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

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

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

K-1368

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

(NEP)

(BBT2004B) BACK PAPER

DEVELOPMENT BIOLOGY

Paper Code
BBT2004B

(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 of the following statements about spermatogenesis is true?

(A) It occurs in the ovary

(B) It produces 4 haploid sperm cells

(C) It involves the fusion of two haploid cells

(D) It occurs in the testis

2. The yolk containing pole of fertilized egg is called

(A) vegetal pole

(B) animal pole

(C) posterior pole

(D) anterior pole

3. Which tissue sends inductive signals to form the neural plate?

(A) Notochord

(B) Ectoderm

(C) Mesoderm

(D) Optic vesicle

4. Telolecithal eggs have yolk concentrated at:

(A) The center

(B) The animal pole

(C) One end of the egg

(D) Evenly throughout the cytoplasm

5. The acrosome plays important role in

(A) motility of sperm

(B) penetration of sperm into ovum

(C) fusion of pronuclei into the gametes

(D) to degenerate the ovum

6. Cell lineage tracing is used to study:

(A) DNA replication

(B) Growth rates during cleavage

(C) Enzyme activity

(D) Developmental history of cells

7. The villi are numerous and scattered uniformly over chorion in

(A) Diffused

(B) cotyledonary

(C) Zonary

(D) Discoidal

8. How many polar bodies are typically formed in oogenesis?

(A) 0

(B) 1

(C) 2

(D) 3

9. The amnion is a(n):

(A) Internal organ

(B) Germ layer

(C) Extra-embryonic membrane

(D) Somite derivative

10. Gametogenesis produces:

(A) Somatic cells

(B) Gametes

(C) Zygotes

(D) Embryos

11. The type of placenta found in pig is

(A) epithelia-chorial

(B) syndesmo-chorial

(C) endothelio-chorial

(D) Haemo-chorial

12. Neural folds fuse to form:

(A) Brain

(B) Neural tube

(C) Notochord

(D) Somites

13. Zona pellucida is dissolved by

(A) hyaluronidase

(B) lysine

(C) acrosin

(D) Estrogen

14. Morula contains _____ cells

(A) 32

(B) more than 32

(C) less than 16

(D) 16

15. Differential gene expression allows:

(A) All cells to express the same genes

(B) Specialized functions in different cells

(C) Genes to mutate during development

(D) Uncontrolled cell division

16. Extraembryonic membranes do not include

(A) Amnion

(B) chorion

(C) allantois

(D) yolk

17. Which type of egg contains very little yolk?

(A) Microlecithal

(B) Macrolecithal

(C) Mesolecithal

(D) Centrolecithal

18. Gastrula encloses a cavity called

(A) amnion

(B) yolk sac

(C) blastocoel

(D) Archenteron

19. Which cells are called as supporting cells between spermatogonia?

(A) Sertoli cells

(B) germinal cells

(C) Leydig cells

(D) connective tissue

20. The uterine wall fuses with extra-embryonic membranes to form

(A) neural crest

(B) notochord

(C) placenta

(D) blastula

21. The neural plate forms from:

(A) Mesoderm

(B) Endoderm

(C) Ectoderm

(D) Notochord

22. Somites give rise to:

(A) Skin only

(B) Muscles and vertebrae

(C) Blood only

(D) Brain

23. The region where sperm enters the egg is called

(A) animal pole

(B) penetration pole

(C) vegetal pole

(D) receptor cone

24. What is the term for the transformation of spermatids into spermatozoa?

(A) Meiosis

(B) Spermiogenesis

(C) Gametogenesis

(D) Fertilization

25. Meroblastic cleavage occurs in eggs with:

(A) No yolk

(B) Little yolk

(C) Moderate yolk

(D) Large amount of yolk

26. The chorion functions in:

(A) Gas exchange

(B) Blood cell production

(C) Digestion

(D) Urine formation

27. Which part of sperm provides energy to fertilise the egg

(A) sperm tail

(B) acrosome

(C) middle piece

(D) sperm head

28. What is an “organizer” in developmental biology?

(A) A gene controlling development

(B) A region that directs the development of adjacent cells

(C) A molecule responsible for DNA synthesis

(D) A phase in the cell cycle

29. Which of the fetal membranes is directly connected with placenta?

(A) amnion

(B) yolk sac

(C) allantois

(D) chorion

30. Cells of corona radiate are glued by

(A) hyaluronidase

(B) estrogen

(C) hyaluronic acid

(D) lipid

31. What is the function of yolk sac in embryonic development?

(A) exchange of gases

(B) nutrient storage

(C) protection of embryo

(D) production of blood cells

32. Which of the following is a diploid cell?

(A) Zygote

(B) Ovum

(C) Sperm

(D) Secondary oocyte

33. The process by which a fertilized egg develops into a multicellular organism is called:

(A) Development

(B) Morphogenesis

(C) Differentiation

(D) Cleavage

34. Which of the following is not a mechanism of cell signaling during embryonic development?

(A) contact-dependent

(B) phagocytosis

(C) paracrine signaling

(D) endocrine signalling

35. Hollow blastocoel surrounded by a single layer of cells characterizes

(A) stereoblastula

(B) periblastula

(C) coeloblastula

(D) Amphiblastula

36. In mammals fertilization is

(A) external

(B) tubal

(C) uterine

(D) internal

37. The hollow stage of embryo is:

(A) Morula

(B) Blastula

(C) Gastrula

(D) Neurula

38. Placenta cannot be classified on the basis of

(A) origin

(B) intimacy

(C) histology

(D) shape of villi

39. The acrosomal reaction occurs in:

(A) Egg cytoplasm

(B) Sperm cell

(C) Zona pellucida

(D) Cortical granules

40. The substance fertilisin is secreted by

(A) spermatozoa

(B) spermatogonia

(C) ova

(D) blastula

41. Morphogenesis refers to:

(A) Cell differentiation

(B) Formation of specialized structures in an organism

(C) DNA replication

(D) Breakdown of organic matter

42. Type of cleavage does not depend on

(A) amount of yolk

(B) distribution of yolk

(C) zygote nucleus

(D) time of cleavage

43. Plasticity in embryonic development refers to:

(A) Inflexibility in cell fate

(B) Irreversible differentiation

(C) Determination of zygote

(D) Ability of cells to change fate

44. The placenta in mammals is primarily derived from:

(A) Endoderm only

(B) Maternal uterine tissue only

(C) Both embryonic and maternal tissues

(D) Ectoderm only

45. A signal from one group of cells that influences the development of another is called:

(A) Induction

(B) Determination

(C) Cleavage

(D) Translation

46. The cleavage furrow extends through the entire egg in _____ cleavage.

(A) Holoblastic

(B) meroblastic

(C) meroblastic equal

(D) meroblastic unequal

47. The male gamete is known as

(A) spermatosome

(B) spermatocyte

(C) spermatid

(D) Sperm

48. In mammals ovary is primarily concerned with

(A) production of hormone

(B) production of ovum

(C) development of secondary sexual characters

(D) production of Graffian Follicle

49. The process of delamination involves:

(A) Surface cells migrating inward

(B) Splitting of a cell sheet into two layers

(C) Folding of the neural plate

(D) Formation of yolk plug

50. The primitive gut formed during gastrulation is known as:

(A) Blastocoel

(B) Coelom

(C) Archenteron

(D) Notocord

51. The solid ball of cells formed after cleavage is known as

(A) morula

(B) blastula

(C) gastrula

(D) fetus

52. Multiplication phase results in the formation of

(A) sperm

(B) secondary spermatocyte

(C) spermatid

(D) Spermatogonium

53. Number of germ layers in most animals:

(A) One

(B) Two

(C) Three

(D) Four

54. Holoblastic cleavage extends through

(A) entire egg

(B) center of egg

(C) animal pole

(D) vegetal pole

55. Cell communication in development is called:

(A) Digestion

(B) Induction

(C) Respiration

(D) Excretion

56. The zygote undergoes its first division by:

(A) Meiosis

(B) Mitosis

(C) Amitosis

(D) Binary fission

57. The process of formation of the neural tube is called:

(A) Neurulation

(B) Gastrulation

(C) Induction

(D) Delamination

58. Cell commitment involves:

(A) Random cell fate

(B) Reversible gene expression

(C) Specification and determination

(D) Complete differentiation

59. The acrosome is formed by

(A) mitochondria

(B) golgi bodies

(C) ribosomes

(D) nucleus

60. The amnion primarily functions to:

(A) Protect the embryo from shocks

(B) Provide nutrients

(C) Facilitate waste removal

(D) Support placenta formation

61. Gonads develop from embryonic

(A) ectoderm

(B) endoderm

(C) yolk sac

(D) Mesoderm

62. One layered barrier between maternal and fetal placenta

(A) endothelio-chorion

(B) Haemo-endothelium

(C) epithelio-chorion

(D) haemo-chorial

63. Morphogens are:

(A) Gradients of signaling molecules

(B) Structural proteins

(C) Digestive enzymes

(D) Transport proteins

64. The term “cell fate” refers to:

(A) The potential function a cell will achieve during development

(B) The destruction of cells during apoptosis

(C) Cell division without differentiation

(D) The death of a cell

65. The heart originates from which germ layer?

(A) Endoderm

(B) Ectoderm

(C) Paraxial mesoderm

(D) Lateral plate mesoderm

66. Sertoli cells do not

(A) maintain blood-testis barrier

(B) create environment for differentiation of sperm cells

(C) do not secrete inhibin

(D) help maintain high testosterone level

67. Epiboly occurs in:

(A) Yolk-rich cells

(B) Neural crest cells

(C) Mesodermal precursors

(D) Surface ectoderm cells

68. The first germ layer to form during gastrulation is:

(A) Mesoderm

(B) Ectoderm

(C) Endoderm

(D) Neural crest

69. Body axes include:

(A) Length only

(B) Width only

(C) Anterior-posterior

(D) Color pattern

70. Which signaling pathway is critical for cell fate determination?

(A) Hedgehog pathway

(B) Glycolysis pathway

(C) Calvin cycle

(D) Respiratory chain

71. The layer of cells immediately surrounding the ovum but outside the zona pellucida is called

(A) corona radiate

(B) theca interna

(C) membrane granulosa

(D) germinal epithelium

72. Competence in embryonic cells refers to:

(A) Cell division rate

(B) Cell death

(C) DNA replication

(D) Ability to respond to inductive signals

73. The dorsal lip of the blastopore acts as:

(A) Organizer

(B) Repressor

(C) Inducer

(D) Inhibitor

74. Cells formed after cleavage are called

(A) sperms

(B) blastomeres

(C) ova

(D) megameres

75. The anterior-posterior axis is primarily regulated by:

(A) Hox genes

(B) tRNA

(C) rRNA

(D) Ribosomes

76. Organogenesis begins after:

(A) Cleavage

(B) Blastulation

(C) Gastrulation

(D) Fertilization

77. Notogenesis involves the development of:

(A) Notochord

(B) Neural crest cells

(C) Optic vesicle

(D) Retinal pigment epithelium

78. Which of the following is not a morphogenetic movement during gastrulation?

(A) Cleavage

(B) Epiboly

(C) Ingression

(D) Convergent extension

79. The blastocoel is absent in:

(A) Coeloblastula

(B) Stereoblastula

(C) Discoblastula

(D) Blastocyst

80. Human placental classification is:

(A) Epitheliochorial

(B) Syndesmochorial

(C) Hemochorial

(D) Endotheliochorial

81. After entry of sperm into an ovum in fertilization, entry of other sperms is prevented by

(A) development of the vitelline membrane

(B) development of pigment coat

(C) formation of fertilization membrane

(D) formation of yolk

82. The allantois contributes to the formation of:

(A) Umbilical cord

(B) Placenta

(C) Liver

(D) Lens vesicle

83. Cleavage is:

(A) Cell growth

(B) Cell division without growth

(C) Cell death

(D) Cell differentiation

84. Excretion in developing embryo is enabled by

(A) chorion

(B) yolk sac

(C) allantois

(D) amnion

85. Entry of more than one sperm is:

(A) Monospermy

(B) Polyspermy

(C) Cleavage

(D) Fertilization

86. Acrosomal reaction is stimulation by exchange of

(A) Ca^{++}

(B) I

(C) Fe^{++}

(D) Na^{+}

87. Cleavage results_____ number of cells.

(A) decreased

(B) increased

(C) same

(D) still not known

88. Fertilization results in the formation of:

(A) Gametes

(B) Blastula

(C) Oocyte

(D) Zygote

89. Which of the following is true about fate maps?

(A) They show the future developmental fate of embryonic regions

(B) They identify cell death locations

(C) They are used only in mammals

(D) They are visible with the naked eye

90. Germinal ectoderm forms _____ sublayers.

(A) One

(B) Two

(C) Three

(D) Four

91. The fluid-filled cavity in the blastula is called:

(A) Blastocoel

(B) Blastoderm

(C) Morula

(D) Inner cell mass

92. The irreversible stage of cell commitment is:

(A) Specification

(B) Determination

(C) Differentiation

(D) Migration

93. The study of development is known as:

(A) Embryology

(B) Genetics

(C) Physiology

(D) Cytology

94. Which layer of the egg must be penetrated during fertilization?

(A) Chorion

(B) Amnion

(C) Endometrium

(D) Zona pellucida

95. Multiplication, growth, maturation and spermiogenesis are phases of

(A) spermatogenesis

(B) oogenesis

(C) spermateliosis

(D) spermatogonia formation

96. What prevents polyspermy during fertilization?

(A) Syngamy

(B) Cortical reaction

(C) Pronuclear fusion

(D) Acrosomal enzymes

97. One of these is not a cell movement

(A) invagination

(B) ingression

(C) epiboly

(D) cleavage

98. The neural tube is the precursor to:

(A) Retina

(B) Brain and spinal cord

(C) Cornea

(D) Notochord

99. The plane of cleavage depends on the amount and distribution of

(A) cells

(B) mitochondria

(C) yolk

(D) membranes

100. Fertilization restores:

(A) Haploid state

(B) Diploid state

(C) Triploid state

(D) Polyploidy

******

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।