

Roll. No.

Question Booklet Number

O.M.R. Serial No.

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M.Sc. (SEM.-IV) (NEP) (SUPPLE.) EXAMINATION, 2024-25

ZOOLOGY

(Molecular Endocrinology)

Paper Code

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**Question Booklet
Series**

A

Time : 1 : 30 Hours

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

(Remaining instructions on 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 हों या उसमें किसी अन्य प्रकार की कमी हो, उसे तुरन्त बदल लें।
4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर- A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छानना है। उत्तर को OMR उत्तर-पत्रक में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

(शेष निर्देश अन्तिम पृष्ठ पर)

1. The smallest known peptide hormone is :
 - (A) Oxytocin
 - (B) Vasopressin
 - (C) Angiotensin II
 - (D) Somatostatin
2. Which group of hormones is soluble in plasma without carrier proteins?
 - (A) Steroids
 - (B) Thyroid Hormones
 - (C) Peptide Hormones
 - (D) Retinoids
3. Precursor for thyroid hormone is :
 - (A) Glycine
 - (B) Tyrosine
 - (C) Phenyl alanine
 - (D) Serine
4. Western Blotting is used to detect :
 - (A) RNA
 - (B) Proteins
 - (C) DNA
 - (D) Metabolites
5. In RIA, sensitivity mainly depends on :
 - (A) Enzyme concentration
 - (B) Specificity of antibody
 - (C) Amount of substrate
 - (D) Temperature
6. Sandwich ELISA differs from competitive ELISA as it :
 - (A) Requires only one antibody
 - (B) Detects antigen
 - (C) Does not use an enzyme
 - (D) Works only for hormones
7. Advantage of ELISA over RIA is :
 - (A) Higher accuracy
 - (B) Non-radioactive waste
 - (C) Works only for DNA
 - (D) Needs fewer antibodies
8. The technique which separates molecules based on size and charge is :
 - (A) Northern blot
 - (B) Electrophoresis
 - (C) RIA
 - (D) ELISA
9. Best method for real time hormone gene expression study is :
 - (A) q PCR
 - (B) HPLC
 - (C) RIA
 - (D) SDS-PAGE

10. Immuno-histochemistry provides :
- (A) Quantitative hormone data
 - (B) Spatial localization in tissues
 - (C) DNA fingerprinting
 - (D) Enzyme kinetics
11. RDT in endocrinology is mainly used for :
- (A) Producing therapeutic hormones
 - (B) Gene editing
 - (C) Protein folding studies
 - (D) Hormone transport
12. Probe used in ISH is :
- (A) Antigen
 - (B) Antibody
 - (C) Labeled DNA / RNA
 - (D) Enzyme
13. Nobel prize for Insulin discovery was awarded to :
- (A) Watson and Crick
 - (B) Brown and Goldstein
 - (C) Sanger and Gilbert
 - (D) Banting and Macleod
14. Distinguishing feature between steroid and peptide hormones is :
- (A) Short half life
 - (B) Interaction with surface receptors
 - (C) Storage in vesicles before release
 - (D) Ability to diffuse across membranes
15. In electrophoresis proteins migrate according to :
- (A) Size
 - (B) Charge to mass ratio
 - (C) Shape
 - (D) Density
16. Monoclonal antibody is produced by :
- (A) Single immune cell clone
 - (B) Mixed immune cells
 - (C) Plasma protein fractionation
 - (D) Recombinant bacteria only
17. Which one is not an amine?
- (A) Thyroxine
 - (B) Epinephrine
 - (C) Melatonin
 - (D) Cortisol
18. Which technique does not require nucleic acids?
- (A) Western Blot
 - (B) Northern Blot
 - (C) Southern Blot
 - (D) PCR

19. Which analytical method measures hormone molecular mass precisely?
- (A) ELISA
(B) Mass spectrometry
(C) PCR
(D) Northern Blot
20. Autoradiography in endocrinology helps in :
- (A) Protein folding
(B) DNA sequencing
(C) Receptor trafficking
(D) Visualizing radioactive hormones in tissues
21. Which hormone is stored in granules before release?
- (A) Cortisol
(B) Testosterone
(C) Insulin
(D) Aldosterone
22. A Hybridoma cell is fusion of :
- (A) B cell and T cell
(B) B cell and Myeloma cell
(C) Neuron and Myeloma cell
(D) Stem cell and Macrophage
23. Which technique allows single cell gene expression analysis ?
- (A) RIA
(B) Micro assay
(C) Single cell RNA – seq.
(D) HPLC
24. Chemical used in agarose gel to visualize nucleic acid is :
- (A) Ethidium Bromide
(B) Sudan Black
(C) EDTA
(D) Coomassie blue
25. Which hormone is derived from cholesterol but stored minimally?
- (A) Testosterone
(B) Insulin
(C) FSH
(D) LH
26. Endocrine signalling is distinct from autocrine because it :
- (A) travels via circulation
(B) is rapid
(C) acts on same cell
(D) uses peptides

27. Knock in mice differ from knock out in that they :
- (A) Remove a gene
 - (B) Silence RNA
 - (C) Insert a specific gene
 - (D) Delete promoter regions only
28. Which one is anti-androgenic?
- (A) Pthalates
 - (B) BPA
 - (C) DDT
 - (D) Atrazine
29. Which method can be used for DNA sequencing?
- (A) ELISA
 - (B) RIA
 - (C) Sanger's method
 - (D) HPLC
30. Which gland is controlled by hypothalamic releasing hormones?
- (A) Thyroid
 - (B) Adrenal
 - (C) Pituitary
 - (D) Parathyroid
31. The insulin receptor belongs to :
- (A) G-protein coupled receptor
 - (B) Ion channel receptor
 - (C) Tyrosine kinase receptor
 - (D) Nuclear receptor
32. Which second messenger is formed from ATP?
- (A) cAMP
 - (B) DAG
 - (C) IPB
 - (D) cGMP
33. Receptors for thyroid hormones are located in :
- (A) Cytoplasm
 - (B) Nucleus
 - (C) Plasma lemma
 - (D) Mitochondria
34. Which is a ligand gated ion channel?
- (A) TSH receptor
 - (B) Insulin receptor
 - (C) Glucocorticoid receptor
 - (D) Nicotinic acetylcholine receptor

35. GPCRs activate adenylate cyclase through :
- (A) G_q protein
 - (B) G_i protein
 - (C) G_{12} protein
 - (D) G_s protein
36. α subunit of a G-protein binds :
- (A) GTP
 - (B) ATP
 - (C) Calcium
 - (D) Sodium
37. Which second messenger mobilizes calcium from ER stores?
- (A) IP3
 - (B) DAG
 - (C) cAMP
 - (D) cGMP
38. Feedback control of cortisol on ACTH is an example of :
- (A) Positive feedback
 - (B) Negative feedback
 - (C) Autocrine regulation
 - (D) Paracrine signalling
39. Which intracellular signalling molecule activates protein Kinase C?
- (A) DAG
 - (B) IP3
 - (C) cGMP
 - (D) cAMP
40. Steroid hormone receptors belong to :
- (A) Tyrosine kinase family
 - (B) Nuclear receptor
 - (C) GPCR family
 - (D) Ion channel family
41. Which feedback loop is typical in LH surge before ovulation?
- (A) Short loop negative feedback
 - (B) Long loop negative feedback
 - (C) Positive feedback
 - (D) Autocrine loop
42. Which receptor type undergoes dimerization after hormone binding?
- (A) GPCR
 - (B) Tyrosine kinase
 - (C) Ligand-gates Ion channel
 - (D) GABA

43. The intracellular receptor for cortisol directly affects :
- (A) DNA transcription
 - (B) Enzyme phosphorylation
 - (C) RNA splicing
 - (D) Protein folding
44. Hormone which acts via cGMP as second messenger is?
- (A) Vasopressin
 - (B) ANP
 - (C) Glucagon
 - (D) Epinephrine
45. Signal amplification is characteristic of :
- (A) Direct ion transport
 - (B) Hormone storage granules
 - (C) DNA methylation
 - (D) G protein coupled receptor pathways
46. First step after ligand binding to GPCR is :
- (A) Phosphorylation of receptor
 - (B) Protein kinase Activation
 - (C) GDP-GTP exchange on G_α
 - (D) Calcium release
47. TSH receptor belongs to :
- (A) Ion channel receptor
 - (B) GPCR family
 - (C) Nuclear receptor family
 - (D) Enzyme linked receptor
48. Feedback control of oxytocin during childbirth is :
- (A) Negative feedback
 - (B) Positive feedback
 - (C) Feed forward inhibition
 - (D) Autocrine inhibition
49. Molecule which terminates cAMP signalling?
- (A) Adenylate cyclase
 - (B) Protein kinase A
 - (C) Phospho diesterase
 - (D) Calmodulin
50. Insulin receptor phosphorylates :
- (A) Tyrosine residues
 - (B) Serine residues
 - (C) Threonine residues
 - (D) Histidine residues

51. Which pathway is activated by growth hormone receptor?
- (A) MAPK pathway
(B) IP3-DAG pathway
(C) JAK-STAT pathway
(D) PI3K pathway
52. Which hormone receptor is cytoplasmic before activation?
- (A) Estrogen receptor
(B) Glucocorticoid receptor
(C) Thyroid receptor
(D) Retinoic acid receptor
53. Which protein serves as a molecular switch by cycling between GTP and GDP forms?
- (A) Adenylate Cyclase
(B) G-protein
(C) Protein Kinase
(D) Phospholipase C
54. Autocrine signaling means hormone acts :
- (A) on same cell
(B) on adjacent cells
(C) at a distant site
(D) via blood stream
55. Which hormone receptor is associated with HSP 90 before activation?
- (A) Progesterone receptor
(B) GH receptor
(C) Insulin receptor
(D) Prolactin receptor
56. Desensitization of GPCRs often involves :
- (A) Increased ligand binding
(B) Receptor phosphorylation
(C) DNA methylation
(D) RNA splicing
57. Which second messenger system is directly linked with nitric oxide signalling?
- (A) IP3-DAG
(B) cAMP
(C) cGMP
(D) JAK-STAT
58. Which hormone mainly activates tyrosine kinase receptors?
- (A) Insulin
(B) T_3
(C) Cortisol
(D) Testosterone

59. Example of paracrine signalling :
- (A) Estrogen on ovary cells
 - (B) TSH on thyroid gland
 - (C) GH on liver cells
 - (D) Insulin on muscle
60. Which receptor acts as a transcription factor upon ligand binding?
- (A) Insulin receptor
 - (B) GH receptor
 - (C) TSH receptor
 - (D) Glucocorticoid receptor
61. Which hormone stimulates ovulation?
- (A) LH
 - (B) FSH
 - (C) Estrogen
 - (D) Progesterone
62. Which hormone regulates sodium reabsorption in kidney?
- (A) Cortisol
 - (B) Aldosterone
 - (C) Insulin
 - (D) GH
63. Second messenger cAMP is degraded by :
- (A) Kinase
 - (B) Phosphodiesterase
 - (C) Cyclase
 - (D) Synthase
64. IP3 and DAG are produced from cleavage of :
- (A) ATP
 - (B) GTP
 - (C) PIP2
 - (D) RNA
65. Which second messenger increases intracellular Ca^{2+} release?
- (A) cAMP
 - (B) DAG
 - (C) cGMP
 - (D) IP3
66. G protein is activated when :
- (A) GDP binds
 - (B) GTP binds
 - (C) ATP binds
 - (D) ADP binds

67. Action of steroid hormones is generally :
- Slow and long lasting
 - Rapid and short lived
 - Rapid and long lasting
 - Reversible
68. Which protein terminates G protein signalling?
- GTPase
 - Kinase
 - Adenylate cyclase
 - Phospholipase
69. Which one is not a second messenger?
- cAMP
 - DAG
 - IP3
 - ATP
70. Which hormone acts through intracellular receptor?
- Epinephrine
 - Cortisol
 - Insulin
 - Glucagon
71. Which protein is phosphorylated by PKC?
- Tyrosine Kinase
 - Membrane proteins
 - Cytoplasmic proteins
 - All of the above
72. Termination of hormone action is achieved by :
- Hormone degradation
 - Receptor down regulation
 - Second messenger breakdown
 - All of the above
73. Which hormone receptor works as a transcription factor?
- GPCR
 - Nuclear receptor
 - Ion channel receptor
 - Tyrosine kinase receptor
74. Calmodulin is activated by :
- DAG
 - IP3
 - Ca²⁺
 - cAMP

75. Which second messenger is responsible for smooth muscle relaxation?
- (A) cAMP
 - (B) cGMP
 - (C) IP3
 - (D) DAG
76. Enzyme that converts GTP to cGMP is :
- (A) Adenylate cyclase
 - (B) Guanylate cyclase
 - (C) Kinase
 - (D) Phosphatase
77. Which protein directly activates MAP Kinase pathway?
- (A) Ras
 - (B) Gs
 - (C) Gi
 - (D) Rho
78. Which hormone action involves JAK-STAT signalling?
- (A) Insulin
 - (B) GH
 - (C) Epinephrine
 - (D) Cortisol
79. Gq protein activates :
- (A) Adenylate cyclase
 - (B) Phospholipase cyclase
 - (C) MAP kinase
 - (D) Tyrosine kinase
80. Binding site for steroid hormone on DNA is called :
- (A) Promoter
 - (B) Operator
 - (C) Hormone Response Element (HRE)
 - (D) Enhancer
81. Which signalling molecule can diffuse across membranes?
- (A) cAMP
 - (B) Nitric oxide
 - (C) DAG
 - (D) IP3
82. Which hormone is called "Love Hormone"?
- (A) Oxytocin
 - (B) Prolactin
 - (C) Vasopressin
 - (D) Testosterone

83. Seasonal reproduction in mammals is regulated by :
 (A) Cortisol
 (B) Prolactin
 (C) Melatonin
 (D) Estrogen
84. Hormone related with stress response is :
 (A) Cortisol
 (B) Insulin
 (C) GH
 (D) Thyroxine
85. Endocrine disruptor Bisphenol A mimics :
 (A) Androgen
 (B) Estrogen
 (C) Cortisol
 (D) Glucagon
86. Pharmacokinetics of hormones include :
 (A) Absorption
 (B) Distribution
 (C) Metabolism and excretion
 (D) All of the above
87. Half life of peptide hormones in plasma is generally :
 (A) Seconds to minutes
 (B) Hours
 (C) Days
 (D) Weeks
88. Hormone associated with maternal bonding behaviour is :
 (A) Prolactin
 (B) Oxytocin
 (C) Estrogen
 (D) GH
89. Hormonal contraceptives mainly use :
 (A) Progesterone and estrogen
 (B) Cortisol and aldosterone
 (C) GH and prolactin
 (D) Oxytocin and vasopressin
90. Anabolic steroids are synthetic derivatives of :
 (A) Estrogen
 (B) Testosterone
 (C) Cortisol
 (D) Progesterone
91. Effect of hormone does on response is best explained by :
 (A) Michaelis-menten kinetics
 (B) Dose response curve
 (C) Line weaves-bank not
 (D) First order kinetics

92. Which hormone is widely used as emergency contraceptive?
- (A) Estrogen
(B) Cortisol
(C) Levonorgestrel
(D) Testosterone
93. Furminization of fish in polluted water is due to :
- (A) DDT
(B) Atrazine
(C) PCB
(D) Bisphenol A
94. Which hormone regulates appetite?
- (A) Leptin
(B) Insulin
(C) Cortisol
(D) Thyroxine
95. Which hormone analog is used to induce ovulation in infertility treatment?
- (A) GnRH analog
(B) Insulin analog
(C) Prolactin analog
(D) Cortisol analog
96. Which is not a hormonal contraceptive method?
- (A) Oral Pills
(B) Hormone releasing IUD
(C) Injectable progesterone
(D) Copper T IUD
97. Which hormone is used to manage post menopausal symptoms?
- (A) Estrogen
(B) Insulin
(C) Cortisol
(D) Melatonin
98. Erythropoietin is used in treatment of :
- (A) Anaemia
(B) Diabetes
(C) Thyroid disorder
(D) Osteoporosis
99. Which enzyme metabolizes steroid hormone in liver?
- (A) Cytochrome P 450
(B) Kinase
(C) Lysozyme
(D) Transferred
100. Which hormone is used in pregnancy test?
- (A) Estrogen
(B) Progesterone
(C) hCG
(D) Prolactin

Rough Work / रफ कार्य

Example :

Question :

Q.1 (A) ● (C) (D)

Q.2 (A) (B) ● (D)

Q.3 (A) ● (C) (D)

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 & 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.

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)

प्रश्न 2 (A) (B) ● (D)

प्रश्न 3 (A) ● (C) (D)

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ०एम०आर० 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. ओ०एम०आर० 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 में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैल्कुलेटर, 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 प्रश्नपुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरिज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।