



Note: Answer all the following

اسم الطالب :

Choose the correct answer : (150 M) .

Histological Section

1-The teeth of the oral cavity are

- A- Non accessory B- Necessary C- Ntrophied D- None of all

2-The salivary glands are present in the

- A- Esophagus B- Oropharynx C- Oral cavity D- Nasopharynx

3-The tongue has

- A- Taste buds B- Smooth muscles C- Lymph nodes D- Adipose tissue

4-The fungiform papilla has

- A- Motor cells B- Blood vessels C- Fat cells D- Taste buds

5-Labial glands are

- A- Major glands B- Minor glands C- Absent D- None of all

6-The parotid salivary gland has

- A- Hyaline cartilage B- Elastic cartilage C- Fat tissue D- Main duct

7- The tongue has

- A- Cilia B- Villi C- Filiform papillae D- Microvilli

8-The taste bud has

- A- Supporting cells B- Parietal cells C- Chief cells D- RBC

9- Oropharynx is lined by

- A- Simple squamous epithelium B- Transitional epithelium
C- Respiratory epithelium D- Stratified squamous cells

10-Esophagus is lined by

- A- Stratified squamous epithelium B- Simple columnar
C- Pseudostratified columnar D- Transitional epithelium



11- The whole muscles of the stomach are

- A- Skeletal B- Fibrous C- Smooth muscles D- Cartilaginous

12-The epithelial cells of the stomach have

- A- Villi B- Microvilli C-Cilia D- None of all

13-Pyers patches has

- A- Lymphocytes B- RBC C- Fat cells D- Chondrocytes

14-Brunners glands present in the

- A- Jejunum B- Stomach C- Duodenum D-Gall bladder

15-Blood sinusoids are present in the

- A- Liver B- Kidney C- Skin D- Pancreas

16- Appendix has

- A- Lymphocytes B- Fat cells C- Follicular cells D- Chief cells

17- The gall bladder has

- A- Bile B- Parietal cells C- Macrophages D- Lymphocytes

18- Brunner's glands secrete

- A- Plasma B- Serum C- Steroid D- Mucus

19- Filiform papillae have

- A- Fat cells B- Sensory cells C- Lymphocytes D- None of all

20- Schwann cells are covering

- A- Collagen fibers B- Elastic fibers C- Axon D- Hyaline cartilage

21- Dust cells are

- A- Mucus cells B- Plasma cells C- Goblet cells D- Macrophages

22-The larynx has

- A- Smooth muscles B- Skeletal muscles C- Lymph tissue D- Plasma

23- Pleura is covering the

- A- Trachea B- Larynx C- Bronchus D- Lung



24- Nerve cells are mostly present in the

- A- Brain B- Skin C- Bone D- Kidney

25- meninges are covering

- A- Kidney B- Liver C- Adrenal gland D- Brain

26- The lung has

- A- Bronchioles B- Extrapulmonary bronchi C- Blood sinusoids D- Chief cells

27- Neurons have

- A - Cilia B- Microvilli C- Nissl granules D- Villi

28- Ganglia have

- A- Nerve cells B- Lymphocytes C- RBC D- WBC

29- Sympathetic fibers are within

- A- CNS B- PNS C- Autonomic NS D- None of all

30- Ependymal cells secrete

- A- Lymph B- CSF C- Sweat D- Saliva

31- Glial cells are considered as

- A- Sensory cells B- Motor cells C- Supporting cells D- None of all

32- Sensory cells are present in the

- A- Bone B- Cartilage C- Bone marrow D- Olfactory epithelium

33- Hyaline cartilage is not present in the

- A- Larynx B- Trachea C- Bronchus D- Bronchiole

34- Respiratory bronchioles are lined by

- A- Simple cuboidal cells B- Stratified squamous
C- Transitional D- Digestive epithelium

35- Ventricles of brain are lined by

- A- Ependymal cells B- Neurons C- Microglial cells D- Lymphocytes

36- Node of Ranvier is present along

- A- Smooth muscle fibers B- Peripheral nerve
C- Central NS D- Skeletal muscle fibers



37- The trachea has

- A- Elastic cartilage B- Fibrocartilage C- Hyaline cartilage D- None of all

38- The nasal cavity is lined by

- A- Respiratory epithelium B- Transitional
C- Digestive epithelium D- Simple squamous

39- Choroid plexuses are present in the

- A- Liver B- Kidney C- Adrenal gland D- Brain ventricles

40- Bronchioles have

- A- Smooth muscle fibers B- Cartilage C- Fibrocartilage D- Fat cells

41- All the following are scientific facts except:

- A- Internal pyramidal layer of cerebral cortex contains the largest pyramidal cells.
B- Connective tissues of peripheral nerves include epineurium, perineurium, and endoneurium.
C- Microglia fill tissue defects after CNS injury by proliferation to form microglial scar.
D- Pia mater, the innermost highly vascular layer of the meninges.

42- Which structures are part of the blood-brain barrier?

- A- Endothelium of vessels, basal lamina, and neurons.
B- Endothelium of vessels, basal lamina, and glial cells.
C- Endothelium of vessels, basal lamina, and extracellular matrix.
D- Endothelium of vessels only.

43- Regarding the node of Ranvier, which of the following is false?

- A- It insulates the axon.
B- It represents the junction between adjacent Schwann cells.
C- It is required for saltatory conduction.
D- It allows for an increase in the rate of impulse transmission.



44- All the following are true except:

- A- Neuron in CNS, which primary function is connecting other neurons, is called an interneuron.
- B- Nissl substances is also called neuronal RER and distinguished as chromatophilic substance.
- C- The groups of axons which are subdivided as fascicles, are each surrounded by epineurium.
- D- Fine processes network emerging from neurons and neuroglia are collectively called neuropil.

45- Regarding the respiratory cell types, all the following are true except:

- A- Ciliated columnar cells move the mucus coat toward the pharynx.
- B- Goblet cells secrete mucus to trap inhaled dust particles.
- C- Clara cells act as stem cells to replace damaged bronchiolar lining.
- D- Brush cells are specialized neurons responsible for the sense of smell.

46- Regarding the upper respiratory tract, all the following are true except:

- A- The roof of the nasal cavity is covered by olfactory epithelium.
- B- Within the nasal vestibule, stratified squamous epithelium becomes pseudostratified columnar.
- C- Olfactory glands of Bowman are mixed seromucous glands.
- D- The nasopharynx is lined by typical respiratory epithelium.

47- Regarding bronchioles and alveoli, all the following are true except:

- A- Terminal bronchioles lack goblet cells and are lined by Clara cells.
- B- Respiratory bronchioles participate directly in gas exchange.
- C- Type I alveolar cells secrete pulmonary surfactant to reduce surface tension.
- D- Alveolar macrophages phagocytose dust and debris in the alveolar spaces.

48- All the following are true except:

- A- Parotid glands consist exclusively of serous acini.
- B- Filiform papillae are heavily keratinized and lack taste buds.
- C- The upper one-third of the esophageal muscularis is smooth muscle.
- D- The esophagogastric junction features an abrupt epithelial change.



49- All the following are true except:

- A- Parietal cells secrete hydrochloric acid.
- B- Permanent circular folds are completely absent in the jejunum.
- C- Chief cells secrete pepsinogen and predominate at gastric gland bases.
- D- Hepatocytes synthesize and secrete major plasma proteins into blood.

50- All the following are false except:

- A- Gallbladder synthesizes bile to emulsify dietary fats.
- B- Small intestine is the primary site for nutrient absorption.
- C- Esophagus contains large amounts of cartilage rings.
- D- Liver is in the left upper side of the abdomen.

51- In which of the following structures of the oral cavity would taste buds be localized in the highest concentration?

- A- Fungiform papillae
- B- Vallate papilla
- C- Filiform papillae
- D- Ventral surface of the tongue

52- The teniae coli of the large intestine represent an organ-specific specialization of which layer of the intestinal tract wall?

- A- Epithelium
- B- Lamina propria
- C- Muscularis mucosa
- D- Muscularis externa

53- Which feature is unique to the exocrine pancreas?

- A- Insulin-secreting β cells
- B- Centro acinar cells
- C- Striated interlobular ducts
- D- Striated intralobular ducts

54- Which type of epithelium lines the trachea?

- A- Stratified squamous non-keratinized epithelium
- B- Simple cuboidal epithelium
- C- Pseudostratified ciliated columnar epithelium
- D- Transitional epithelium

55- Which structural feature distinguishes between terminal and respiratory bronchioles?

- A. Alveoli
- B- Cilia
- C- Exocrine bronchiolar cells
- D- Mucous glands in lamina propria



56- Which of the following features distinguishes a bronchus within a lung from the primary bronchi?

- A- Glands in the submucosa B- Pseudostratified ciliated columnar epithelium
C- Smooth muscle in the wall D- Irregular plates of cartilage

57- are interspersed among the absorptive enterocytes, whose main function is to protect and lubricate the lining of the intestine

- A- Goblet cells B- Paneth cells C- Enteroendocrine D- Microvilli

58- Which of the following best describes the structure of a multipolar neuron?

- A- It has one axon and multiple dendrites
B- It has only one process extending from the cell body
C- It has two axons of equal length extending from the cell body .
D- It lacks dendrites and contains several axons.

59- Peripheral nerves have a dense, irregular fibrous coat called..... which extends deeply to fill the space between fascicles

- A- epineurium B- endoneurium C- perineurium D- Axons

60- The proximal part of the duodenum has large clusters of branched tubular mucous glands, the duodenal (or Brunner) glands, with small excretory ducts opening among the intestinal crypts , found in

- A- The submucosa and mucosa
B- Mucosa
C- Submucosa
D- Muscularis externa



Embryological Section

- 61- Which of the following cellular processes is uniquely associated with germ - line cells rather than somatic cells during mammalian embryonic development?**
- A- Meiotic reduction division
 - B-Adhesion and migration
 - C-Progressive differentiation
 - D- Apoptosis
- 62- A fully differentiated mammalian hepatocyte residing in the G0 phase is stimulated to divide. At what specific point does this cell commit to entering the S phase independently of further extracellular influences?**
- A- Upon transitioning from prophase to metaphase
 - B-At the restriction point near the end of the G1 phase
 - C-Immediately upon the activation of the S-phase cyclin-CDK complex
 - D- At the late G2 phase checkpoint
- 63- According to the text, what constitutes the primary driver of variations in the total length of the cell cycle among different mammalian cell types?**
- A- The frequency of transient arrests during the G2 phase
 - B-The duration of DNA synthesis during the S phase
 - C-The precise assembly speed of the mitotic apparatus in M phase
 - D- The length of the G1 phase
- 64- During the initial development of gametogenesis, what pathway do the primordial germ cells of the epiblast take to reach the developing gonads?**
- A- They migrate via the ventral mesentery while undergoing meiosis.
 - B- They migrate via the dorsal mesentery while undergoing mitosis.
 - C- They migrate through the vascular system while remaining quiescent.
 - E- They migrate via the myometrium after completing a mitotic cycle.



- 65- **At what specific developmental stage does the male germ cells form seminiferous cords and become quiescent until puberty?**
A- As type A spermatogonia, in association with Sertoli cells.
B- As type B spermatogonia, in association with epithelial cells.
C- As stem cells, in association with mesodermal cells.
D- As primary spermatocytes, in association with squamous cells.
- 66- **Which of the following correctly identifies the cellular division and ploidy transition that results in the formation of haploid secondary spermatocytes?**
A- Mitotic division of diploid primary spermatocytes.
B- First stage of meiotic division of diploid primary spermatocytes.
C- Second stage of meiotic division of haploid type B spermatogonia.
D- Metamorphosis of diploid spermatids.
- 67- **What is the single cell from which all cells, tissues, and organs of the mammalian body ultimately derive?**
A- A fertilized oocyte (zygote)
B- A differentiated hepatocyte
C- A somatic stem cell
D- A haploid gamete
- 68- **Which phase of the somatic cell cycle is explicitly dedicated to DNA synthesis?**
A- S phase
B- M phase
C- G1 phase
D- G2 phase
- 69- **Which anatomical region of the female mammalian uterine tube is the specific site where fertilization takes place?**
A- Fimbriae
B- Ampulla
C- Infundibulum
D- Isthmus



70- What is the primary defining characteristic of cleavage that distinguishes it from typical standard somatic cell mitosis?

- A- The first series of divisions always occurs asynchronously among blastomeres.
- B- Nuclear division occurs without any subsequent division of the cytoplasm.
- C- The total volume and diameter of the entire embryonic mass increase exponentially.
- D- The sequential daughter cells become progressively smaller with each division.

71- At which specific developmental stage does the first cellular tight junctions establish within the embryo?

- A- The morula stage
- B- The elongated blastocyst stage
- C- The 2-blastomere stage
- D- The blastula stage

72- If the first two cleavage divisions of a fertilized oocyte pass vertically through the main axis, what is the spatial orientation of the third cleavage division?

- A- It is restricted entirely to the animal pole hemisphere.
- B- It takes place in the equatorial plane.
- C- It passes obliquely from the animal pole to the vegetal pole.
- D- It runs parallel to the first vertical division plane.

73- How do early mammalian embryonic cell divisions differ fundamentally from cytokinesis events observed in lower organisms like amphibians?

- A- Mammalian cytokinesis generates asymmetric daughter cells containing distinct cell fate factors
- B- Mammalian cytokinesis relies entirely on a myosin-independent pinching mechanism
- C- Mammalian divisions omit the interphase entirely, relying on asymmetric organelles
- D- Mammalian early divisions distribute cytoplasmic determinants uniformly, with early differentiation guided by microenvironmental factors.



74- Which of the following describes the correct molecular activation mechanism and timing of M-cyclin-dependent kinase (M-CDK)?

- A- It is activated by the addition of regulatory phosphate groups during the S phase
- B- It is activated by binding permanently to G1 cyclins at the restriction point
- C- It is activated by the removal of inhibitory phosphate groups in the late G2 phase
- D- It is activated by the transcriptional downregulation of CDK1 in early prophase

75- Based on the core control network mentioned in the text, which group of proteins works collectively to regulate kinetochore–microtubule attachment stability and promote error correction?

- A- Proto-oncogenes, tumor suppressors, and CDK inhibitors
- B- Centrosomes, paired centrioles, and asters
- C- SAC, PLK1, Aurora A and B kinases, and cyclin-CDK
- D- Actin, myosin, and α -tubulin

76- During spermiogenesis, how is the acrosome formed within the spermatid?

- A- Granules synthesized in the rough endoplasmic reticulum condense directly over the nucleus.
- B- Paired centrioles fuse together at the anterior aspect of the nucleus.
- C- Granules synthesized in the Golgi complex fuse into a single vesicle that covers the anterior aspect of the condensed nucleus.
- D- Mitochondria aggregate at the proximal pole and secrete a glycoprotein coating.

77- What architectural feature is unique to the dividing spermatogonia and spermatocytes during the process of spermatogenesis?

- A- They completely lack standard mammalian organelles like the endoplasmic reticulum.
- B- Their cytoplasmic divisions are incomplete, leaving them attached by cytoplasmic bridges.
- C- They are entirely isolated from one another by a dense layer of squamous epithelial cells.
- D- They undergo immediate cellular shedding into residual bodies before nuclear condensation.



- 78- The blood–testis barrier is established by tight junctions between adjacent Sertoli cells. What is one of its primary physiological functions?**
- A- To facilitate the passive transport of non-motile spermatozoa into the circulation.
 - B- To prevent macromolecules from entering the basal compartment from the testicular vascular supply.
 - C- To prevent the entry of cells involved in generating immunological responses into the adluminal compartments.
 - D- To stimulate the ciliary beat of the seminiferous tubule epithelium.
- 79- What is the term used to describe the chromosomal complement of a cell, individual, or species when arranged systematically in homologous pairs?**
- A- Phenotype
 - B- Genotype
 - C- Karyotype
 - D- Zygotype
- 80- The biochemical and physiological modifications that spermatozoa must undergo within the female reproductive tract to gain fertility are collectively called:**
- A- Parthenogenesis
 - B- Capacitation
 - C- The acrosome reaction
 - D- The zona reaction
- 81- Which molecule acts as the species-specific glycoprotein receptor on the zona pellucida that binds the advancing spermatozoon?**
- A- ZP3
 - B- Acrosin
 - C- Oxytocin
 - D- Hyaluronidase



82- How does an increase in the yolk content of a fertilized oocyte physically impact the process of cytokinesis?

- A- It shifts the plane of the first division from vertical to purely horizontal.
- B- It accelerates nuclear division while completely eliminating cytoplasmic cleavage.
- C- It correlates with a retardation of the completion of cytokinesis.
- D- It forces all blastomeres to divide with perfect synchrony throughout cleavage.

83- Which term correctly describes an oocyte that contains a moderate amount of yolk?

- A- Medialecithal
- B- Discoidal
- C- Miolecithal
- D- Megalecithal

84- Why does cleavage in amphibians result in blastomeres of unequal size?

- A- Amphibian oocytes are megalecithal, restricting mitosis entirely to the animal pole.
- B- Amphibian oocytes are medialecithal, and yolk accumulation at the vegetal pole retards mitosis.
- C- Cells at the vegetal pole lack nuclei and fail to undergo karyokinesis.
- D- The first cleavage furrow is oriented horizontally rather than vertically.

85- During the substages of Prophase I in meiosis, at which specific point does the homologous chromosomes complete their final preparations for spindle attachment as the nuclear membrane begins to disintegrate?

- A- Pachytene
- B- Leptotene
- C- Zygotene
- D- Diakinesis



- 86- What structural feature of a chromosome serves as the specialized platform during late prophase for the assembly of the kinetochore protein complex?**
A- The GTP cap
B- The tetrad
C- The centromere
D- The chiasma
- 87- Which Mendelian principle is directly underpinned by the random and variable distribution of maternally-derived and paternally-derived homologous chromosomes during Anaphase I?**
A- The principle of progressive differentiation
B- The principle of identical segregation
C- The principle of global DNA demethylation
D- The principle of random assortment
- 88- Spermatozoa leaving the seminiferous tubules are non-motile. Through what mechanisms are they conveyed from the rete testis through the efferent ductules to the epididymis?**
A- Active propulsion by their own newly developed axial filaments.
B- Peristaltic contractions of the myometrium and fluid absorption.
C- Passive drift in the urinary system and phagocytic movement.
D- Ciliary action of the duct epithelium and contractions of the smooth muscle of the duct wall.
- 89- In mammalian females, when does the mitotic phase of oogenesis definitively cease?**
A- At the onset of puberty due to gonadotrophic hormone activation.
B- Soon after birth, irrespective of the species.
C- During the 12th to 14th days of pregnancy.
D- Only after successful fertilization by a mature spermatozoon.
- 90- Before being activated by gonadotrophic hormones at puberty, mammalian primary oocytes are arrested in which specific prolonged resting stage?**
A- Metaphase of the second meiotic division.
B- Prophase of the mitotic division.
C- Dictyate stage of the prophase of the first meiotic division.
D- Anaphase of the first meiotic division.



- 91- What cellular event constitutes the 'zona reaction' to prevent polyspermy after sperm entry?**
- A- The rapid drop in cytosolic calcium concentrations to halt meiotic progression.
 - B- The complete breakdown of the vitelline membrane by paternal hyaluronidase.
 - C- The release of enzymes from cortical granules, altering the zona pellucida and causing the loss of species-specific sperm receptors.
 - D- The immediate duplication of maternal autosomes within the perivitelline space.
- 92- If a chromosome's centromere is located close to or at the absolute end of the chromosome structure, how is it classified?**
- A- Submetacentric
 - B- Acrocentric
 - C- Karyocentric
 - D- Metacentric
- 93- Which of the following describes the correct genetic configuration and mechanism of sex determination in avian species?**
- A- Males are homogametic (ZZ) and females are heterogametic (ZW).
 - B- Both males and females produce identical homogametic gametes containing only W chromosomes.
 - C- Sex is determined entirely by the incubation temperature of the avian egg.
 - D- Males are heterogametic (XY) and females are homogametic (XX).
- 94- In what type of oocyte is cleavage partial or meroblastic, leaving the inert yolk mass at the vegetal pole undivided?**
- A- Megalecithal oocytes of fish, reptiles, and birds
 - B- Medialecithal oocytes of amphibians
 - C- Miolecithal oocytes of placental mammals
 - D- Miolecithal oocytes of primitive chordates



95- What structural feature characterizes the blastula of the primitive chordate *Amphioxus lanceolatum* at the end of cleavage?

- A- A solid, compact sphere of identical blastomeres without an internal cavity.
- B- A multi-layered disc of cells overlying an unsegmented massive yolk block.
- C- A single layer of cells surrounding a central cavity known as the blastocoele.
- D- A structure entirely devoid of a blastocoele due to asynchronous vegetal divisions.

96- In avian embryonic development, what is the clear, liquefied region of yolk over which the central blastoderm sits?

- A- The blastocyst cavity
- B- The area opaca
- C- The hypoblast
- D- The subgerminal cavity

97- What is the primary asymmetry observed during Cytokinesis following Telophase I in female gametogenesis compared to male gametogenesis?

- A- Male gametogenesis avoids the interkinesis stage by skipping nuclear envelope formation
- B- Male gametogenesis results in a smaller polar body due to unequal actin ring contraction
- C- Female gametogenesis involves an unequal division of cytoplasm, producing one large oocyte precursor and a small polar body
- D- Female gametogenesis bypasses cytokinesis completely, generating multi-nucleate oocytes.

98- How does the alignment and microtubule attachment strategy of Metaphase II differ mechanically from Metaphase I within the meiotic pathway?

- A- In Metaphase II, chromosomes fail to align at the midway metaphase plate
- B- In Metaphase II, the microtubules bypass kinetochores entirely and bind to the chiasmata
- C- In Metaphase II, kinetochores form on each individual chromatid, allowing separate microtubule attachment
- D- In Metaphase II, sister chromatids are held together by a shared tetrad complex



- 99- What cellular event occurs during the brief resting phase termed 'interkinesis' that takes place between the two meiotic divisions?**
- A- The reciprocal exchange of genetic material via a secondary crossover
 - B- The complete duplication of the nuclear DNA complement
 - C- A global reduction of chromatin down to single-stranded protofilaments
 - D- Replication of DNA does not occur during this phase
- 100-What is the composition and origin of the translucent acellular layer known as the zona pellucida?**
- A- It is composed of mucopolysaccharides secreted entirely by the surrounding squamous epithelial cells.
 - B- It is composed of glycoproteins secreted primarily by the oocyte.
 - C- It is a cellular stratified layer formed by the proliferation of granulosa cells.
 - D- It is a lipid membrane derived from the breakdown of residual bodies.
- 101- Intercellular communication between the primary oocyte and the surrounding follicular cells is maintained through which structures?**
- A- Tight junctions that divide the follicle into basal and adluminal compartments.
 - B- Cytoplasmic bridges resulting from incomplete mitotic divisions.
 - C- Protoplasmic droplets that collect within the fluid-filled antrum.
 - D- Gap junctions between the oocyte and the microvillous cytoplasmic processes of follicular cells.
- 102- What are the products of the completed first meiotic division in oogenesis?**
- A- Two haploid cells of equal size called secondary oocytes.
 - B- Four haploid spermatids linked by cytoplasmic bridges.
 - C- Two haploid cells of unequal size: a secondary oocyte and a first polar body.
 - D- One diploid primary follicle and one acellular zona pellucida.
- 103- What genetic phenomenon explains why natural or experimental parthenogenesis in mammals fails to produce viable offspring unless normal gene expression patterns are altered?**
- A- Capacitation
 - B- Hypertrophy
 - C- Imprinting
 - D- Trisomy



- 104- Following fertilization, what is the fate of the paternal (spermatozoan) mitochondria within the mammalian oocyte cytoplasm?**
- A- They initiate the rapid phase of uterine contractions via oxytocin release.
 - B- They fuse with maternal mitochondria to create hybrid metabolic networks.
 - C- They are degraded, ensuring that only mitochondria of maternal origin persist.
 - D- They migrate exclusively to populate the future germ cell precursors.
- 105- In a laboratory experiment, a scientist blocks the release of oxytocin from the neurohypophysis and removes prostaglandins from the seminal plasma during coitus in cattle. What aspect of sperm transport is most directly impaired?**
- A- The rapid phase of sperm transport driven by muscular contractions of the female tract.
 - B- The slow sustained phase of transport relying on gradual release from the isthmus epithelium.
 - C- The biochemical process of capacitation within the uterus.
 - D- The species-specific binding of sperm to the ZP3 glycoprotein receptors.
- 106- Which distinct regions make up the avian blastoderm before it segregates into the epiblast and hypoblast?**
- A- The area pellucida and the area opaca
 - B- The zona pellucida and Rauber's layer
 - C- The trophoblast and the inner cell mass
 - D- The animal pole and the vegetal pole.
- 107- What pattern of cleavage replaced ancestral meroblastic cleavage in higher mammals as their oocyte yolk content diminished?**
- A- Discoidal cleavage
 - B- Asymmetrical partial cleavage
 - C- Holoblastic cleavage
 - D- Medialecithal segmentation



108- Which statement accurately describes the synchrony of early blastomere divisions in mammalian cleavage?

- A- The synchronous division of blastomeres is lost at an early stage, leading to odd-numbered cell stages.
- B- Mammalian blastomeres never divide synchronously, even during the first cleavage division.
- C- Cleavage rates remain identical among all blastomeres until the blastocyst hatches.
- D- Synchronous division is strictly maintained until the 64-cell stage.

109- What phenomenon can occur during cell division if mitosis proceeds to completion but is not followed by the process of cytokinesis?

- A- The complete degradation of sister chromatids by the Aurora kinases
- B- The formation of binucleate or, occasionally, multinucleate cells
- C- The immediate formation of haploid germ cells
- D- An accelerated progression through the G0 restriction point.

110- What is the primary evolutionary advantage conferred on animal populations by the crossover events that take place during meiotic prophase I?

- A- It extends genetic variation beyond that which is possible from random segregation alone, conferring an evolutionary advantage
- B- It speeds up the synthesis of α -tubulin and β -tubulin subunits during interkinesis
- C- It prevents the occurrence of non-disjunction mutations during subsequent anaphase stages
- D- It guarantees that daughter cells remain genetically identical to the progenitor germ cell

111- Which phase of the cell cycle is described as being metabolically active and fulfilling specialized functions preparatory to the next phase, but completely lacks DNA replication activity?

- A- Pro-metaphase
- B- S phase
- C- M phase
- D- G1 and G2 phases



- 112- In which species does ovulation typically occur during the metaphase of the first meiotic division, serving as an exception to most mammals?**
A- Cats and rabbits
B- Dogs and foxes
C- Horses and cattle
D- Sheep and pigs
- 113- What unique phenomenon occurs to unfertilized oocytes in horses and bats within the uterine tube?**
A- They form a heavy mucopolysaccharide coat around the zona pellucida.
B- They are actively transported to the uterus within 24 hours.
C- They are retained at the isthmus of the uterine tube.
D- They immediately undergo spontaneous activation to become diploid.
- 114- Which of the following options correctly matches a species with the reported duration that spermatozoa can retain viability or fertilizing capacity within the female reproductive tract?**
A- Bitches — up to 21 days in special sperm nests
B- Mares — up to 11 days after mating
C- Domesticated fowl — up to 21 days in special sperm nests
D- Bats — only a few hours at 4 °C
- 115- Which of the following pairs correctly matches a species with its cellular defense mechanism efficiency against polyspermy based on the text?**
A- Humans: entirely reliant on anatomical barriers because cellular blocks do not exist.
B- Pigs and Cats: the zona reaction is completely effective and instantaneous.
C- Cattle and Sheep: effective zona reaction; Avian species: polyspermy is tolerated as non-fusing sperm simply degenerate.
D- Rabbits: highly effective zona reaction; ineffective vitelline block.



116- How do turtle and crocodile embryos differ from mammals and reptiles with heteromorphic sex chromosomes regarding how their sex is determined?

- A- Their sex is determined entirely by the incubation temperature of the fertilized oocyte.
- B- Their sex is determined by the specific ratio of X to Y spermatozoa at the moment of ampullary fertilization.
- C- Their sex depends on the suppression of the second meiotic division to create ZZ males.
- D- Their sex is determined by a ZW homogametic mechanism controlled by maternal mRNA translation.

117- When turkeys or chickens hatch via natural parthenogenesis, why are the offspring always male (ZZ) and diploid?

- A- Because they are fertilized by heterogametic W-bearing oocyte polar bodies.
- B- Because they circumvent imprinting by absorbing paternal mitochondria from the extracellular matrix.
- C- Because higher environmental incubation temperatures automatically convert ZW genomes into ZZ genomes.
- D- Because the diploid number is restored either by suppressing the second stage of meiosis or by the recombination of the second polar body with the oocyte nucleus.

118- The active process of cavitation and fluid accumulation in the blastocyst cavity depends on sodium and potassium pump activity. At what specific cell stage does this occur in humans, cattle, and sheep?

- A- The 2-cell stage
- B- The 64-cell stage
- C- The 16-cell stage
- D- The 100-cell stage



119- Which mammalian group is noted for a unique blastocyst appearance where an inner cell mass does not form, leaving the blastocyst as a hollow sphere of similar cells?

- A- Avian species
- B- Eutherian mammals
- C- Marsupial embryos
- D- Prototherian mammals

120- What is Rauber's layer, and what is its fate in domestic mammals compared to primates?

- A- It is the inner cell mass core that turns into the hypoblast in all species.
- B- It is a specialized uterine gland secretion necessary for thread-like expansion.
- C- It is an extracellular shell membrane that breaks down during hatching in cattle and sheep.
- D- It is the trophoblastic cell layer overlying the inner cell mass; it persists in primates but degenerates prior to implantation in domestic mammals.

Anatomical Section

121- Which cartilage forms the majority of the laryngeal framework?

- A- Arytenoid cartilage
- B- Thyroid cartilage
- C- Epiglottic cartilage
- D- Corniculate cartilage

122- The trachea extends from the:

- A- Pharynx to esophagus
- B- Larynx to primary bronchi
- C- Nasal cavity to larynx
- D- Bronchi to alveoli

123- The functional unit of the lung is the:

- A- Bronchiole
- B- Bronchus
- C- Alveolus
- D- Pleura



124- Which structure prevents food from entering the respiratory tract during swallowing?

- A- Thyroid cartilage B- Arytenoid cartilage C- Epiglottis D- Vocal fold

125- The lungs are covered by:

- A- Pericardium B- Endocardium C- Visceral pleura D- Parietal pleura

126- Gas exchange primarily occurs in the:

- A- Trachea B- Bronchi C- Alveoli D- Larynx

127- The diaphragm separates the:

- A- Thoracic and abdominal cavities B- Thoracic and pelvic cavities
C- Abdominal and pelvic cavities D- Cranial and thoracic cavities

128- The right lung of domestic mammals generally has:

- A- One lobe B- Two lobes C- Four lobes D- Five lobes

129- The nasal cavity is divided by the:

- A- Hard palate B- Nasal septum C- Soft palate D- Cricoid cartilage

130- Which bronchus supplies a lung lobe?

- A- Primary bronchus B- Secondary (lobar) bronchus
C- Trachea D- Respiratory bronchiole

131- The pleural cavity normally contains:

- A- Air B- Blood C- Serous fluid D- Lymph

132- Which cartilage forms the base of the epiglottis?

- A- Elastic cartilage B- Fibrocartilage
C- Hyaline cartilage D- Articular cartilage



133- The vocal cords are located within the:

- A- Pharynx B- Trachea C- Larynx D- Bronchi

134- The bifurcation of the trachea is called the:

- A- Hilus B- Carina C- Glottis D- Meatus

135- The principal muscle of inspiration is the:

- A- Rectus abdominis B- Intercostal muscle
C- Diaphragm D- Latissimus dorsi

136- The basic structural and functional unit of the nervous system is the:

- A- Axon B- Neuron C- Dendrite D- Synapse

137- The central nervous system consists of the:

- A- Brain and spinal cord B- Cranial and spinal nerves
C- Brain and ganglia D- Nerves and ganglia

138- Which part of the brain is responsible for coordination of movement?

- A- Cerebrum B- Thalamus C- Cerebellum D- Medulla oblongata

139- Cranial nerves arise directly from the:

- A- Spinal cord B- Vertebral column C- Brain D- Ganglia

140- How many pairs of cranial nerves are present in domestic mammals?

- A- 10 B- 11 C- 12 D- 13

141- The meninges are:

- A- Brain ventricles B- Protective coverings of the CNS
C- Nerve fibers D- Endocrine tissues

142- Which meninx is closest to the brain?

- A- Dura mater B- Arachnoid mater C- Pia mater D- Epidural layer

143- The autonomic nervous system is divided into:

- A- Motor and sensory divisions B- Somatic and visceral divisions
C- Sympathetic and parasympathetic divisions D- Cranial and spinal divisions



144- The spinal cord is located within the:

- A- Thoracic cavity B- Cranial cavity C- Vertebral canal D- Pelvic cavity

145- The largest cranial nerve is:

- A- Facial nerve B- Trigeminal nerve C- Vagus nerve D- Optic nerve

146- The vagus nerve is cranial nerve:

- A- V B- VII C- IX D- X

147- Cerebrospinal fluid is produced mainly by the:

- A- Pia mater B- Dura mater C- Choroid plexus D- Cerebellum

148- The gray matter of the spinal cord contains mainly:

- A- Myelinated axons B- Neuronal cell bodies
C- Blood vessels only D- Connective tissue

149- The optic nerve is responsible for:

- A- Hearing B- Smell C- Vision D- Taste

150- The sympathetic nervous system is generally associated with:

- A- Rest and digestion B- Fight or flight response
C- Vision D- Equilibrium

Examiner

prof. Dr. Ayad H. Ibrahim
Asst. prof. Mahmood N. Mustafa
Asst. prof. Firas A. Hussin

prof. Dr. Khulood N. Rasheed
Asst. prof. Bader K. Hameed
Asst. prof. Marwa A. Hameed

prof. Dr. Idrees K. Thamer
Asst. prof. Oday A Jassim
Lect. Dr. Noor A. Azawi

Head of Department

Asst. prof. Bader K. Hameed