

**Yashwantrao Chavan College of Science, Karad.**

**Department of Zoology**

**B.Sc. III Zoology Semester -VI**

**Paper –XIII Developmental Biology**

**Question Bank**

1. Which of the following stages follows fertilization in embryonic development?
  - a) Blastula
  - b) Gastrula
  - c) Zygote
  - d) Morula
  
2. What is the outer layer of the blastula called?
  - a) Ectoderm
  - b) Endoderm
  - c) Mesoderm
  - d) Trophoblast
  
3. During gastrulation, which layer gives rise to the nervous system?
  - a) Ectoderm
  - b) Endoderm
  - c) Mesoderm
  - d) Trophoblast
  
4. The process by which sperm and egg fuse is called:
  - a) Fertilization
  - b) Cleavage
  - c) Gastrulation
  - d) Implantation
  
5. Which of the following is not a type of egg based on yolk distribution?
  - a) Isolecithal
  - b) Telolecithal

- c) Centrolecithal
- d) Mesolecithal

6. In chickens, the fertilized egg undergoes cleavage to form a:

- a) Morula
- b) Gastrula
- c) Blastula
- d) Blastocyst

7. The process of forming organs from the three germ layers is called:

- a) Cleavage
- b) Fertilization
- c) Gastrulation
- d) Organogenesis

8. Which of the following is derived from the mesoderm?

- a) Digestive tract
- b) Nervous system
- c) Heart and blood vessels
- d) Epidermis

9. The extraembryonic membrane that helps in gas exchange in avian embryos is called the:

- a) Amnion
- b) Chorion
- c) Allantois
- d) Yolk sac

10. The process of implantation occurs during which stage of embryonic development?

- a) Blastula
- b) Gastrula
- c) Morula
- d) Blastocyst

11. Which structure allows for the exchange of nutrients and wastes between the embryo and the mother in placental mammals?
- a) Chorion
  - b) Amnion
  - c) Allantois
  - d) Yolk sac
12. Which type of egg has a moderate amount of yolk concentrated at one pole?
- a) Isolecithal
  - b) Telolecithal
  - c) Centrolecithal
  - d) Mesolecithal
13. What is the first stage of embryonic development?
- a) Gastrulation
  - b) Blastula
  - c) Morula
  - d) Fertilization
14. In avian embryonic development, the primitive streak forms during which stage?
- a) Blastula
  - b) Gastrula
  - c) Morula
  - d) Cleavage
15. Which of the following is not a function of the placenta?
- a) Gas exchange
  - b) Waste elimination
  - c) Production of gametes
  - d) Nutrient transfer
16. What is the process by which the blastocyst attaches to the uterine wall?
- a) Fertilization
  - b) Implantation
  - c) Gastrulation
  - d) Cleavage

17. Which of the following is not a germ layer in embryonic development?
- a) Ectoderm
  - b) Mesoderm
  - c) Endoderm
  - d) Trophoderm
18. Which part of the egg provides nutrition to the developing embryo in birds?
- a) Albumen
  - b) Yolk
  - c) Shell membrane
  - d) Chalaza
19. Which of the following is true about organogenesis?
- a) It occurs during gastrulation.
  - b) It involves the formation of the three germ layers.
  - c) It is completed before cleavage.
  - d) It primarily occurs in the yolk sac.
20. Which of the following is not an extraembryonic membrane in birds?
- a) Chorion
  - b) Amnion
  - c) Allantois
  - d) Yolk sac
21. The process of blastulation involves:
- a) Formation of blastocoel
  - b) Formation of the primitive streak
  - c) Differentiation of the germ layers
  - d) Attachment of blastocyst to the uterine wall
22. Which of the following structures is responsible for providing nourishment to the embryo in mammals?
- a) Yolk sac
  - b) Allantois
  - c) Placenta
  - d) Chorion

23. During gastrulation, the ectoderm gives rise to:
- a) Digestive tract
  - b) Nervous system
  - c) Muscles and bones
  - d) Blood vessels
24. What is the process of forming the three germ layers from the blastula called?
- a) Gastrulation
  - b) Cleavage
  - c) Fertilization
  - d) Implantation
25. Which of the following is characteristic of a zygote?
- a) It has three germ layers.
  - b) It is diploid.
  - c) It undergoes cleavage.
  - d) It has a blastocoel.
26. In avian embryonic development, the first appearance of the nervous system occurs during:
- a) Blastulation
  - b) Gastrulation
  - c) Neurulation
  - d) Cleavage
27. Which structure in the egg helps in the exchange of gases?
- a) Amnion
  - b) Chorion
  - c) Allantois
  - d) Yolk sac
28. In placental mammals, which structure connects the fetus to the placenta?
- a) Amnion
  - b) Umbilical cord
  - c) Chorion
  - d) Allantois

29. What is the role of the chorion in avian embryonic development?
- a) Nutrient storage
  - b) Gas exchange
  - c) Protection
  - d) Waste elimination
30. The process by which the blastula transforms into the gastrula is called:
- a) Cleavage
  - b) Gastrulation
  - c) Fertilization
  - d) Implantation
31. Which of the following is not a characteristic of the blastula stage?
- a) Formation of the blastocoel
  - b) Three germ layers
  - c) Hollow ball of cells
  - d) Formation of the primitive streak
32. What is the function of the allantois in avian embryonic development?
- a) Gas exchange
  - b) Nutrient storage
  - c) Protection
  - d) Waste elimination
33. Which of the following is a function of the yolk sac?
- a) Gas exchange
  - b) Nutrient storage
  - c) Protection
  - d) Waste elimination
34. During which stage of embryonic development does the neural tube form?
- a) Blastula
  - b) Gastrula

- c) Neurula
- d) Morula

35. The process of forming the blastocyst involves:

- a) Cleavage
- b) Gastrulation
- c) Implantation
- d) Fertilization

36. In avian embryonic development, what structure surrounds the embryo and provides protection?

- a) Amnion
- b) Chorion
- c) Allantois
- d) Yolk sac

37. Which of the following is not a germ layer?

- a) Epiderm
- b) Endoderm
- c) Mesoderm
- d) Ectoderm

38. The process of forming the primitive streak occurs during which stage of embryonic development?

- a) Cleavage
- b) Blastula
- c) Gastrula
- d) Neurula

39. In placental mammals, what structure allows for the exchange of nutrients and wastes between the mother and the fetus?

- a) Chorion
- b) Amnion
- c) Allantois
- d) Yolk sac

40. Which of the following structures is not derived from the mesoderm?

- a) Muscles
- b) Heart
- c) Nervous system
- d) Bones

41. During which stage of embryonic development does the blastula form?

- a) Cleavage
- b) Gastrulation
- c) Neurulation
- d) Organogenesis

42. What is the function of the amnion in avian embryonic development?

- a) Gas exchange
- b) Nutrient storage
- c) Protection
- d) Waste elimination

43. Which of the following is true about cleavage?

- a) It occurs before fertilization.
- b) It involves the formation of the blastocoel.
- c) It results in the formation of the three germ layers.
- d) It increases the size of the embryo.

44. The formation of the notochord occurs during which stage of embryonic development?

- a) Cleavage
- b) Gastrulation
- c) Neurulation
- d) Organogenesis

45. Which of the following is not an extraembryonic membrane in birds?

- a) Amnion
- b) Chorion
- c) Allantois
- d) Endoderm



46. During which stage of embryonic development does the blastocoel form?

- a) Cleavage
- b) Blastula
- c) Gastrula
- d) Neurula

47. The process of forming the neural tube occurs during:

- a) Cleavage
- b) Gastrulation
- c) Neurulation
- d) Organogenesis

48. Which of the following is not a function of the blastocoel?

- a) Nutrient storage
- b) Protection
- c) Gas exchange
- d) Waste elimination

49. Which of the following is not a function of the amnion?

- a) Gas exchange
- b) Nutrient storage
- c) Protection
- d) Waste elimination

50. What is the function of the amnion in avian embryonic development?

- a) Gas exchange
- b) Nutrient storage
- c) Protection
- d) Waste elimination

51. Which of the following is true about cleavage?

- a) It occurs before fertilization.

- b) It involves the formation of the blastocoel.
- c) It results in the formation of the three germ layers.
- d) It increases the size of the embryo.

52. The formation of the notochord occurs during which stage of embryonic development?

- a) Cleavage
- b) Gastrulation
- c) Neurulation
- d) Organogenesis

53. Which of the following is not an extraembryonic membrane in birds?

- a) Amnion
- b) Chorion
- c) Allantois
- d) Endoderm

54. During which stage of embryonic development does the blastocoel form?

- a) Cleavage
- b) Blastula
- c) Gastrula
- d) Neurula

55. The process of forming the neural tube occurs during:

- a) Cleavage
- b) Gastrulation
- c) Neurulation
- d) Organogenesis

56. Which of the following is not a function of the blastocoel?

- a) Nutrient storage
- b) Protection
- c) Gas exchange
- d) Waste elimination

57. Which of the following is true about the process of neurulation?
- a) It occurs before cleavage.
  - b) It involves the formation of the notochord.
  - c) It primarily occurs in the endoderm.
  - d) It is completed before fertilization.

### Long Answer Question

1. What is a blastula, and how does it form in the chick embryo?
2. Describe the cellular events involved in blastulation in the chick embryo.
3. What are the key features of blastula formation in avian development?
4. How does the blastoderm develop into a blastula in the chick embryo?
5. Explain the role of cleavage in blastula formation in chick embryogenesis.
6. Discuss the structural characteristics of the blastula stage in chick development.
7. What are the main cell types present in the blastula of a chick embryo?
8. How does blastocoel formation occur in the chick blastula?
9. Explain the significance of the blastula stage in chick embryonic development.
10. Explain how blastula formation prepares the embryo for gastrulation in chick development.
11. Discuss the role of transcription factors in regulating gene expression during blastula formation in chick embryos.
12. Eggs based on distribution of Yolk in cytoplasm.
13. Amphimixis.
14. Define Fertilization and explain the process of internal fertilization.
15. Describe the fate of three germ layers in the frog.
16. Cleavage cell divisions in frog.
17. Morphological changes during Frog metamorphosis.
18. Development of primitive streak.
19. Significance of placenta.
20. What are the key morphological landmarks of the gastrula stage in chick embryogenesis?
21. Describe the cellular movements involved in gastrulation in chick embryos.
22. Explain how the primitive streak forms during gastrulation in chick development.
23. Discuss the role of cell-cell signaling in gastrulation patterning in chick embryos.
24. How do the germ layers differentiate during gastrulation in chick embryos?

25. What are the major signaling pathways involved in gastrulation initiation in chick development?
26. Describe the fate mapping studies that have elucidated gastrulation in chick embryos.
27. Explain the significance of the Hensen's node in chick gastrulation.
28. Discuss the role of extracellular matrix components in gastrulation movements in chick embryos.
29. How do the germ layers undergo morphogenesis during gastrulation in chick development?
30. What are the major cellular behaviors exhibited during gastrulation in chick embryos?
31. Describe the formation of the notochord during chick gastrulation.
32. Discuss the similarities and differences between gastrulation in chick and amphibian embryos.
33. Explain how gastrulation establishes the basic body plan in chick embryos.
34. What is the role of the primitive streak in organizing gastrulation movements in chick embryos?
35. Describe the fate of the cells that ingress through the primitive streak during chick gastrulation.
36. How does gastrulation contribute to tissue specification in chick embryogenesis?
37. Describe the process of neural tube formation during organogenesis in chick embryos.
38. Discuss the morphogenetic movements involved in neural tube closure in chick embryos.
39. Explain how the neural tube gives rise to the central nervous system in chick embryos.
40. Discuss the formation of the neural plate and neural folds during chick embryogenesis.
41. How does the notochord influence neural tube development in chick embryos?.
42. Describe the formation of the heart tube during chick organogenesis.
43. Describe the formation of the gut tube during organogenesis in chick embryos.
44. Discuss the regionalization of the gut tube along the anterior-posterior axis in chick development.
45. How does the endoderm differentiate into various gut organs during chick embryogenesis?
46. Explain the role of signaling molecules in gut tube patterning in chick embryos.
47. Describe the process of gut tube folding during chick organogenesis.
48. Discuss the formation of the dorsal and ventral pancreas from the gut endoderm in chick embryos.

49. Explain the molecular regulation of gut tube morphogenesis in chick development.
50. Discuss the role of the notochord in gut tube development in chick embryos.
51. What are the main types of eggs found in different animal species, and how do their structures and compositions vary?
52. Discuss the significance of the yolk in different types of eggs and its role in embryonic development.
53. Explain the differences between telolecithal, centrolecithal, and alecithal eggs, providing examples of animals that produce each type.
54. How does the distribution of yolk affect the cleavage pattern in different types of eggs?
55. Discuss the relationship between cleavage patterns and blastula formation in various types of eggs.
56. What are the main types of placenta found in mammals, and how do they differ in structure
57. Explain the process of fertilization and cleavage in frog embryos, including the formation of the blastula.
58. Describe the mechanisms of gastrulation in frog embryos, focusing on the formation of the blastopore and the three germ layers.
59. Discuss the role of the organizer region in frog gastrulation and its significance in embryonic patterning.
60. Describe Fertilization and give the significance of fertilization
61. Describe the structure of blastula in a frog and the fate map of the frog blastula
62. What is Foetal membrane? Describe their formation and function in chick.
63. Explain the formation of the neural tube and notochord in frog embryos and their roles in nervous system development.
64. Explain the role of environmental factors, such as temperature and humidity, in regulating frog embryonic development and metamorphosis.
65. Structure of Mature Egg of Bird.
66. Capacitation of sperm.
67. Fertilization in frog.
68. Hormonal control of frog metamorphosis.
69. What is vitellogenesis? Explain its process in chick.
70. Yolk sac placenta

71. Describe the process of metamorphosis in frogs, including the transformation from tadpole to adult frog and the role of thyroid hormones.
72. What is Cleavage? Explain the types of cleavage seen in the eggs.
73. Describe the process of Gastrulation in Frog.
74. Describe the process of development of heart of chick embryo upto 72 hrs of incubation.

### **Short answer question**

1. What are the different types of eggs based on yolk distribution?
2. Describe the difference between isolecithal and telolecithal eggs.
3. What is the role of the yolk in an egg?
4. How does the yolk distribution affect embryonic development?
5. Define oligolecithal eggs.
6. Explain centrolecithal eggs.
7. What is mesolecithal eggs?
8. Describe the structure of a blastula.
9. What is gastrulation?
10. How does gastrulation occur in embryonic development?
11. What are the three germ layers formed during gastrulation?
12. Define embryology.
13. What is the significance of embryology?
14. Describe the embryology of a frog.
15. What are the stages of frog embryonic development?
16. Explain the process of fertilization in frogs.
17. How do frog eggs differ from mammalian eggs?
18. Discuss the role of the blastula in frog development.
19. Describe the embryology of a chick.
20. How does chick embryonic development differ from frog embryonic development?
21. Explain the process of cleavage in chick embryology.
22. What are the extraembryonic membranes in chick development?

23. Discuss the formation of the neural tube in chick embryology.
24. What is the role of the notochord in chick development?
25. Differentiate between the amniotic and allantoic membranes in chick development.
26. Explain the process of neurulation in chick embryology.
27. What are somites in chick embryonic development?
28. Describe the formation of the primitive streak in chick development.
29. What is the significance of the primitive streak in chick embryology?
30. Discuss the role of the placenta in embryonic development.
31. Capacitation of sperm
32. Fate map of frog
33. Development of primitive streak
34. Area opaca and area pellucida
35. Yolk sac placenta
36. Significance of Placenta
37. How many types of placenta are there?
38. Describe the structure of the placenta.
39. Explain the function of the placenta.
40. Differentiate between the types of placenta based on structure.
41. What is the function of the chorion in placental development?
42. Describe the role of the amnion in placental development.
43. Discuss the significance of the umbilical cord in placental development.
44. Explain the process of villi formation in placental development.
45. What is the function of villi in placental development??
46. Describe the structure of the yolk sac in placental development.
47. What is the function of the yolk sac in placental development?
48. Explain the role of the allantois in placental development.
49. Discuss the significance of the allantois in placental development.
50. How does the amnion contribute to embryonic protection in placental development?
51. Describe the formation of the chorion in placental development.
52. Explain the role of the chorion in placental development.
53. Describe the formation of the neural tube in human embryonic development.

54. What is the significance of the neural tube in human embryonic development?
55. Discuss the formation of the three germ layers in human embryonic development.
56. Explain the process of gastrulation in human embryonic development.
57. What is the role of the notochord in human embryonic development?
58. Describe the formation of somites in human embryonic development.
59. Discuss the significance of somites in human embryonic development.
60. How does neurulation occur in human embryonic development?
61. What are the extraembryonic membranes in human embryonic development?
62. Explain the function of the amnion in human embryonic development.
63. Discuss the role of the yolk sac in human embryonic development.
64. Describe the function of the allantois in human embryonic development.
65. Types of Cleavages.
66. Hormonal control of frog metamorphosis.
67. Egg of Frog.
68. What is vitellogenesis? Explain its process in chick.
69. Development of hypoblast in chick embryo



Seat No.	
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**B.Sc.(Part-III) (Semester-VI) (Revised) (New) Examination, April-2019**

**ZOOLOGY**

**Developmental Biology (Paper XIV)**

**Sub. Code:65854**

**Day and Date : Tuesday, 16 -4- 2019**

**Total Marks : 40**

**Time : 03.00 p.m. to 05.00 p.m.**

- Instructions :**
- 1) All questions are compulsory.
  - 2) Figures to the right indicate full marks.
  - 3) Neat and labeled diagrams must be drawn wherever necessary

**Q1)** Select the correct alternative from the given options and rewrite the sentence. [8]

- a) The chemical substance present on the plasma membrane of the egg to attract the sperm of the same species is known as-----
  - i) fertilizin
  - ii) antifertilizin
  - iii) antigen
  - iv) antibody
- b) According to amount of yolk egg of amphioxius is the example of ----- type of egg
  - i) alecithal
  - ii) micrlecithal
  - iii) telolecithal
  - iv) megalecithal
- c) ----- type of cleavage is present in mollusca.
  - i) superficial
  - ii) Discoidal
  - iii) Spiral
  - iv) Radial
- d) In chick during embryonic development of brain is developed from-----
  - i) Bile
  - ii) Myocin
  - iii) Troponin
  - iv) tropomyosin
- e) Migration of blastomeres through blastopore is known as-----
  - i) epiboly
  - ii) emboly
  - iii) envagination
  - iv) delamination

**P.T.O.**

- f) In chick during development gastrulation is due to-----
- i) emboly
  - ii) epiboly
  - iii) invagination
  - iv) delamination
- g) Chorion is developed from-----
- i) somatoplure
  - ii) splanchnopure
  - iii) allantois
  - iv) seroamnion
- h) The embryo of chick is developed inside the extra embryonic cavity made by\_\_\_\_\_
- i) amnion
  - ii) chorion
  - iii) allantois
  - iv) seroamnion

**Q2) Attempt any two following: [16]**

- a) What is fertilization? Describe the cytology of fertilization.
- b) Describe the development of heart in chick up to 72 hours of incubation.
- c) What is gastrulation? Describe process of gastrulation in amphioxus.

**Q3) Attempt any four of the following. [16]**

- a) Describe structure of Hen's egg
- b) Describe different types of eggs
- c) Development of chorion and amnion in chick
- d) Cloning-significances and ethical issues
- e) Organizer
- f) Classification of placenta according to distribution of chorionic villi

