



Question 1: Choose the correct answer of the following. (25 pt.)

- 1- Which of the following features apply to vertebrates?
 - a) Cephalization, have opsithonephric kidney
 - b) Segmentation, have metanephric kidney
 - c) None of them
- 2- Which of the following is a unique characteristic that distinguishes lizards from other reptiles?
 - a) Have flexible hinge between the scales and possess osteoderms under the epidermal scales
 - b) Shedding of the cornified layer, and have femoral gland
 - c) Possess rows of femoral glands along the underside of the hindlimb in the thigh region.
- 3- Which of following not appear in skin of bird?
 - a) Plies collagen fibers, have few gland
 - b) presence of epidermalscales on its body
 - c) All of above
- 4-centra are most common in turtles that retract their necks and in cervicalvertebrae of.....
 - a) Heterocoelous- birds
 - b) Amphicoelous- Fish
 - c) Procoelous- reptile
- 5- What do we call the third aortic arch in amniotes?
 - a) Systemic arch
 - b) Pulmonary arch
 - c) Carotid arch
- 6- Neurocranium is understood to include.....
 - a) The braincase plus associated sensory capsules.
 - b) The braincase plus associated splanchnocranium.
 - c) Only sensory capsules
- 7- Which of the following is epidermal derivative?
 - a) Antler
 - b) Ramphoceaca
 - c) Scales of osteichthyes
- 8- The mesenchymal cells form discrete blocks of cartilage, up to..... called.....
 - a) Four pairs per segment- perichordal ring

- b) Two pairs per segment- primary somite
 - c) Four pairs per segment- arcualia
- 9- Which of the following is a unique characteristic that distinguishes a salamander from other amphibian?**
- a) Have large Leydig cells
 - b) It depend entirely on cutaneous respiration
 - c) Have two types of multicellular glands: mucous and poison glands.
- 10- The centrum is....., a design that seems to allow limited motion in most directions in.....**
- a) Amphicoelous- Fish
 - b) Procoelous- Fish
 - c) Opisthocoelous- Fish
- 11-are the most prominent cell types of the epidermis.**
- a) stratum corneum
 - b) Merkel cells
 - c) Keratinocytes
- 12- The hyomandibula plays no part in supporting the jaws in.....**
- a) Amphibian, Reptilian, Avian
 - b) Only Reptilian
 - c) All tetrapod
- 13- Ecdysis is a phenomenon among**
- a) Crocodile
 - b) Ophidia
 - c) All Reptiles
- 14-types of embryonic cells differentiate to form the chondrocranium.**
- a) Two b) several c) one
- 15- Tetrapodarise from cells oforigin to form a perichordal tube, not from discrete blocks of.....**
- a) Ventral arch- somite origin- bone
 - b) Dorsal arch- sclerotome- cartilage
 - c) Centra- sclerotome- cartilage
- 16- In mammals, jaw suspension is..... The entire upper jaw is incorporated into the braincase, but the lower jaw is suspended from the dermal..... of the braincase**
- a) Craniostylic- squamosal bone
 - b) Metautostylic- jugal bone
 - c) Craniostylic- jugal bone

- 17- Nuptial pads are raised calluses of , appear in the of amphibian during mating.
- Dermis- Female
 - Cornified epidermis- male
 - Cornified epidermis- Female
- 18- In terrestrial vertebrates, if the surface cells of buccal cavity are often patterned with tiny microridges that perhaps
- Hold the surface layer of mucus.
 - Resist any friction mechanism
 - All of above
- 19- Which of the following have prokinetic skull and lack upper and lower temporal bars?
- Amphisbaenians
 - Lizards
 - Snakes
- 20- The..... absent in.....mammals
- Teeth- Marsupials
 - Nipple- Monotremes
 - Scent gland- Eutherian
- 21- a.....teeth attached to the medial side of the jaw bone of.....
- Pleurodont- Lizards
 - Pleurodont-snake
 - Acrodont- snake
- 22- In....., the scent glands can produce quite pungent odors, especially when the animal is alarmed by handling.
- Some turtles
 - Crocodiles
 - Lizard
- 23- The..... acts as a modification of the and is located on the heads of some marine birds.
- Salt gland- eye gland
 - Salt gland- salivary gland
 - None of above
- 24-are the source of dentin of the mammals teeth and form from the.....
- Odontoblasts- dermal papilla
 - Ameloblasts- dermal papilla
 - Dermal papillae- dermis
- 25- Which of the following grow together across the midline to form the sphenoid group?
- Trabecula
 - Parachordals
 - Nasal capsule with trabecula

Question II: Choose whether the statement is True or False. (25 pt.)

- 26- The most ancient part of skull is the splanchnocranium which first arose to support pharyngeal slits in agnathan.
- 27- Beta-keratins are present in most flexible epidermal layers where shape changes occur.
- 28- In monotremes, the mammary glands produce oil and open directly to the surface via nipple.
- 29- The lower jaw of mammals consists entirely of the dentary bone, which is also of dermal origin.
- 30- The paired fifth arch and their branches as part of the pulmonary arch to the lungs.
- 31- Nails are plates of tightly compacted, cornified epithelial cells on the surface of fingers and toes of mammals.
- 32- The squamate's heart has one ventricle with three cava.
- 33- The cosmoid scale lacks enamel, dentin, and a vascular bone layer.
- 34- The modern sharks exhibit amphistylic jaw suspension that is the jaws are attached to the braincase via hyomandibula.
- 35- Skin surface of aquatic vertebrate are patterned with tiny microridges that perhaps hold the surface layer of mucus.
- 36- The atrium is divided into two chambers in the vertebrate which have double circulation.
- 37- In terrestrial vertebrates, the stratum compactum is obvious and have regularly ordered.
- 38- The palatoquadrate give rise to the incus of the mammal's middle ear.
- 39- The scent gland may be located almost in the cloaca of crocodile and on the chin of some deer, rabbits.
- 40- The prefrontal, postparietal, and postorbital continue the ring of bones above and behind the orbit.
- 41- In only amphibians, the first two aortic arches (I, II) disappear early in development.
- 42- Conus arteriosus lack cardiac muscle.
- 43- Meibomian gland is situated along the eyelid, releases oily secretion in many nonvenomous snakes.

- 44- Contour feathers constitute the major aerodynamic surfaces.
 - 45- The Merkel cells, originating from the neural crest are thought to respond to tactile stimulation (mechanoreceptors).
 - 46- The presence of epidermal scales along the body of birds testifies to their debt to reptiles.
 - 47- In tetrapods, the trunk becomes further differentiated into the cervical region, and posteriorly into the caudal region.
 - 48- The bony vertebra is formed directly or exclusively from its adjacent sclerotome, one-to-one, forming resegmented sclerotomes that produce the basic vertebra.
 - 49- The elements of the second visceral arch and parts of the third contribute to the hyoid apparatus that supports the tongue and the floor of the mouth.
 - 50- In mammals, the lower temporal bar is absent, and the upper temporal bar is a slender rod called the temporal arch.
-



Q1: Fill the following sentences:

(22 marks)

- 1) The progenitor stem cells are classified into three types:
..... and.....
- 2) MHC class I is expressed on the surface ofwhile MHC class II is expressed on the surface of.....
- 3) The presence ofon the surface of B cells discriminates between naïve, memory and plasma cells.
- 4)Class of lymphocytes important in non-specific defense against viral infections and tumor cells.
- 5) Based on the type of constant region of the heavy chains.....are classified intoclasses:.....,.....,.....and.....
- 6) is a material from pathogen that induces an immune response.
- 7) Primary mediators of mast cell areand.....while the secondary mediators of mast cell areand
- 8)is the first line of defense and does not generate lasting protective immunity.
- 9) Type of adaptive immunity results from an infection by a parasite.
- 10) Allergen is.....

Q2: Answer briefly three the following items:

(9 marks)

- A. Compare between passive and active immunity.
- B. Process of phagocytosis
- C. Factors of innate immunity that limit growth of microorganisms within the body.
- D. Organs of immune system

Q3: Discuss using diagram the different complement system pathways.

(10 marks)

Q4: Answer three of the following items:

(9 marks)

- A- In a table compare between the different classes of antibodies.
- B- Compare between TCR and BCR structures.
- C- The balance between Th1 and Th2 response after T cell activation.
- D- Process of inflammation

GOOD LUCK

Dr. Leila Hassan
Lecturer of Immunology

University: Assiut

Introduction to embryology & evolution

Faculty: Science

Code: 418 Z

Total degree = 50

Department: Zoology

Time: 2 hrs.

Final exam. 2024

Note: Questions are in 2 pages

I- Embryology

Q1. Choose the correct answer

10 mark

- 1) Gametogenesis is the process of the production of mature
(a) Spermatozoa (b) ovum (c) both (d) nothing
- 2) All these structures are derivatives of the endoderm except
(a) liver (b) connective tissues (c) lining of lung (d) pancreas
- 3) The epimer is differentiated into
(a) dermatome (b) myotome (c) sclerotome (d) all answers.
- 4) Deuterostome animals have cleavage
(a) radial (b) circular (c) spiral (d) all answers
- 5) Internal fertilization occurs in
(a) Fishes (b) Amphibia (c) Mammals (d) nothing
- 6) Unequal holoblastic cleavage occurs in eggs.
(a) isolecithal (b) mesolecithal (c) polylecithal (d) all answers.
- 7) The chorion is made up of
(a) ectomesoderm (b) endomesoderm (c) endoderm (d) all answers.
- 8) The retina of the eye is made of
(a) Ectoderm (b) mesoderm (c) neural crest (d) endoderm
- 9) The allantois membrane is made of
(a) Ectoderm-mesoderm (b) endo-mesoderm (c) mesoderm (d) endoderm
- 10) All these classes are amniotic animals except
(a) Reptiles (b) Birds (c) Mammals (d) Amphibia

Q2. Put False (F) or true (T) & correct the false one:

10 mark

1. The wall of the yolk sac is made up of somatopleure.
2. In the gastrula of Amphioxus, the notochord is found underneath the spinal cord.
3. Spermiogenesis is the changes of the spermatid to sperm.
4. Dorsal root ganglia of spinal nerves are derivatives of the neural crest
5. Cleavage in protostomes animals is spiral and determinate.

6. The lining of the alimentary canal arises from the endoderm.
7. Meroblastic cleavage occurs in polylecithal eggs.
8. Centrolecithal eggs are found in mammals.
9. In oogenesis the second maturation division occurs before fertilization.
10. The allantois grows from the floor of the hind gut.

Q3. Write short notes on two only:

5 Mark

- 1- Compare between blastula of frog & Amphioxus with drawing.
- 2- Different types of the stem cells according to their potentials.
- 3- Mention the functions of two of the extraembryonic membranes.

II. Evolution

Q4: Correct over the line:

(9 marks)

- 1- Bottle neck is the mechanism of New Darwinism.
- 2- Turtles of Galapagos are examples of preadaptation.
- 3- Natural selection is a complex preplanning process.
- 4- Lamarckism was based on cloning technology.
- 5- Metamorphosis occurs because of mutation.
- 6- The reason bacterial resistance against antibiotics is spontaneous generation.
- 7- Java man is a reconstructed skull with Orangutan's lower jaw!
- 8- The Cambrian explosion revealed no creatures.
- 9- Longisquama is not the ancestor of land-dwelling creatures, but it is just normal fish.

Q5: Answer only four of the following:

(16 marks)

- 1- Demonstrate why fish couldn't be the ancestor of tetrapods.
- 2- Illustrate why antibiotics techniques disprove the evolution concept.
- 3- Paleontology disagrees with the evolution claims, discuss two examples in detail.
- 4- Distinguish between "Metamorphosis" & evolution.
- 5- Clarify the distribution of creatures in both Darwinism hypothesis & fossil record.



Assiut University Faculty of Science Department of Zoology	Final exam of Experimental Embryology (Z 438) for Zoology students	June, 2 nd 2024 Time: 2 hours Total marks: 50
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Answer the following questions using labeled drawings when it is possible:

- 1- What is the significance of metamorphosis? Describe the hormonal control of metamorphosis and the different ways of animal response to hormonal changes during metamorphosis. (10 marks)
- 2- Discuss the different hypotheses explaining how cancer occurs and methods of curing. (10 marks)
- 3- Write an essay on parthenogenesis explaining its significance, types and compare between sexual reproduction, haploid parthenogenesis and diploid parthenogenesis. (10 marks)
- 4- A) What are the characteristics to be considered in experimental embryology animals? (5 marks)
B) Describe the physiological processes involved in regeneration. (5 marks)
- 5 A) Choose the right answer (5 marks)
 - i- Metamorphosed frogs excrete nitrogen in the form of
a) ammonia b) urea c) uric acid d) amino acids
 - ii- Cells which undergo abnormal and uncontrolled growth at the cost of remaining cells are called
a) teratoma cells b) cancer cells c) malignant cells d) neoplastic cells
 - iii- Which of the following is considered as totipotent stem cells?
a) Cells of inner mass b) Cells of morula c) liver cells d) neurons
 - iv- Among legal considerations animals should be correctly
a) fed b) housed c) handled d) all
 - v- During metamorphosis the visual pigment shifts to the use of
a) porphyropsin b) rhodopsin c) carotene d) none
- B) State true or false: (5 marks)
 - i- Growth inhibiting substance increases the regeneration in hydra.
 - ii- Normal morphogenesis result in the formation of a terata
 - iii- Marcello Malpighi is a co-discoverer of sperm.
 - iv- Epigenesis theory now is 100% wrong.
 - v- Some kinds of stem cells are haploid cells.

End of questionsBest of Luck

Dr. Reda A. Ali
Prof. Experimental Embryology



Answer the following questions:

(50 marks)

الأمتحان في 4 صفحات

I- Write the scientific term of the following statements:

(8 marks)

- 1- Marine ecosystem which occurs where the land meets the ocean. (.....)
- 2- The Deepest depth in the ocean. (.....)
- 3- A tiny benthos that are less than 0.5 mm but greater than 64 μ m in size. (.....)
- 4- Living organisms are utilized to screen the health of the natural ecosystem in the environment. (.....)
- 5- An underwater ecosystem characterized by massive deposits of calcium carbonate. (.....)
- 6- Coral reefs get rid of a type of algae inside their tissues called Zooxanthella and turn to white. (.....)
- 7- A bivalve molluscs with a rough, irregularly shaped shell. (.....)
- 8- Marine organisms that are able to swim and move independently of currents. (.....)

II- Choose the correct answer and also write its letter in the answers table below: (26 marks)

1- Physical oceanography includesand

- | | |
|--------------------------------|---------------------------|
| A) dissolved gases / nutrients | B) salinity / chloronoiy. |
| C) heat transfer / waves | D) all of the above |

2- The benthic suboceanic environments include..... zones.

- | | |
|--------------------------------------|--------------------------------------|
| A) Bathyal, Abyssal, and Sublittoral | B) Bathyal, Abyssal, and Hadal |
| C) Abyssal, Hadal, and Littoral | D) Bathyal, Hadal, and Supralittoral |

3- Marshes, mangroves and estuaries follows ecosystem.

- | | |
|----------------|---------------------|
| A) freshwater | B) coastal |
| C) terrestrial | D) all of the above |

4- Class Anthozoa includes

- | | |
|-----------------------------|----------------------|
| A) corals, sea anemones | B) coral, hydra |
| C) jellyfishs, sea anemones | D) hydra, jellyfishs |

5- One of the following is not related to the others.

- A) Exposed rocky shores
- B) Sandy shores
- C) Boulder beaches
- D) Shelterd rocky shores

6- Sequential weight loss of 1g of dried sediment at 550°C refer to of sediment.

- A) Grain-size
- B) Carbonate contents
- C) Total organic matter
- D) Non answer

7- Benthos which eat food particles lying in sediments are called

- A) Deposit feeding
- B) Suspension feeding
- C) Scavengers or Croppers
- D) all of the above

8- are organisms swim or crawl through water above the seafloor.

- A) Epifauna
- B) Infauna
- C) Nektobenthos
- D) Meiofauna

9- Mangrove hard- bottom dwelling associated fauna includes

- A) Barnacles, True crabs, and Hermit crabs
- B) Birds, Reptiles, and Arthropods
- C) Large crabs, Lobsters and Shrimps
- D) all of the above

10- Optimal reef development occurs where the mean annual temperatures are about.....

- A) 15-20°C
- B) 23-25°C
- C) 25-35°C
- D) 35-40°C

11- are the producers of hydrothermal vent benthic communities

- A) Euobacteria
- B) Phytobenthoses
- C) Chemosynthetic *Archaea*
- D) Aquatic algae

12-shore is found only where conditions are normally calm and without strong currents.

- A) Muddy
- B) Littoral fringe
- C) Sandy
- D) Rocky

13- Coral reefs do not develop in water deeper than about.....

- A) 20-30 m
- B) 30-50 m
- C) 50-70 m
- D) 10-20 m

14- Mangrove associated crustaceans include:

- A) barnacles, true crabs, and hermit crabs
- B) barnacles, true crabs, and ascidians
- C) oyster, true crabs, and hermit crabs
- D) octopus, true crabs, and sepia

15- One of the following is not related to the others.

- A) Fringing reef
- B) Barrier reef
- C) Soft reef
- D) Atoll reef

16- are supralittoral organisms able to withstand long dry periods

- A) Periwinkle, Giant clam, Mussel
- B) Periwinkle, Limpet, Rock lice
- C) Limpet, Rock lice, Tube worm
- D) Rock lice, Mussel, Tube worm

17-area occupies the upper parts of sandy shores, and characterizes by dry sand.

- A) Littoral fringe
- B) Sublittoral
- C) Muddy shore
- D) Eulittoral

18- are species characterized by having creeping organs inhabiting Rocky shores

- A) Chiton, Brancles
- B) Crab, *Pattela*
- C) Rock lice, Chiton
- D) Chiton, *Pattela*

19- is one of the biomarkers used in ecotoxicological effects of chemicals

- A) *Tridacna squamosa*
- B) Gonads
- C) Biomagnification
- D) all of the above

20- It is an echinoderm recommended to be bioindicator for the environment.

- A) *Tridacna squamosa*
- B) *Echinometra mathaei*
- C) *Oliva bulbosa*
- D) *Uca rapax*

21- Zone includes the area from the average high tide to just below the average sea level.

- A) Supralittoral
- B) Littoral zone
- C) High Intertidal
- D) Midlittoral

22- Fossiled Foraminifera tests are found in sediments as old as the earliestand can still be found in abundance today.

- A) Precambrian
- B) Cambrian
- C) Terreneuvian
- D) Tonian

23- One of the following is not related to the others.

- A) Rock louse
- B) Fiddler crab
- C) Seagull
- D) Mud crab

24- are common examples of what you can find in the midlittoral zone.

- A) Yeti crab, true crabs, and hermit crabs
- B) Barnacles, yeti crab, and ascidians
- C) Oyster, tubeworm mussel, and hermit crabs
- D) Blue mussel, hermit crab, and acorn barnacle

25- The upper parts of sandy shores in Red Sea is marked by pyramids produced

- A) hermit crabs
- B) ghost crabs
- C) tubeworms
- D) all of the above

26- are common examples of what you can find in the hydrothermal vents.

- A) Pompeii Worm, Tubeworm Mussel, Yeti Crab
- B) Pompeii Worm, Sea Urchin, Turtles
- C) Tubeworm Mussel, Baracle, Sandpiper
- D) Chiton, *Epinephelus*, Yeti Crab

Answers table

Question	1	2	3	4	5	6	7	8	9	10	11	12	13
Answer													
Question	14	15	16	17	18	19	20	21	22	23	24	25	26
Answer													

III- Put true (✓) or false (X) for each of the following statements: (16 marks)

- () 1- The structure of macrobenthos community spatially and seasonally differs according to changes of environmental factors.
- () 2- Vent communities found in all oceans at depths 1-2 miles down.
- () 3- Muddy shores are restricted to intertidal areas completely exposed to wave action.
- () 4- Snorkeling and SCUBA diving are collecting methods for marine Macro-benthic invertebrates
- () 5- Most organisms inhabit the marine environment, >98% are benthos!.
- () 6- Gonads of marine invertebrates cannot be used as bioindicator tissue in pollution biomonitoring studies.
- () 7- The yellow color of sandy beaches due to particles mixed with silt, clay and organic matter debris.
- () 8- Organisms in the midlittoral zone adapt to daily tidal rhythms, requiring the ability to live both in and out of water.
- () 9- Global warming could have significant concerns for coastal marine ecosystems.
- () 10- In marine ecosystems, macro-benthic invertebrates decline detritus decomposition.
- () 11- Most of soft corals have symbiotic plant cells called zooxanthellae.
- () 12- The roots of *Avicennia marina* are grey or black, directed upwards.
- () 13- The Red Sea mangrove includes *Avicennia mucronat* and *Rhizophora marina*.
- () 14- The sinking of the RubyMar ship in the Red Sea overloads of nutrients in seawater which are dangerous to the local human community.
- () 15- The seagrass biomass in mangrove areas are quite low.
- () 16- Ascidians have a sedentary mode of life carrying their mouth and anus at the same level.

أنتهت الأسئلة مع خالص التمنيات بالتوفيق.....

أ.د. خالد فؤاد عبد الوكيل

K. F. Wakiel