands release hormones directly into the bloodstream instead of using specialized channels for transport.

(A) Blood

(B) Ducts

(C) Cells

(D) Hormones

66. Some hormones act antagonistically to insulin and help increase blood glucose levels during fasting or stress conditions.

(A) Insulin

(B) Glucagon

(C) Calcitonin

(D) ADH

67. Cortisol is a hormone produced by the adrenal cortex and belongs to a class of cholesterol-derived hormones.

(A) Enzyme

(B) Lipid

(C) Protein hormone

(D) Steroid hormone

68. Antidiuretic hormone (ADH) mainly acts on organs responsible for regulating water balance by increasing water reabsorption.

(A) Brain

(B) Heart

(C) Kidney

(D) Liver

69. Thyroxine, a hormone produced by the thyroid gland, primarily increases the overall metabolic rate of the body.

(A) Immunity

(B) Digestion

(C) Metabolism

(D) Growth

70. Insulin is a hormone secreted by pancreatic β-cells that helps regulate blood sugar by promoting glucose uptake into cells and reducing its level in the bloodstream.

(A) Glucose

(B) Calcium

(C) Sodium

(D) Oxygen

71. How is cardiac output (CO) calculated?

(A) HR + SV

(B) HR×SV

(C) SV-HR

(D) HR÷SV

72. Through which vessel does oxygenated blood return from the lungs to the heart?

(A) Pulmonary vein

(B) Aorta

(C) Vena cava

(D) Pulmonary artery

73. What does the T wave in an electrocardiogram (ECG) represent?

(A) Depolarization

(B) Repolarization

(C) Contraction

(D) Relaxation

74. Under which condition does blood pressure increase in the circulatory system?

(A) Vasodilation of blood vessels

(B) Vasoconstriction of blood vessels

(C) Decrease in heart rate

(D) Decrease in cardiac output

75. Which factor directly influences stroke volume of the heart?

(A) Heart rate

(B) Contractility of cardiac muscle

(C) Hormones

(D) Temperature

76. What is the primary function of capillaries in the circulatory system?

(A) Pumping blood

(B) Exchange of gases and nutrients

(C) Storage of blood

(D) Filtration of blood

77. What is the primary function of the sinoatrial (SA) node in the heart?

(A) It controls heart rhythm

(B) It regulates blood flow

(C) It controls oxygen levels

(D) It secretes hormones

78. What is the effect of an increase in heart rate (HR) on cardiac output (CO), assuming other factors remain constant?

(A) Cardiac output increases

(B) Cardiac output decreases

(C) No change in cardiac output

(D) No change in blood pressure

79. Which type of valve in the heart prevents the backflow of blood from the ventricles into the atria?

(A) Semilunar valve

(B) Atrioventricular (AV) Valve

(C) Aortic valve

(D) Pulmonary valve

80. By which mechanism does the heart pump blood throughout the circulatory system?

(A) Diffusion

(B) Pressure gradient

(C) Osmosis

(D) Filtration

81. What is the likely consequence of a low platelet count in the blood?

(A) Anemia

(B) Excessive bleeding

(C) Increased infection risk

(D) Reduced oxygen supply

82. Which type of cell is responsible for producing antibodies in the body?

(A) T lymphocyte

(B) Red blood cells

(C) B lymphocytes

(D) Platelets

83. What does hematocrit represent in a blood test?

(A) Percentage of plasma

(B) Percentage of red blood cells

(C) Percentage of white blood cells

(D) Platelet count

84. What is the average lifespan of red blood cells in humans?

(A) 60 days

(B) 90 days

(C) 120 days

(D) 150 days

85. What is the primary role of albumin in blood plasma?

(A) Maintaining osmotic pressure

(B) Providing immunity

(C) Helping in clotting

(D) Transporting oxygen

86. What effect does a decrease in blood pH have on the oxygen—haemoglobin dissociation curve?

(A) Increased haemoglobin concentration

(B) Shift to the left

(C) No change

(D) Shift to the right

87. Which type of white blood cell is primarily involved in defense against parasitic infections?

(A) Monocytes

(B) Basophils

(C) Neutrophils

(D) Eosinophils

88. What is the main function of platelets in the blood?

(A) Blood clotting

(B) Providing immunity

(C) Gas transport

(D) Digestion

89. What will be the effect on oxygen transport if haemoglobin levels decrease in the blood?

(A) Increased oxygen transport

(B) Decreased oxygen transport

(C) Increased carbon dioxide levels

(D) No change in oxygen transport

90. What is the primary function of red blood cells (RBCs) in the human body?

(A) Transport of carbon dioxide (CO_2)

(B) Transport of oxygen (O_2)

(C) Transport of hormones

(D) Transport of enzymes

91. What process is most directly affected if calcium (Ca^{2+}) channels are blocked at the synapse?

(A) Nerve impulse conduction

(B) Release of neurotransmitters

(C) Formation of myelin sheath

(D) ATP synthesis

92. Which ion primarily enters the neuron during the depolarization phase of an action potential?

(A) K^+

(B) Na^+

(C) Ca^{2+}

(D) Cl^-

93. From which part of the neuron are neurotransmitters released into the synaptic cleft?

(A) Dendrites

(B) Axon terminal

(C) Soma

(D) Nodes

94. What will be the effect on membrane potential if potassium (K^+) permeability decreases in a neuron?

(A) Hyperpolarization will occur

(B) Depolarization will occur

(C) There will be no change

(D) Repolarization will increase

95. Which part of a neuron is mainly responsible for initiating the action potential?

(A) Axon hillock

(B) Dendrite

(C) Soma

(D) Synapse

96. What effect does an increase in stimulus strength have on the frequency of nerve impulses generated?

(A) It reduces impulse frequency,

(B) It increases impulse frequency

(C) It prevents impulse generation

(D) It slows conduction

97. Which type of neuron is responsible for connecting sensory neurons to motor neurons within the central nervous system?

(A) Motor neuron

(B) Sensory neuron

(C) Interneuron

(D) Bipolar neuron

98. Why is the myelin sheath considered important for proper functioning of neurons?

(A) It stores energy for neurons

(B) It insulates nerve fibers to enhance signal transmission

(C) It stores neurotransmitters

(D) It synthesizes proteins

99. What will happen to the generation of an action potential if sodium (Na^+) channels are blocked in a neuron?

(A) Faster impulse transmission

(B) No depolarization will occur

(C) Hyperpolarization will occur

(D) Increased calcium influx

100. Which ion is primarily responsible for bringing the neuron back to its resting state during repolarization?

(A) K^+

(B) Na^+

(C) Ca^{2+}

(D) Cl^-

******

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।