

Chordate Development and Evolution

Part 1

- 1) The bones of forelimbs of whale, bat, cheetah and man are similar in structure, because
 - (a) one organism has given rise to another
 - (b) they share a common ancestor
 - (c) they perform the same function
 - (d) they have biochemical similarities.

Answer: b

- 2) 2. In frog, the first cleavage is
 - a) Meridional
 - b) Latitudinal
 - c) Equatorial
 - d) Vertical
- 3) 3. The resulting daughter cells from cleavage are called
 - a) Epimeres
 - b) Hypomeres
 - c) Blastomeres
 - d) Mesomeres
- 4) . The outer single layer in the blastula is called
 - a) Ectoderm
 - b) Blastoderm
 - c) Blastocoel
 - d) Endoderm
- 5) Which type of cleavage is found in insects
 - a) Superficial
 - b) Discoidal
 - c) Meroblastic
 - d) Holoblastic
- 6) . Incomplete cleavage is also called as
 - a) Discoidal
 - b) Holoblastic
 - c) Superficial
 - d) Heteroblastic
- 7) . Micromeres and macromeres are found in the
 - a) Blastula of amphioxus
 - b) Blastula of frog

- c) Gastrula of amphioxus
 - d) Gastrula of frog
- 8) 12. Which is formed by the cleavage process
- a) Morula
 - b) Blastula
 - c) Gastrula
 - d) Neurula
- 9) In frog, 32 cell stage is formed by the
- a) I division
 - b) II division
 - c) IV division
 - d) V division
- 10) . The type of cleavage in amphioxus egg is
- a) Discoidal
 - b) Meroblastic
 - c) Holoblastic unequal
 - d) Holoblastic equal
- 11) An example of holoblastic unequal cleavage is the egg of
- a) Amphioxus
 - b) Hen
 - c) Frog
 - d) Fish
- 12) . Which plane passes through animal-vegetal axis
- a) Meridional
 - b) Vertical
 - c) Equatorial
 - d) Latitudinal
- 13) Superficial and discoidal cleavage are the types of
- a) Equal holoblastic
 - b) Unequal holoblastic
 - c) Meroblastic
 - d) Both 1 and 2
- 14) . Name the type of cleavage that takes place in frog's egg
- a) Equal holoblastic
 - b) Unequal holoblastic
 - c) Meroblastic
 - d) Partial cleavage
- 15) 19. The central cavity in the blastoderm is called
- a) Haemocoel
 - b) Archenteron
 - c) Gastrocoel
 - d) Blastocoel
- 16) In which portion of the frog's life-cycle would a frog appear most similar to a mammal?

- a) the fertilized eggs of frogs and mammals are similar in size and look nearly identical
- b) a frog blastula is very similar to a mammalian blastocyst
- c) the events of gastrulation in frogs are highly similar to gastrulation and extraembryonic membrane formation in mammals
- d) late in organogenesis, at the phylotypic stage, the body plans of frogs and mammals are remarkably similar
- e) Early on in organogenesis

17) The notochord is a ___ structure in vertebrate embryos that lies under the ___, and is flanked by _____.

- a) mesodermal, neural tube, somites
- b) endodermal, mesoderm, the gut
- c) ectodermal, neural tube, mesoderm
- d) mesodermal, ectoderm, endoderm
- e) endodermal, epidermis, blastocoel

18) During gastrulation in Xenopus, the blastocoel

- a) becomes the gut
- b) is filled with endodermal cells and disappears
- c) is filled with mesoderm and disappears
- d) does not change, but develops into what is called the archenteron
- e) is displaced, and its original location becomes an endoderm lined cavity, the archenteron, which is a precursor to the gut

19) The process in which the three germ layers form is called:

- a) fertilization
- b) cleavage
- c) gastrulation
- d) organogenesis
- e) metamorphosis

20) During gastrulation in Xenopus, the future mesoderm and endoderm move inside the embryo through the "blastopore"; in contrast, in chickens, gastrulation involves cells moving inward through the:

- a) blastoderm
- b) yolk
- c) cleavage furrow
- d) primitive streak
- e) gut

21) In mammalian development, the embryo will form from which population of cells?

- a) the blastocyst
- b) the inner cell mass
- c) the trophectoderm
- d) the blastocoel
- e) the extraembryonic membranes

22) What property of the mammalian embryo permits the production of chimeric mice?

- a) The inner cell mass is highly regulative, so that extra cells derived from the inner cell mass of a different embryo are incorporated without causing defects.
- b) If half of the cells of the inner cell mass is removed and replaced with cells from half of a different embryo's inner cell mass, the embryo will heal and develop normally.
- c) The embryo can develop outside the womb, making surgical manipulations possible.
- d) Blastomeres separated at the two-cell stage will regulate and each forms a normal embryo.
- e) Genetically determined pigmentation differences are incompatible in the developing embryo.

23) In chick development, the cell movement during gastrulation is called:

- a) invagination
- b) involution
- c) ingestion

- d) epiboly
- e) neurulation

24) _____ are similar anatomical features in different species that do
25) not have a known common ancestor.

- a) analogies
- b) homologies
- c) homologous structures
- d) b or c

26) When two species both have similar anatomical structures that were inherited from the same ancestor that also had them, the similarities are referred to as being:

- a) homoplasies
- b) homologies
- c) neither of the above

27) Nonhomologous structures can result:

- a) only from convergent evolution
- b) from either convergent or parallel evolution
- c) neither of the above

28) Nonhomologous structures are :

- a) androgynous
- b) homoplasies
- c) neither of the above

29) The wings of a bird and the wings of a butterfly are:

- a) analogous structures
- b) homologous structures
- c) both of the above

30) The three long bones in your arm and in the wing of a bird are:

- a) homoplastic structures
- b) homologous structures

c) neither of the above

31) Gastrulation in frog involves:

- a) Epiboly
- b) Emboly
- c) Invagination
- d) All of these

32) Gastrula is the stage of the embryonic development of frog in which:

- a) The embryo has three primary germ layers
- b) Embryo is a hollow ball of cells with a single cell thick wall
- c) Embryo has ectoderm, endoderm and a blastopore
- d) Embryo has ectoderm, endoderm and a rudimentary nervous system

33) Three processes involved in the gastrulation of frog are in which of the following sequences:

- a) Epiboly, invagination, cleavage
- b) Involution, invagination, cleavage
- c) Involution, epiboly, evagination
- d) Involution, epiboly, invagination

34) Beginning of the formation of archenteron in the development of frog represents:

- a) Early blastula stage
- b) Neurula stage
- c) Early gastrula stage
- d) Late gastrula stage

35) Late gastrula in frog shows:

- a) Ectoderm, endoderm, blastopore and archenteron
- b) Ectoderm, mesoderm, blastopore and archenteron
- c) Ectoderm, endoderm, blastocoel and archenteron
- d) Ectoderm, mesoderm, blastocoel and archenteron

36) Blastopore is found in:

- a) Blastula and is the opening of blastocoel
- b) Blastula and is opening of archenteron
- c) Gastrula and is the opening of blastocoel
- d) Gastrula and is the opening archenteron

37) Holoblastic and equal cleavages in frog end after:

- a) First cleavage division
 - b) Second cleavage division
 - c) Fourth cleavage division
 - d) Fifth cleavage division
- 38) Cleavage differs from mitosis in that:
- a) It occurs in all body cells
 - b) It occurs only in zygote
 - c) It results into haploid cells only
 - d) It results into unidentical cells
- 39) Which grouping correctly represents the germinal layer and the structure derived from it:
- a) Ectoderm - liver
 - b) Mesoderm - skeleton
 - c) Endoderm - brain
 - d) Ectoderm - blood vessels
- 40) Which of the following structures are formed by the ectoderm in frog:
- a) Epidermis, stomodaeum and proctodaeum
 - b) Retina, lens, cornea and conjunctiva of the eye
 - c) Olfactory lobes, auditory vesicle, pituitary, pineal body and adrenal medulla
 - d) All of these
- 41) All the digestive glands are formed in the vertebrates by:
- a) Ectoderm only
 - b) Endoderm only
 - c) Mesoderm only
 - d) None of these
- 42) Which of the following structures in our eye are not derived from ectoderm:
- a) Lens, retina, cornea, and conjunctiva
 - b) Sclerotic, choroids layer and pupil
 - c) Iris, ciliary body and eye muscles
 - d) Both of the structures in list (b) and (c)
- Answer: Option A
- 43) Heart and kidney in the frog are derived from mesoderm whereas the lungs are derived from:
- a) Ectoderm
 - b) Endoderm
 - c) Both (a) & (b)
 - d) None of these

Answer: Option B

- 44) Which of the following parts of excretory system are endodermal in origin:
- a) A.Kidneys
 - b) B.Urinary bladder
 - c) C.Both (a) & (b)
 - d) D.None of these

Answer: Option B

- 45) Which of the following parts in adrenal gland are mesodermal in origin:
- a) A.Medulla
 - b) Cortex
 - c) C.Both (a) & (b)
 - d) D.None of these

Answer: Option B

Part 2

- 1) Which of the following structures in frog is ectodermal in origin:
- a) A. Epidermis
 - b) B. Skin glands
 - c) Dermis
 - d) D.All of these

Answer: Option C

- 2) Most mammalian eggs have practically very little amount of yolk, the survival of their embryos is made possible by the fact that:
- a) A.These are milk-fed
 - b) B.These are larger in size
 - c) C.These are nourished through placenta
 - d) D.They need no food

Answer: Option C

- 3) The term development which means formation of body from a single called zygote includes which of the following processes:
- a) A.Increase in cellular number by growth and divisions
 - b) Differentiation according to division of labour by genetic
 - c) suppression
 - d) C.Arrangement of these parts into tissues, organs etc.
 - e) All of these

Answer: Option D

- 4) Development in frog is:
- a) A.Direct
 - b) Indirect
 - c) C.Both (a) & (b)
 - d) None of these

Answer & Explanation

Answer: Option B

- 5) Eggs in frog are:
- a) A.Microlecithal
 - b) Mesolecithal
 - c) C.Telolecithal
 - d) Polylecithal

Answer: Option B

- 6) Animal pole in frog's egg in water remains upwards because:
- a) A.Sperms enter through it
 - b) It absorbs light
 - c) C.It is free from yolk
 - d) It makes egg invisible to enemies by absorbing light

Answer: Option C

- 7) Animal pole in frog's egg represents perspective:
- a) A.Dorsal side
 - b) Head end
 - c) C.Tail end
 - d) Ventral side

Answer: Option B

- 8) Gray crescent in frog's egg marks the future:
- a) A.Dorsal side of the embryo
 - b) Ventral side of the embryo
 - c) C.Lateral side of the embryo
 - d) Tail of the embryo

Answer: Option A

- 9) The entrance point of sperm in frog's egg marks which of the sides of future embryo:
- a) A.Anterior side

- b) Posterior side
- c) C.Dorsal side
- d) Ventral side

Answer: Option A

10) Posterior side of future embryo of frog will be the side:

- a) A.Of entrance point of sperm
- b) Opposite to entrance point of sperm
- c) C.Offgray crescent
- d) Of animal pole

Answer: Option B

Part 3

- 1) In frog's egg the plane cutting through entrance point, sperm path and median line of gray crescent represents:
 - 1. A.Sagittal plane of future embryo
 - 2. Anterior end of future embryo
 - 3. C.Tail of future embryo
 - 4. None of these

Answer: Option A

- 2) 1st cleavage in frog's egg is:
 - a) A.Holoblastic and vertical
 - b) Holoblastic and transverse
 - c) C.Meroblastic and vertical
 - d) Meroblastic and transverse

Answer: Option A

- 3) The term cleavage refers to:
 - a) A.Cell divisions of zygote upto completion of blastula stage
 - b) Cell divisions of sperms mother cells upto formation of spermatozoa
 - c) C.Maturation of oogonium upto formation of 1st polar body
 - d) Maturation of spermatids to form spermatozoa

Answer: Option A

- 4) Third cleavage in frog's egg is:
 - a) A.Vertical and complete
 - b) Meridional and incomplete

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- c) C.Vertical and incomplete
- d) Horizontal and complete

Answer: Option D

- 5) Morula in frog is:

A.8 celled

16 celled

C.32 celled

64 celled

Answer: Option C

- 6) According to intravitum technique used by many embryologists, the presumptive ectodermal area in frog's blastula is formed by:
- a) A.Outermost pigmented cells of animal hemisphere
 - b) Innermost cells of animal hemisphere blastocoels
 - c) C.Outermost cells of vegetal hemisphere
 - d) Innermost cells of vegetal hemisphere

Answer: Option A

- 7) Presumptive endoderm is formed in frog's blastula by:
- a) A.Most of the animal hemisphere
 - b) Most of the vegetal hemisphere
 - c) C.Partially by both of these
 - d) None of these

Answer: Option B

- 8) Gray crescent in frog's blastula includes:
- a) A.Parts of presumptive ectoderm
 - b) Parts of presumptive endoderm
 - c) C.Parts of both of these
 - d) Parts of none of these

Answer: Option C

- 9) Middorsal portion of gray crescent in frog's blastula is:
- a) A.Presumptive notochord
 - b) Presumptive neural tube

- c) C.Presumptive ectoderm
- d) None of these

Answer: Option A

10) Prechordal area in frog's blastula is the part from which:

- a) A.Tail of the tadpole is formed
- b) Mesodermal and endodermal parts of the pharyngeal region are derived
- c) C.Notochord is derived
- d) None of these

Answer: Option B

Part 4

- 1) Epiboly occurs in the:
 - a) A.Micromeres only
 - b) Macromeres only
 - c) C.Micromeres and macromeres both
 - d) None of these

Answer: Option A

2) Cells become variable in morphology and function in different regions of the embryo. The process is

- (a) differentiation
- (b) metamorphosis
- (c) organisation
- (d) rearrangement

3) Human eggs are

- (a) alecithal
- (b) microlecithal
- (c) mesolecithal
- (d) macrolecithal

4) Egg is liberated from ovary in

- (a) secondary oocyte stage

- (b) primary oocyte stage
- (c) oogonial stage
- (d) mature ovum stage.

5) Gonads develop from embryonic

- (a) ectoderm
- (b) endoderm
- (c) mesoderm**
- (d) both mesoderm and endoderm.

6) How many sperms are formed from a secondary spermatocyte?

- (a) 4
- (b) 8
- (c) 2**
- (d) 1.

7) Fertilizins are emitted by

- (a) immature eggs
- (b) mature eggs**
- (c) sperms
- (d) polar bodies.

8) During cleavage, what is true about cells?

- (a) nucleocytoplasmic ratio remains unchanged
- (b) size does not increase**
- (c) there is less consumption of oxygen
- (d) the division is like meiosis.

9) Middle piece of mammalian sperm possesses

- (a) mitochondria and centriole
- (b) mitochondria only
- (c) centriole only
- (d) nucleus and mitochondria.

10) Meroblastic cleavage is a division which is

- (a) horizontal

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- (b) partial/parietal
- (c) total
- (d) spiral.

11) 12. Eye lens is formed from

- (a) ectoderm
- (b) mesoderm
- (c) endoderm
- (d) ectoderm and mesoderm.

12) 13. Blastopore is

- (a) opening of neural tube
- (b) opening of gastrocoel
- (c) future anterior end of embryo
- (d) found in blastula.

13) Extrusion of second polar body from egg nucleus

occurs

- (a) after entry of sperm before completion of fertilization
- (b) after completion of fertilization
- (c) before entry of sperm
- (d) without any relation of sperm entry.

14) Termination of gastrulation is indicated by

- (a) obliteration of blastocoel
- (b) obliteration of archenteron
- (c) closure of blastopore
- (d) closure of neural tube.

15) In telolecithal egg the yolk is found

- (a) all over the egg
- (b) on one side
- (c) both the sides
- (d) centre.

16) Acrosome reaction in sperm is triggered by

- (a) capacitation
- (b) release of lysin
- (c) influx of Na
- (d) release of fertilizin.

17) Amount of yolk and its distribution are changed in the egg. Which one is affected?

- (a) pattern of cleavage
- (b) formation of zygote
- (c) number of blastomeres
- (d) fertilization.

18) Male hormone is produced in the testis by cells of

- (a) Sertoli
- (b) epithelial
- (c) spermatocytes

(d) leydig.

19) Fertilizin is a chemical substance produced from

- (a) polar bodies
- (b) middle piece of sperm
- (c) mature eggs
- (d) acrosome.

20) In human beings, the eggs are

- (a) mesolecithal
- (b) alecithal
- (c) microlecithal
- (d) macrolecithal

Part 5

1) The middle piece of the sperm contains

- (a) proteins
- (b) mitochondria
- (c) centriole
- (d) nucleus.

2) Blastopore is the pore of

- (a) archenteron
- (b) blastocoel
- (c) coelom
- (d) alimentary canal

3) What is true for cleavage?

- (a) size of embryo increases
- (b) size of cells decreases

- (c) size of cells increases
- (d) size of embryo decreases.

- 4) Grey crescent is the area
- (a) at the point of entry of sperm into ovum
 - (b) Just opposite to the site, of entry of sperm into ovum**
 - (c) at the animal pole
 - (d) at the vegetal pole.

- 5) Meroblastic Cleavage is another name for which of these
- (a) Equal holoblastic
 - (b) Unequal holoblastic
 - (c) Partial
 - (d) Superficial

Answer: (c)

- 6) Which type of Cleavage is found in Insects?
- (a) Discoidal
 - (b) Holoblastic
 - (c) Meroblastic
 - (d) Superficial

Answer: (d)

- 7) Discoidal and Superficial Cleavages belong to which type of Cleavage?
- (a) Unequal holoblastic
 - (b) Equal holoblastic
 - (c) Both (a) and (b)
 - (d) Meroblastic

Answer: (d)

- 8) When the first Cleavage furrow divides the Zygote completely into two, it is
- (a) Meroblastic cleavage
 - (b) Radial cleavage
 - (c) Equatorial cleavage
 - (d) Holoblastic cleavage

Answer: (d)

- 9) The only system in Humans which is derived from all the three Germ layers is
- (a) Nervous system
 - (b) Respiratory system
 - (c) Digestive system
 - (d) Excretory system

Answer: (c)

- 10) The process by which fertilized egg divides is known as
- (a) Cleavage
 - (b) Oogenesis
 - (c) Regeneration
 - (d) Invagination

Answer: (a)

- 11) When an unfertilized egg is pricked with a micro needle, what happens?
- (a) It will transform into a tadpole at a faster rate
 - (b) It starts dividing
 - (c) It will remain undivided
 - (d) It will die immediately

Answer: (b)

- 12) How many cells are there in a freshly unfertilized egg of hen?
- (a) One cell

- (b) 1,000 cells
- (c) 100 cells
- (d) 10,000 cells

Answer: (a)

13) A 16 celled stage of egg completes how many Cleavages?

- (a) 12
- (b) 4
- (c) 8
- (d) 3

Answer: (b)

14) The spindle in determinate Cleavage is situated

- (a) Horizontal
- (b) Vertical
- (c) Oblique
- (d) Sub-equatorial

Answer: (c)

15) How many hours after fertilization, the zygote undergoes a series of Mitotic divisions to form Blastomeres?

- (a) 10 hours
- (b) 5 hours
- (c) 15 hours
- (d) 30 hours

Answer: (d)

16) An outer envelope of cells in the Blastocyst is called

- (a) Trophoblast
- (b) Embryoblast

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- (c) Animal pole
- (d) Anembryonic pole

Answer: (a)

17) Which of the following is correct during Cleavage?

- (a) Embryo size decreases
- (b) Cell's size decreases
- (c) Cell's size increases
- (d) Embryo size increases

Answer: (b)

18) In mammalian egg, Cleavage is

- (a) Discoidal meroblastic
- (b) Unequal holoblastic
- (c) Equal holoblastic
- (d) Superficial meroblastic

Answer: (c)

19) In an egg, the Cleavage type can be determined by

- (a) Sperm's shape and size
- (b) Location and size of the nucleus
- (c) Distribution and amount of yolk
- (d) Number of egg membranes

Answer: (c)

20) What's true about the Cleavage in fertilized eggs of Humans?

- (a) It starts in the fallopian tube
- (b) It starts when egg reaches the uterus
- (c) It is meroblastic
- (d) It is identical to normal mitosis

Answer: (a)

Part 6

1. How is the division of Meroblastic Cleavage?

- (a) Horizontal
- (b) Spiral
- (c) Total
- (d) Parietal/partial

Answer: (d)

2. In frog, IV V division of cleavage forms

- a) 2 cell stage
- b) 4 cell stage
- c) 16 cell stage
- d) 32 cell stage

ANSWER : : 16 cell stage

3. Which of the following is also called as meroblastic cleavage

- a) Equal holoblastic
- b) Unequal holoblastic
- c) Partial
- d) Superficial

ANSWER : : Partial

4. Which of the following is also called as meroblastic cleavage

- a) Equal holoblastic
- b) Unequal holoblastic
- c) Partial
- d) Superficial

ANSWER : : Partial

5. In frog, 4th cleavage is

- a) Meridional
- b) Latitudinal
- c) Transverse
- d) Vertical

ANSWER : : Vertical

6. 4. The type of cleavage in frog's egg is
a) Holoblastic equal
b) Holoblastic unequal
c) Meroblastic
d) Discoidal

ANSWER : : Holoblastic unequal

7. Which plane bisects the egg at right angles to the median axis
a) Meridional
b) Latitudinal
c) Equatorial
d) Latitudinal

ANSWER : : Equatorial

8. In frog, the first cleavage is
a) Meridional
b) Latitudinal
c) Equatorial
d) Vertical

ANSWER : : Meridional

9. The resulting daughter cells from cleavage are called
a) Epimeres
b) Hypomeres
c) Blastomeres
d) Mesomeres

ANSWER : : Blastomeres

10. The outer single layer in the blastula is called
a) Ectoderm
b) Blastoderm
c) Blastocoel
d) Endoderm

ANSWER : : Blastoderm

11. Which type of cleavage is found in insects
a) Superficial
b) Discoidal

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- c) Meroblastic
- d) Holoblastic

ANSWER : : Superficial

12. .Incomplete cleavage is also called as

- a) Discoidal
- b) Holoblastic
- c) Superficial
- d) Heteroblastic

ANSWER : : Discoidal

13. Micromeres and macromeres are found in the

- a) Blastula of amphioxus
- b) Blastula of frog
- c) Gastrula of amphioxus
- d) Gastrula of frog

ANSWER : : Blastula of frog

14. Which is formed by the cleavage process

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

ANSWER : : Blastula

15. In frog, 32 cell stage is formed by the

- a) I division
- b) II division
- c) IV division
- d) V division

ANSWER : : V division

16. The type of cleavage in amphioxus egg is

- a) Discoidal
- b) Meroblastic
- c) Holoblastic unequal
- d) Holoblastic equal

ANSWER : : Holoblastic equal

17. An example of holoblastic unequal cleavage is the egg of
- a) Amphioxus
 - b) Hen
 - c) Frog
 - d) Fish

ANSWER : : Frog

18. Which plane passes through animal-vegetal axis
- a) Meridional
 - b) Vertical
 - c) Equatorial
 - d) Latitudinal

ANSWER : : Meridional

19. .Superficial and discoidal cleavage are the types of
- a) Equal holoblastic
 - b) Unequal holoblastic
 - c) Meroblastic
 - d) Both 1 and 2

ANSWER : : Meroblastic

20. Name the type of cleavage that takes place in frog's egg
- a) Equal holoblastic
 - b) Unequal holoblastic
 - c) Meroblastic
 - d) Partial cleavage

ANSWER : : Unequal holoblastic

21. The central cavity in the blastoderm is called
- a) Haemocoel
 - b) Archenteron
 - c) Gastrocoel
 - d) Blastocoel

ANSWER : : Blastocoel

22. The process of formation of primary organ rudiment is called
- a) Tubulation
 - b) Neurulation

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- c) Elongation
- d) Organogenesis

ANSWER :: Tubulation

23. During organogenesis, hypomere mesoderm flanks the
- a) Gut region
 - b) Neural tube
 - c) Notochord
 - d) Intermediate

ANSWER :: Gut region

24. During gastrulation in frog, the prospective nervous system mainly expand due to
- a) involution
 - b) Invagination
 - c) Epiboly
 - d) Delamination

ANSWER :: Epiboly

25. In the Gastrula of frog which of the following layers line the roof of the archenteron and floor of the archenteron, respectively
- a) Mesoderm, Endoderm
 - b) Endoderm, Mesoderm
 - c) Ectoderm, Mesoderm
 - d) Mesoderm, Ectoderm

ANSWER :: Endoderm, Mesoderm

26. Gastrulation in Amphioxus occurs by a process of
- a) Hyperboly
 - b) Hypoboly
 - c) Delamination
 - d) Invagination

ANSWER :: Invagination

27. Epiboly occurs in
- a) Cleavage
 - b) Oogenesis
 - c) Gastrulation
 - d) Organogenesis

ANSWER :: Gastrulation

28. In amphioxus gastrula, archenteron is formed by the
- a) Involution
 - b) Invagination
 - c) Delamination
 - d) Convergence

ANSWER : : Invagination

29. The cavity formed during the process of gastrulation is called
- a) Blastocoel
 - b) Archenteron
 - c) Sub-germinal cavity
 - d) Blastoderm

ANSWER : : Archenteron

30. The mass separation of cells from one another is called
- a) Epiboly
 - b) Invagination
 - c) Involution
 - d) Delamination

ANSWER : : Delamination

31. In frog gastrula, mesodermal cells remain separated from the notochordal cells by
- a) Convergence
 - b) Delamination
 - c) Involution
 - d) Invagination

ANSWER : : Delamination

32. Which of the following is called chordo-mesoderm
- a) Notochord and mesoderm
 - b) Notochord and endoderm
 - c) Ectoderm and mesoderm
 - d) Notochord and ectoderm

ANSWER : : Notochord and mesoderm

Part 7

1. In gastrulation, the movement of ‘throwing in’ is known as

- a) Epiboly
- b) Emboly
- c) Hypoboly
- d) Hyperboly

ANSWER : : Emboly

2. The term mesogenesis refers to the formation of
- a) Notochord only
 - b) Mesoderm only
 - c) Notochord and mesoderm
 - d) Notochord and nerve cord

ANSWER : : Mesoderm only

3. Yolk plug is found in the
- a) Blastula of amphioxus
 - b) Gastula of amphioxus
 - c) Blastula of frog
 - d) Gastrula of frog

ANSWER : : Gastrula of frog

4. In frog, the gastrula is rotated to bring its antero-posterior axis in a
- a) Horizontal plane
 - b) Longitudinal plane
 - c) Latitudinal plane
 - d) Vertical plane

ANSWER : : Horizontal plane

5. One of the following is not the type of emboly
- a) Involution
 - b) Delamination
 - c) Epiboly
 - d) Invagination

ANSWER : : Epiboly

6. In amphioxus gastrula, circular rim is called
- a) Blastopore
 - b) Blastocoel
 - c) Archenteron
 - d) Lip of blastopore

ANSWER : : Lip of blastopore

7. Mesodermal cells are formed by
- a) Involution
 - b) Invagination
 - c) Epiboly
 - d) Delamination

ANSWER : : Delamination

8. The organ that develops from ectoderm is
- a) Pancreas
 - b) Spleen
 - c) Kidney
 - d) Eye

ANSWER : : Eye

9. In amphioxus gastrula, which tissue lies in the dorsal lip of blastopore
- a) Ectoderm
 - b) Endoderm
 - c) Mesoderm
 - d) Notochord

ANSWER : : Notochord

10. Which mesoderm flanks the neural tube and notochord
- a) Epimere
 - b) Mesomere
 - c) Hypomere
 - d) Metamere

ANSWER : : Epimere

11. During organogenesis, the splanchnic mesoderm lies next to the
- a) Ectoderm
 - b) Gut epithelium
 - c) Notochord
 - d) Gut endoderm

ANSWER : : Gut endoderm

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12. In a developing embryo, the nervous system is derived from the
- a) Ectoderm
 - b) Endoderm
 - c) Mesoderm
 - d) Blastoderm

ANSWER : : Ectoderm

13. When the micromeres divide rapidly and grow over the macromeres, it is known as
- a) Epiboly
 - b) Involution
 - c) Delamination
 - d) Gastrulation

ANSWER : : Epiboly

14. The formation of brain and different sensory organs is called
- a) Metagenesis
 - b) Neurogenesis
 - c) Notogenesis
 - d) Mesogenesis

ANSWER : : Neurogenesis

15. Morphogenetic movements occur during
- a) Cleavage
 - b) Blastulation
 - c) Fertilization
 - d) Gastrulation

ANSWER : : Gastrulation

16. Which is the first indication of gastrulation in frog
- a) Formation of germ ring
 - b) Formation of gery crescent
 - c) Formation of germ layers
 - d) Formation of archenteron

ANSWER : : Formation of germ ring

17. One of the following is not a kind of tubulation
- a) Neurogenesis
 - b) Notogenesis

- c) Mesogenesis
- d) Metagenesis

ANSWER : : Metagenesis

18. The rolling in of the superficial cells over the rim of the blastopore is called
- a) Invagination
 - b) Involution
 - c) Delamination
 - d) Epiboly

ANSWER : : Involution

19. This is also known as meroblastic cleavage

- (a) Partial
- (b) Unequal holoblastic
- (c) Equal holoblastic
- (d) Super

20. 2. The type of cleavage found in insects

- (a) Holoblastic
- (b) Discoidal
- (c) Superficial
- (d) Meroblastic

Answer: (c)

- 21. Discoidal and superficial are which types of cleavage?**

- (a) Unequal holoblastic
- (b) equal holoblastic
- (c) both (a) and (b)
- (d) Meroblastic

Answer: (d)

- 22. If the _rst cleavage furrow divides zygote completely into two, the cleavage type is**

- (a) meroblastic
- (b) holoblastic
- (c) equatorial
- (d) radial

Answer: (b)

23. The only human system that is derived from all the three germ layers is

- (a) Nervous system
- (b) Digestive system
- (c) Respiratory system
- (d) Excretory system

Answer: (b)

24. The fertilized egg divides by the process of

- (a) Oogenesis
- (b) Cleavage
- (c) Regeneration
- (d) Invagination

Answer: (b)

25. If an unfertilized egg is pricked with a microneedle, it will

- (a) transform into a tadpole at a faster rate
- (b) die immediately
- (c) will remain undivided
- (d) start dividing

Answer: (d)

26. A freshly unfertilized egg of hen contains

- (a) 10,000 cells

- (b) 1,000 cells
- (c) 100 cells
- (d) one cell

Answer: (d)

27. How many cleavages are completed in the 16-celled stage of an egg?

- (a) 12
- (b) 8
- (c) 4
- (d) 3

Answer: (c)

28. The spindle in the determinate cleavage is

- (a) Horizontal
- (b) Oblique
- (c) Vertical
- (d) Sub-equatorial

Answer: (b)

29. Development in a fertilized egg starts from:

- a) A.Fragmentation
- b) Regeneration
- c) C.Cleavage
- d) Invagination

Answer: Option C

30. Development in all the fertilized eggs occurs in a definite sequence which of these is a correct sequence?

- a) A.Zygote, cleavage morula, blastula gastrula
- b) Zygote, morula, blastula, cleavage, gastrula
- c) C.Zygote, blastula, morula, eleavage gastrula
- d) Zygote, morula, blastula, gastrula, cleavage

Answer: Option A

31. Gastrula is a stage in the development of frog in which embryo possesses:
- a) A.Ectoderm, mesoderm and endoderm layers
 - b) Ectoderm layer surrounding the blastocoel
 - c) C.Ectoderm and endoderm layers forming archenteron
 - d) Ectoderm, mesoderm and endoderm layers along with a rudimentary nervous system

Answer: Option A

32. Blastopore is found in:
- a) A.Morula
 - b) Blastula
 - c) C.Gastrula
 - d) Neurula

Answer: Option C

33. Tadpole larva is stage in life history of frog which:
- a) A.Grows inside the uterus of frog
 - b) Lives on land only
 - c) C.Is different in structure and behaviour than adult frog
 - d) Resembles the adult frog

Answer: Option C

34. Archenteron is a cavity found in which of the following stages of frog's development:
- a) A.Morula
 - b) Blastula
 - c) C.Gastrula
 - d) None of these

Answer: Option C

Part 8

1. Which mammals have more yolk than cytoplasm in their eggs [MP PMT 1992]
 - a) Placental mammals
 - b) Aquatic mammals
 - c) Marsupials
 - d) Egg laying mammals

2. In determinate cleavage, the spindle is [MP PMT 1992]
 - a) Vertical
 - b) Horizontal

- c) Sub-equatorial
 - d) Oblique
3. The fertilized egg divides by the process of
- a) Regeneration
 - b) Oogenesis
 - c) Cleavage
 - d) Invagination
4. If the first cleavage furrow divides the zygote completely into two, the cleavage type is [MP PMT 1992]
- a) Radial
 - b) Equatorial
 - c) Meroblastic
 - d) Holoblastic
5. The only human system that is derived from all the three germ layers is
- a) Digestive system
 - b) Excretory system
 - c) Respiratory system
 - d) Nervous system
6. The epidermis of the skin is derived from the germinal layer [CPMT 1992]
- a) Mesoderm
 - b) Endoderm
 - c) Ectoderm
 - d) Neuro-endoderm
7. If an unfertilized egg is pricked with a micro needle, it will [NCERT 1973]
- a) Die immediately
 - b) Start dividing
 - c) Will remain undivided
 - d) Transform into a tadpole at a faster rate
8. Type of cleavage found in mammals is [CPMT 1988]
- a) Holoblastic
 - b) Meroblastic
 - c) Superficial
 - d) None of the above

9. A freshly unfertilized egg of hen contains [CPMT 1979]
a) One cell
b) 100 cells
c) 1,000 cells
d) 10,000 cells
10. The blastopore develops into future [CPMT 1976; DPMT 1985; JIPMER 2002]
a) Mouth
b) Ear
c) Anus
d) Neupore
11. How many cleavages are completed in 16 celled stage of egg. [CPMT 1975]
a) 3
b) 4
c) 8
d) 12
12. Formation of segmentation cavity shows [MP PMT 1993; DPMT 1993]
a) Rearrangement of cells
b) Blastula stage
c) Epiboly
d) Emboly
13. Unfertilized egg of human contains or When released from ovary, human egg contains
a) One Y chromosome
b) X and Y chromosome
c) XX chromosome
d) One X chromosome
14. Egg of rabbit and man are [BHU 1982, 85; CPMT 1973; CBSE PMT 1993; RPMT 1999; Pb. PMT 1999]
a) Microlecithal
b) Megalecithal
c) Telolecithal
d) Isolecithal
15. Massive amount of yolk present in the vegetal region of the egg, makes an egg [AMU 1989]

- a) Oligolecithal
 - b) Mesolecithal
 - c) Telolecithal
 - d) Centrolecithal
16. Cleidoic eggs are found in
- a) Birds
 - b) Mammals
 - c) Annelids
 - d) Molluscs
 - e) clear
17. In some eggs, future organs can be demarcated even before cleavage begins. This type of development is called
- a) Mosaic development
 - b) Regulatory development
 - c) Gynogenesis
 - d) None of the above
18. The cleavage is such method of divisions of fertilized egg in which the egg [MP PMT 1993]
- a) Does not divide but only increase in size
 - b) Divides repeatedly but without growth
 - c) Divides repeatedly and grows
 - d) None of these
19. What is true about cleavage in the fertilised egg in humans [CBSE PMT 1994; AFMC 1999]
- a) It is meroblastic
 - b) It starts while the egg is in fallopian tube
 - c) It is identical to the normal mitosis
 - d) It starts when the egg reaches in uterus
20. Meridional cleavage results in blastomeres numbering
- a) 8
 - b) 4
 - c) 10
 - d) 16
21. Mammalian eggs have
- a) No yolk at all
 - b) Small amount of yolk
 - c) Large amount of yolk
 - d) Large amount of yolk concentrated at one pole
22. Epiboly is the process of
- a) Mass migration of cells from the animal hemisphere so that upper micromeres begin to migrate over the edge of the dorsal lip and roll inside and are tucked beneath the outer layer
 - b) Over growth when the micromeres divide rapidly and begin to spread downwards over the megameres except at the yolk plug

- c) Rotation of gastrula within the vitelline membrane so that the animal pole becomes anterior
 - d) Formation of a small slit like invagination occurring on the gray crescent
23. Coelom derived from blastocoel is known as
- a) Pseudocoelom
 - b) Enterocoelom
 - c) Haemocoel
 - d) Schizocoel
24. What is true about cleavage in the fertilised egg in humans
- a) It is meroblastic
 - b) It starts while the egg is in fallopian tube
 - c) It is identical to the normal mitosis
 - d) It starts when the egg reaches in uterus

Part 9

1. Meridional cleavage results in blastomeres numbering
 - a) 8
 - b) 4
 - c) 10
 - d) 16
2. Mammalian eggs have
 - a) No yolk at all
 - b) Small amount of yolk
 - c) Large amount of yolk
 - d) Large amount of yolk concentrated at one pole
3. Epiboly is the process of
 - a) Mass migration of cells from the animal hemisphere so that upper micromeres begin to migrate over the edge of the dorsal lip and roll inside and are tucked beneath the outer layer
 - b) Over growth when the micromeres divide rapidly and begin to spread downwards over the megameres except at the yolk plug
 - c) Rotation of gastrula within the vitelline membrane so that the animal pole becomes anterior
 - d) Formation of a small slit like invagination occurring on the gray crescent
4. Coelom derived from blastocoel is known as
 - a) Pseudocoelom
 - b) Enterocoelom
 - c) Haemocoel
 - d) Schizocoel
5. Human eggs are
 - a) Microlecithal

- b) Alecithal
 - c) Macrolecithal
 - d) Mesolecithal
6. Eggs of reptiles and birds are
- a) Alecithal
 - b) Isolecithal
 - c) **Telolecithal**
 - d) Homolecithal
7. Cleavage divisions differ from normal mitotic divisions in that
- a) There is no nuclear division during cleavage
 - b) There is no division of the cytoplasm during cleavage
 - c) **There is no period of growth in between the divisions**
 - d) The division of the cytoplasm follows nuclear divisions
8. The eggs of elephant are
- a) Macrolecithal and centrolecithal
 - b) Microlecithal and telolecithal
 - c) Mesolecithal and homolecithal
 - d) **Microlecithal and isolecithal**
9. A blastula which is solid, is known as
- a) **Stereoblastula**
 - b) Coeloblastula
 - c) Superficial blastula
 - d) Discoblastula
10. Which one of the following statements with regard to embryonic development in humans is correct
- a) Cleavage division bring about considerable increase in the mass of protoplasm
 - b) **In the second** cleavage division, one of the two blastomeres usually divides a little sooner than the second
 - c) With more cleavage divisions, the resultant blastomeres become larger and larger
 - d) Cleavage division results in a hollow ball of cells called morula
11. The eggs in which fate of every part of the egg becomes fixed are called
- a) Cleidoic eggs
 - b) Non-cleidoic eggs
 - c) **Mosaic eggs**
 - d) Regulative eggs
12. In macro and telolecithal eggs site of amphimixis lies in the
- a) Centre of **active** cytoplasm at the animal pole
 - b) Near the centre of the egg

- c) Centre of active cytoplasm at the vegetal pole
- d) All the above

13. In spiral cleavage turn of spiral may be

- a) Clockwise
- b) Anticlockwise
- c) [a] and [b] both
- d) None of these

Part 10

- 1. Unit cell of blastula is
 - a) Micromere
 - b) Megamere
 - c) Blastomere
 - d) None of the above
- 2. Yolk of egg in the vertebrates is formed in
 - a) Ovum
 - b) Lungs
 - c) Liver
 - d) Kidney
- 3. In the egg of bird, shell and shell membranes are
 - a) Permeable to O₂ and CO₂
 - b) Permeable to water only
 - c) Permeable to air only
 - d) Non-permeable
- 4. In teleosts, reptiles and birds the cleavage pattern is
 - a) Equal holoblastic
 - b) Unequal holoblastic
 - c) Incomplete meroblastic
 - d) Complete meroblastic

question_answer39)

- 5. The ratio of the nucleus to cytoplasm at the beginning of cleavage is
 - a) Very low
 - b) Very high
 - c) Normal
 - d) A bit higher than the normal
- 6. An avian blastula is called
 - a) Blastocyst
 - b) Trophoblast
 - c) Blastoderm

- d) Foetal blastula
- 7. Blastodisc or germinal disc refers to the protoplasm of egg, this is restricted to small area in
 - a) Amphibian egg
 - b) Avian egg
 - c) Ascidian egg
 - d) Mammalian egg
- 8. When the cleavage furrow extends from animal pole to vegetal pole and does not bisects the egg equally into two blastomeres the plane of cleavage is
 - a) Meridional
 - b) Equatorial
 - c) Latitudinal
 - d) Vertical

question_answer43)

- 9. As a result of cleavages, if blastomeres are symmetrically placed around the polar axis the type of cleavage is known as
 - a) Spiral
 - b) clear
 - c) Discoidal
 - d) Biradial
 - e) Radial
- 10. Calcium deficiency results in the formation of an egg with
 - a) Lesser amount of yolk
 - b) Lesser amount of albumen
 - c) Soft shell
 - d) Non porous shell
- 11. A phenomenon of embryonic induction was first described in amphibia by
 - a) Aristotle
 - b) Spemann
 - c) Von Baer
 - d) Spallanzani
- 12. The rate of cleavage is inversely proportional to the duration of
 - a) Anaphase
 - b) Metaphase
 - c) Interphase
 - d) Telophase
- 13. Cleavage was first observed by
 - a) Swammerdam
 - b) Spallanzani

- c) F.R. Lillie
 - d) Leeuwenhoek
14. Tertiary egg membrane is
- a) Vitelline membrane
 - b) Zona radiata
 - c) Albumen
 - d) Corona radiate

15. Zona pellucida of mammalian egg serves which of the following purpose
- a) Maintains normal cleavage of the egg
 - b) Prevents egg fusion
 - c) Prevents polyspermy

question_answer50)

16. Cleavage is found in
- a) Zygote
 - b) Eggs
 - c) Undivided cell
 - d) After gastrula stage
17. Egg undergoes cleavage and forms
- a) Morula
 - b) Blastula
 - c) Gastrula
 - d) All the above

question_answer52)

18. Egg which contains very little amount of yolk are called as
- a) Alecithal
 - b) Microlecithal
 - c) Mesolecithal
 - d) Polylecithal
19. Telolecithal eggs have
- a) Equal distribution of yolk
 - b) Average amount of yolk
 - c) Yolk present at a distance from nucleus
 - d) No yolk
 - e) All the above
20. Blastula lacks
- a) Blastomeres
 - b) Blastoderm

- c) Blastocoel
- d) **Blastopore**

21. Cleavage in bird's egg is

A)

- a) Equal and holoblastic
- b) Unequal and holoblastic
- c) **Discoidal** meroblastic
- d) Superficial meroblastic

question_answer56)

22. The term blastocyst is applied to the blastula of which one of the following

- a) Kangaroo
- b) Platypus
- c) **Monkey**
- d) Both kangaroo and monkey

23. The outer layer of the blastocyst which forms the ectoderm is called

- a) Cnidoblast
- b) Germinal vesicle
- c) **Trophoblast**
- d) Amnion

24. The cleavage having incomplete division of egg is known as

- a) Holoblastic
- b) **Meroblastic**
- c) Meridional
- d) Spiral

25. Cockroach egg is called as

- a) Microlecithal
- b) Macrolecithal
- c) Isolecithal
- d) **Centrolecithal**

26. Which of the following statement is wrong as regards to man

- a) All eggs are alike
- b) **Eggs are of two types**
- c) Sperms are of two types
- d) None of the above

27. Meroblastic cleavage is

- a) **Partial cleavage**
- b) Spiral cleavage
- c) Equal cleavage
- d) Complete cleavage

28. The third phase in the development of a mammal is
a) Cleavage
b) Gastrulation
c) Gametogenesis
d) Fertilization
29. The fifth cleavage of the fertilized egg of frog results in the formation of
a) 16 cells
b) 48 cells
c) 64 cells
d) 32 cells
30. The egg of frog is
a) Isolecithal
b) Mesolecithal
c) Telolecithal
d) Centrolecithal
31. The egg found in monotremata is
a) Microlecithal
b) Mesolecithal
c) Macrolecithal
d) None of these
32. Cleavage of frog is
a) Holoblastic
b) Meroblastic
c) Superficial
d) None of them
33. Pattern of cleavage in frog's egg is
a) Holoblastic
b) Holoblastic and unequal
c) Holoblastic and equal
d) All of the above
34. Pregnancy begins with implantation of
a) Embryo
b) Fertilised ovum
c) Blastopore
d) Blastocyst

question_answer69)

35. Eggs having yolk in their centre of cytoplasm in peripheral layer are called
a) Isolecithal
b) Microlecithal
c) Centrolecithal

- d) Telolecithal
36. Which is the correct sequence in the development of man
- a) Fertilization, zygote, cleavage, morula, blastula, gastrula
 - b) Zygote, morula, blastula, differentiation
 - c) Fertilization, cleavage, gastrula, morula, blas_tula
 - d) Cleavage, zygote, blastula, morula, gastrula
37. Cleavage is followed by which stage
- a) Invagination
 - b) Evagination
 - c) Gastrula
 - d) Blastula
38. Vegetal hemisphere of egg consists of
- a) Yolk
 - b) Pigment
 - c) Grey crescent
 - d) Germinal vesicle
39. In indeterminate cleavage the fate of blastomeres is fixed at which of the following stage
- a) Blastula
 - b) Gastrulation
 - c) 32-celled stage
 - d) 64-celled stage
40. Microlecithal eggs are found in
- a) Reptilia + Aves
 - b) Amphibia + Aves + Reptilia
 - c) Reptilia + Aves + Chiroptera
 - d) Eutheria
41. Cledoic egg is an adaptation to [RPMT 2001]
- a) Aquatic life
 - b) Marine life
 - c) Terrestrial life
 - d) Aerial life
42. In mammals egg are microlecithal and isolecithal because these are
- a) Oviparous
 - b) Viviparous
 - c) Ovoviviparous
 - d) None of these
43. In frog equal holoblastic cleavage does not found due to
- a) A dark pigment in animal pole
 - b) Heavy yolk in vegetal pole
 - c) Yolk concentrated in center of egg
 - d) Nucleus is assymetrical in position

44. In which of the following animal cleavage divisions are restricted to a small part of cytoplasm & nucleus in animal pole of egg Cockroach
- a) Frog
 - b) Chick
 - c) Rabbit
45. Select the correct statement
- a) Cleavage follows gastrulation
 - b) Yolk content of egg has no role in cleavage
 - c) Cleavage is repeated mitotic division of zygote
 - d) Gastrulation & blastulation are followed by each other