Roll No. .....

Question Booklet Number

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

B. Sc. (Biotechnology) (Second Semester)

EXAMINATION, July, 2022

DEVELOPMENTAL BIOLOGY

Paper Code								
BBT	2	0	0	4	/	GE	0	2	(B)

Questions Booklet Series
A

Time : 1:30 Hours] [*Maximum Marks : 100*

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 any 75 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 75 questions are attempted by student, then the first attempted 75 questions will be considered for evaluation. 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.

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 किन्हीं 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 75 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 75 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा। 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, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page) (शेष निर्देश अन्तिम पृष्ठ पर)

(Only for Rough Work)

1. "Fluid filled segmented cavity" is the characteristic feature of :

(A) blastula

(B) zygote

(C) gastrula

(D) morula

2. How many cleavages are completed in 16-cell stages ?

(A) 3

(B) 8

(C) 4

(D) 12

3. Mammalian placenta is :

(A) a cord between mother and foetus

(B) place of attachment in uterus wall where exchange of material between mother and foetus takes place

(C) outer covering of foetus

(D) allantoic part of the uterus

4. Macrolecithal eggs are found in :

(A) Reptiles

(B) Human

(C) Branchiostoma

(D) Frog

5. Pancreas, lining of urinary bladder etc. develop from :

(A) ectoderm

(B) endoderm

(C) mesoderm

(D) Both endoderm and ectoderm

6. Fertilizin and antifertilizin are secreted by :

(A) sperm and egg

(B) egg and sperm

(C) primary follicular cells and secondary follicular cells

(D) None of the above

7. During cleavage, what is true about cells ?

(A) nucleocytoplasmic ratio remains unchanged.

(B) there is low consumption of oxygen.

(C) size of cells does not increase.

(D) the division is alike of meiosis.

8. Meroblastic cleavage is :

(A) horizontal

(B) spiral

(C) total

(D) partial/parietal

9. In telolecithal egg the yolk is found :

(A) all over the egg

(B) on one side

(C) both the sides

(D) centre

10. Neural tube defect can lead to :

(A) spina bifida

(B) anencephaly

(C) Both (A) and (B)

(D) None of the above

11. The correct order of early development stages :

(A) Fertilization $\rightarrow$ Gametogenesis $\rightarrow$ Blastulation $\rightarrow$ Gastrulation

(B) Gametogenesis $\rightarrow$ Fertilization $\rightarrow$ Blastulation $\rightarrow$ Gastrulation

(C) Fertilization $\rightarrow$ Gametogenesis $\rightarrow$ Gastrulation $\rightarrow$ Blastulation

(D) Gametogenesis $\rightarrow$ Fertilization $\rightarrow$ Gastrulation $\rightarrow$ Blastulation

12. Which transcription factor is important in eye development ?

(A) PAX6

(B) NF-kB

(C) CREB

(D) GgG22

13. Corona Radiata is :

(A) found in mature mammalian eggs

(B) found outside the zona pellucida

(C) formed by columnar, radially arranged layer of follicle cells

(D) All of the above

14. The protein of the bicoid gene in *Drosophila* determines the ..... of the embryo.

(A) posterior-lateral axis

(B) lateral-bilateral axis

(C) anterior-lateral axis

(D) anterior-posterior axis

15. Choose the false statement :

(A) A series of fate maps at consecutive stages shows the progression of different cells or regions.

(B) Fate map is a diagrammatic representation of the prospective fate of each part of an embryo at an early stage of development.

(C) Helps understand the mechanism of morphogenetic movements during gastrulation.

(D) Fate maps does not change over time.

16. The process of eye development involves :

(A) formation of eye field and optic vesicles

(B) formation of lens placode

(C) interaction between optic vesicles and lens placode

(D) All of the above

17. Cytoplasmic determinants are :

(A) maternal molecules that control early development

(B) sperm secretion molecules help to fuse male and female nuclei

(C) Both (A) and (B)

(D) connected to take impulses in the long distances

18. In *Drosophila*, body plan is set up by :

(A) positional information

(B) pattern formation

(C) removal of cytoplasmic determinants

(D) Both (A) and (B)

19. The acrosome of sperm is formed from :

(A) Mitochondria of spermatid

(B) Golgi complex of spermatid

(C) Nucleus of spermatid

(D) Centrosome of spermatid

20. For fate mating which artificial dye is used ?

(A) Vital dyes

(B) Carbon particle marking

(C) Radioactive isotope labelling

(D) All of the above

21. Which of the following cells is immortal ?

(A) Germ cells

(B) Somatic cells

(C) Cells of ovary

(D) Glomerular cells

22. The process of spermatogenesis is induced by :

(A) MSH

(B) ACTH

(C) TSH

(D) FSH

23. Considering the 28-day human ovarian cycle, the ovulation happens on :

(A) day 5 of the cycle

(B) day 28 of the cycle

(C) day 0 of the cycle

(D) day 14 of the cycle

24. The first week of human development begins with the emergence of :

(A) inner cell mass

(B) optic vesicles

(C) spinal cord

(D) brain

25. Capacitation of the sperm :

(A) occurs in zona pellucida.

(B) removes the head of the sperm.

(C) is important in fertilization.

(D) Both (B) and (C)

26. Common site of implantation for the ectopic pregnancy is :

(A) mesentery

(B) ovary

(C) uterine tube

(D) oocyte

27. To differentiate, the two intraembryonic germ layers formed are :

(A) ectoderm and mesoderm

(B) epiblast and hypoblast

(C) endoderm and epiblast

(D) ectoderm and endoderm

28. The primitive streak can be seen at the beginning of the ..... week.

(A) second

(B) third

(C) first

(D) fifth

29. Primary embryonic induction leads to the development of :

(A) neural tube

(B) eye

(C) kidneys

(D) brain and pancreas

30. Spermatogenesis without meiosis occurs in :

(A) bees

(B) bats

(C) birds

(D) birds and bats

31. Human embryo is :

(A) Microlecithal

(B) Alecithal

(C) Mesolecithal

(D) Macrolecithal

32. Two to three germ-layer formation occurs in :

(A) fertilization

(B) organogenesis

(C) gastrulation

(D) fertilization and morula formation

33. Polar bodies are made in process is called :

(A) Spermatogenesis

(B) Spermateleosi

(C) Gametogenesis

(D) Oogenesis

34. After passing through the primitive streak, epiblast cells move laterally into the blastocoel to form a new layer is known as :

(A) lateroderm

(B) mesoderm

(C) endo-lateroderm

(D) meso-lateroderm

35. The wall of the chorionic sac is composed of :

(A) cytotrophoblast and syncytiotrophoblast

(B) extraembryonic splanchnic mesoderm and both layers of trophoblast

(C) trophoblast and exocoelomic membrane

(D) two layers of trophoblast lined by extraembryonic somatic mesoderm

36. During development, the notochordal process :

(A) arises from involuting endodermal cells.

(B) becomes the appendicular skeleton.

(C) is involved in the induction of the primitive gut.

(D) extends from the prochordal plate to the primitive node.

37. The structure that replaces notochord is :

(A) spinal canal

(B) dorsal roots

(C) nucleus pulposus

(D) spinal cord

38. Study of abnormalities in embryonic development is :

(A) immunology

(B) teratology

(C) titenology

(D) birds and bats

39. One embryonic tissue influences upon the other by the phenomenon is called :

(A) morula formation

(B) embryonic induction

(C) gastrulation

(D) neurulation

40. Who discovered homeotic genes ?

(A) Edward B. Lewis

(B) Andrew Thomas

(C) Charles C. Menta

(D) Anastasia M. Wilkins

41. Chose the correct statement :

(A) determination precedes differentiation.

(B) production of tissue-specific proteins is part of cellular differentiation.

(C) determination commits a cell to its final fate.

(D) All of the above

42. Non-coding RNA, that plays an important role in controlling gene expression :

(A) t-RNA

(B) r-RNA

(C) mi-RNA

(D) l-RNA

43. Epigenetics is regulated by the process :

(A) DNA methylation only

(B) Histone modification only

(C) DNA methylation and histone modification

(D) None of the above

44. Which of the following statements is incorrect ?

(A) Prokaryotes and eukaryotes alter gene expression in response to their changing environment.

(B) Split genes in the prokaryotes decide the fate of embryo development.

(C) RNA molecules play many roles in regulating gene expression in eukaryotes.

(D) In multicellular eukaryotes, gene expression regulates development and is responsible for differences in cell types.

45. Portion of placenta contributed by the embryo is the ..... .

(A) Chorion

(B) Yolk sac

(C) Amnion

(D) Allantois

46. Human placenta is classified as ..... .

(A) Mesoeliochorial

(B) Epitheliochorial

(C) Haemochorial

(D) Endotheliochorial

47. Which month the sex of the fetus can be distinguished ?

(A) 1st month

(B) 2nd month

(C) 3rd month

(D) 4th month

48. Tertiary egg membrane does not consist of :

(A) white albumin

(B) shell membrane/shell

(C) jelly coat

(D) chorion

49. Neurulation describe the development of :

(A) notochord

(B) neural tube

(C) somite

(D) All of the above

50. Hematopoietic stem cells (adult stem cells) form the bone marrow that gives rise to :

(A) red blood cells

(B) white blood cells

(C) platelets

(D) All of the above

51. In an egg, the type of cleavage is determined by :

(A) the amount and distribution of yolk

(B) the number of egg membranes

(C) the shape and size of the sperm

(D) the size and location of the nucleus

52. All the three germ layers form :

(A) Excretory system

(B) Digestive system

(C) Nervous system

(D) Respiratory system

53. On the basis of yolk, eggs of frog are :

(A) microlecithal and centrolecithal

(B) alecithal and centrolecithal

(C) mesolecithal and isolecithal

(D) mesolecithal and telolecithal

54. If mouth develops from the blastopore, the organism is called :

(A) deuterostome

(B) deuteroblastosome

(C) protostome

(D) blastostome

55. Double uterus is present in :

(A) elephant

(B) marsupials

(C) whale

(D) tiger

56. Development of eggs without fertilization is called :

(A) oogenesis

(B) pathenogenesis

(C) metamorphosis

(D) neo-ontogenesis

57. Stem cells can divide for indefinite periods and have capability to renew themselves. This property comes under :

(A) culturing

(B) transformation

(C) proliferation

(D) fermentation

58. Delivery of the developed fetus is termed as :

(A) parturition

(B) abortion

(C) oviposition

(D) ovulation

59. Implantation occurs after ..... or fertilization.

(A) 15 days

(B) 4 days

(C) 10 days

(D) 7 days

60. ..... is the process of migration of cells from surface to interior due to inward pressure caused by micromeres.

(A) Emboly

(B) Epiboly

(C) Invaginaion

(D) Ingression

61. Which process does not come under cell differentiation ?

(A) asymmetric segregation of cytoplasmic determinants

(B) attaining functional specialization of cells

(C) follows cell determination

(D) All of the above

62. This ability to respond to a specific inductive signal is called :

(A) induction

(B) competence

(C) recapitulation

(D) involution

63. Neural crest cells give rise to a variety of cell types, for example :

(A) neuron

(B) ovarian cells

(C) macrophages

(D) RBC

64. Which of the following is correct with organogenesis ?

(A) specific organs are formed

(B) involves cell movement

(C) involves cell differentiation

(D) All of the above

65. Eye development is connected to :

(A) prosencephalon

(B) mesencephalon

(C) rhombencephalon

(D) meso-rhombencephalon

66. The structural components of the neuron area :

(A) Cell body, dendrites and axon

(B) Synapse, terminal button and glial cells

(C) Soma, synapse and chemical transmitters

(D) Cell nucleus, axon and transmitters

67. In humans, the number of ova and sperms that would be produced from 100 secondary oocytes and 100 secondary spermatocytes during gametogenesis is :

(A) 50 ova, 100 sperms
(B) 100 ova, 100 sperms
(C) 100 ova, 200 sperms
(D) 200 ova, 200 sperms

68. The development of eye in vertebrate embryology is studied under :

(A) Organogenesis
(B) Mesogenesis
(C) Neurogenesis
(D) Notogenesis

69. In chordate, the embryonic development of the animal pole forms one of the following of the adult :

(A) tail
(B) dorsal side
(C) ventral side
(D) head region

70. Choose the correct statement :

(A) In blastulation major presumptive and organ forming areas are segregated into definite points of the blastoderm.
(B) Archenteron is the fluid filled space in blastula.
(C) Blastulation of frog is called as discoblastula.
(D) Blastulation leads to the formation of three germinal layers.

71. Pituitary gland is related to :

(A) ectoderm
(B) endoderm
(C) mesoderm
(D) somatoderm

72. Protection to embryo from external shocks is exhibited by which membrane ?

(A) Amnion
(B) Placenta
(C) Chorion
(D) Allantois

73. Mass separation of cells during gastrulation is :

(A) Delamination
(B) Epiboly
(C) Morphogenesis
(D) Differentiation

74. Male hormone is :

(A) testosterone
(B) thyroid
(C) oestrogen
(D) prolactin

75. The protusion of ..... generate yolk plug.

(A) Blastomeres
(B) Endodermal cells
(C) Ectodermal cells
(D) Mesodermal cells

76. If all the endodermal cells are removed from the egg reached to gastrulation stage, the developed organism will lack :

(A) Heart

(B) Visceral organs

(C) Brain

(D) Eyes

77. The sperm acrosome contains :

(A) Hydrolytic enzymes

(B) Vitamin B complex

(C) Fructulose

(D) DNA

78. During oogenesis, each diploid cell produces :

(A) One functional egg and three polar bodies

(B) Four functional eggs

(C) Two functional egg and two polar bodies

(D) Four functional polar bodies with two eggs

79. The following function is not executed by placenta :

(A) Exchange dissolved gases

(B) Supply nutrients

(C) Protects from shock and produce hormones

(D) Facilitate embryo to implant itself

80. Choose a mismatched pair :

(A) gut—endoderm

(B) spinal cord—ectoderm

(C) eye—ectoderm and mesoderm

(D) lens—endoderm

81. What is Vitellogenesis ?

(A) Formation of membranes

(B) Synthesis of nuclea

(C) Increase in Golgi bodies and mitochondria

(D) Synthesis of yolk in ovum

82. Migration of individual cells from the surface into the embryo's interior is termed as :

(A) involution

(B) ingression

(C) invagination

(D) devolution

83. ..... cells are committed to a particular fate.

(A) Totipotent

(B) Differentiated

(C) Determined

(D) Both (A) and (B)

84. Cytoplasm and cell wall materials are formed in :

(A) cell division

(B) maturation

(C) elongation

(D) None of the above

85. Response to a stimulus is :

(A) orientation

(B) kinesis

(C) behavior

(D) action

86. Monozygotic and dizygotic twins' genetic percentages are :

(A) 100% and 50% similar

(B) 50% and 100% similar

(C) 25% and 100% similar

(D) 100% and 25% similar

87. Genetic mutations involve :

(A) poor adaptation to the environment

(B) accidental changes in the chromosomes of sperms and eggs

(C) only beneficially changes in the characteristics of an organism

(D) improved reproductive success

88. Cerebellum is responsible for :

(A) memory

(B) learning

(C) coordination

(D) emotional changes

89. In rabbits, humans and other placental mammals, fertilization occurs in :

(A) vagina

(B) ovary

(C) fallopian tubes

(D) uterus

90. External fertilization is seen in all of these, except :

(A) Mammals

(B) Fishes

(C) Amphibians

(D) Algae

91. Animals having cleidoic eggs show :

(A) Internal fertilization and internal development

(B) External fertilization and internal development

(C) External fertilization and external development

(D) Internal fertilization and external development

92. Tapetum lucidum :

(A) provide animals night vision.

(B) it is the coloured part of the eye.

(C) transparent jelly-like fluid released on eggs.

(D) it is the area where the carotid artery attaches.

93. Part of the eye dilates and contracts based on the environment :

(A) Sclera

(B) Pupil

(C) Lens

(D) Cornea

94. Choose the extra-embryonic membrane :

(A) yolk sac and allantois

(B) amnion

(C) chorion

(D) All of the above

95. The period from fertilization till birth is :

(A) pregnancy

(B) organogenesis

(C) gastrulation

(D) blastulation

96. In placenta, waste products like urea, uric acid, creatinine are excreted to maternal blood by diffusion and that comes under :

(A) excretory function

(B) nervous function

(C) respiratory function

(D) neuronal function

97. Maternal factors are :

(A) protein, mRNA packages into the egg

(B) components of the cortical granules

(C) component to stop polyspermy

(D) All of the above

98. During second week of development, the trophoblast differentiates into :

(A) secondary yolk sac

(B) syncytiotrophoblast

(C) mesoderm

(D) ectoderm

99. Cortical granules are associated with :

(A) spermatogenesis

(B) oogenesis

(C) fertilization

(D) cleavage

100. In females, when does an oocyte complete meiosis II :

(A) Just before birth

(B) After fertilization

(C) After implementation of a blastocyst

(D) Prior to follicular germination

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the most correct/appropriate 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 ny 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 सबसे सही अथवा सबसे उपयुक्त 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, उन्हें 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।