7. **A certain sequence called ..... is found at the beginning of the genes.**
   a. Origen of replication
   b. Centromere
   c. Promoter
8. **In Avery experiment, the transformation of bacteria was inhibited by adding .....**
   a. Proteases
   b. RNase
   c. DNase
9. **Which primer of these are most suitable for PCR?**
   a. ATCGGTGGTGTCGACGAA
   b. CACTATAAAACAGCTATC
   c. GGATGTGGTGTCGATAGC
10. **Telomers are present in.....**
   a. Prokaryotes
   b. Eukaryotes
   c. Both Prokaryotes & Eukaryotes
11. **RNA contains .....as its sugar.**
   a. Deoxyribose
   b. Ribose
   c. Lactose
12. **A piece of double stranded DNA has 30% A, what will be the % of G?**
   a. 20%
   b. 30%
   c. 70%
13. **The number of barr bodies in XXY human are.....**
   a. 0
   b. 1
   c. 2
14. **Which best describes alternative splicing?**
   a. Using multiple proteins to create one gene
   b. Using one gene to make multiple proteins
   c. Using multiple proteins to multiple genes
15. **.....is a sequence present in the tRNA molecule**
   a. Code
   b. Codon
   c. Anti Codon

Q-3: Compare between DNA and RNA? (4 Marks)

Q-4: Draw the DNA Replication Fork (5 Marks)

Q-5: Explain in detail the different steps of the PCR cycle? (5 Marks)

Q-6: Given the following DNA sequence: (6 Marks)

5- AAAGATGGTTGCTATTGGTTAGGGCGAGT- 3

- Determine the other DNA strand?
- Determine the mRNA sequence?
- Determine the corresponding amino acid sequence?

Use the genetic code table below to translate.

GGC: **Gly**	GCU: **Ala**	GGU: **Gly**	GAG: **Glu**
AAA: **Lys**	AAG: **Lys**	GUU: **Val**	AUU: **Ile**

Good Luck

امتحان الفصل الدراسي الأول
للعام الجامعي 2025/2024

القسم الذي يقدم المقرر: الوراثة	اسم المادة: وراثة جزيئيه	كود المقرر: 308ز	الزمن: ساعتين
لجنة الممتحنين: أ.د/ كرم أمين - أ.د/ أمير عفت الفراش		تاريخ الامتحان: 13/ 1 /2025	

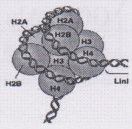
Q-1: Choose True (√) or False (X): (15 marks)

( )	1. DNA polymerase III is the main replicating enzyme in Eukaryotes
( )	2. Each chromosome is made up of several molecules of DNA
( )	3. In DNA, adenine always pairs with thymine and guanine always pairs with cytosine
( )	4. In humans, the sex of the offspring is determined by the male
( )	5. Eukaryotes chromosomes have multiple origins of replication
( )	6. Ribosomes are made of proteins and rRNA
( )	7. The origins of replication are rich in A and T sequences
( )	8. N15 was used to prove that DNA is genetic material.
( )	9. In the nucleotide, Nitrogen bases are attached to the 1-position of the pentose sugar
( )	10. Splicing is the removing of introns from Prokaryotic mRNA
( )	11. One Genetic code consists of three bases.
( )	12. PolyA tail is added to the 5' end of newly transcribed Prokaryotic mRNA
( )	13. Eukaryotes have 3 types of DNA polymerase enzyme
( )	14. Euchromatin has a less compact structure than heterochromatin
( )	15. The genetic material must have the capacity to vary

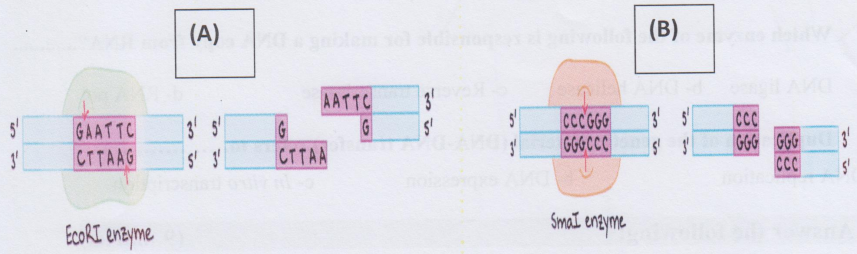
Q-2: Choose the correct answer (15 marks)

1. **The enzyme needed for the transcription is called……..……**
   a. DNA Polymerase II
   b. RNA Polymerase
   c. Reverse transcriptase
2. **The annealing temperature for this primer (GTGGATGTGGTGTCGATG) is……..**
   a. 52 C
   b. 58 C
   c. 72 C
3. **The pyrimidine bases found in RNA are……..……**
   a. Uracil and Thymine
   b. Uracil and Cytosine
   c. Thymine and Cytosine
4. **……is a specific sequence of nucleotides that hold the information to make one protein.**
   a. DNA
   b. Chromosome
   c. Gene
5. **What is the genotype of this cat?……**

   a. $X_b X_b$
   b. $X_B X_b$
   c. $X_b Y$
6. **The following structure are called……**
   a. Non - Histones
   b. Telomere
   c. Nucleosome



2- The following diagrams explain two biological processes



Process A:.....

Process B:.....

IV: Mark true or false for the following sentences (correct false) (4marks)

1- Heat shock transformation is achieved by shocking cells in electric field( )
2- Oligo dA primers are used to prepare cDNA from mRNA ( )
3- Expression vectors are either prokaryotic or eukaryotic in origin ( )
4- In knock in technology a foreign DNA is inserted into the genome ( )
5- The main idea of using site specific nucleases is to generate DSB ( )
6- Chromosomes are different forms of the same gene ( )
7- immunogenicity is one of the advantages of using ZFNs in knockout ( )
8- miRNA must have a 100% complementarity to the target mRNA ( )

End of questions.....

Good luck

Dr. Ahmed Mostafa

8- Ligase enzyme connects DNA molecule by .....

a- Forming polynucleotide b- Forming hydrogen bonds

c- Linking nitrogen bases d- Attaching purines to pyrimidines

9- Which enzyme of the following is responsible for making a DNA copy from RNA?.....

a- DNA ligase b- DNA helicase c- Reverse transcriptase d- RNA pol

10- Duplication of the genetic material (DNA-DNA transfer) refers to.....

a- DNA replication b- DNA expression c- *In vitro* transcription

III: Answer the following: (9 marks)

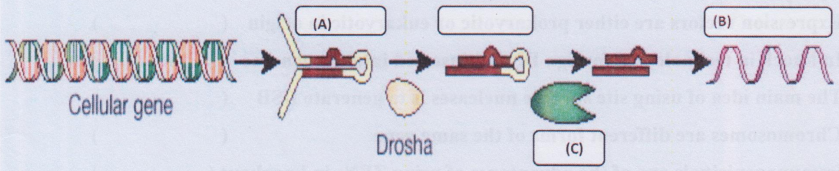
1- The following diagram shows a biological process, identify the process and labels A,B, and C

i. Name of the process.....

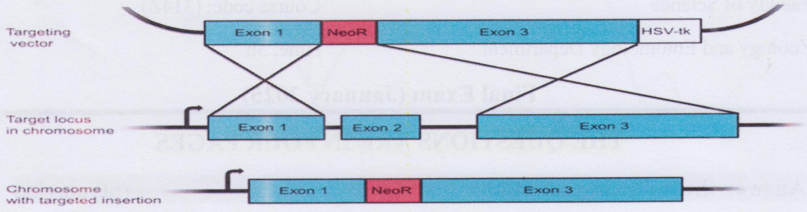
ii. Label (A) refers to.....

iii. Label (B) refers to .....

iv. Label (C) refers to .....



2- The name of the process explained in the following diagram is……



a- Homologous recombination b- RNA interference

c- Non homologous end joining d- All are false

3- In CRISPR-Cas 9 technology, …….. is used to reduce off target cleavage

a- Ligase b- Primase c- Nickase d- All are true

4- A characteristic of genetic material to permit dissemination of genetic information……

a- Stability b- Mutability c- Replicability

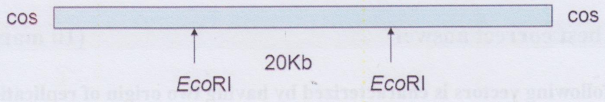
5- …….technology works only with mRNA

a- Knock in b- knockout c- knockdown

6- cDNA is usually synthesized for the purpose of mRNA cloning

a- True b- False

7- The following diagram refers to ……DNA vector



a- Lambda phage insertion vector b- Lambda phage replacement vector

c- Plasmid expression vector d- Plasmid cloning vector

Assiut University
Faculty of Science
Zoology and Entomology Department

Course: Genetic Engineering
Course code: (314Z)
Time: 3h

Final Exam (January 2025)

THE QUESTIONS ARE IN FOUR PAGES

Answer the following questions **(50 marks)**

I : Write notes on the following **(27 marks)**

1- **Components of CRISPR / Cas system in bacteria**

2- **How does ZFNs work?, show with diagram**

3- **Advantages and drawbacks of CRISPR-Cas9 technology**

4- **Compare between types I, II, and type III restriction enzymes**

5- **Steps involved in generation of a genetic library**

6- **Potential problems of ZFNs**

7- **Steps of transient knockdown**

8- **Components of plasmid vector (with drawing)**

9- **Methods of transformation in gene cloning**

II: Choose the best correct answer **(10 marks)**

1- **Which of the following vectors is characterized by having two origin of replication**

a- Plasmid b- Phagmid c- Animal virus d- Lambda phage

٣٢

23) The results of Rothenbuhler's experiments on hygienic bees have shown that:

a) hygienic behavior is controlled by a single recessive allele.
b) hygienic behavior can be passed from one generation to the next.
c) hygienic behavior is a result of social learning.

24) The real cause of sudden disappearance of lemming populations is:

a) biotic environmental factors.
b) social stress originating from their crowdedness.
c) the extreme cold weather in arctic zones.

25) Vervet monkeys have different responses to the same alarm call, based on:

a) the age of the predator.
b) the individual that produces the call.
c) their situation at the time of hearing the call.

26) In the following three categories of animals, the information capacity of language is highest in:

a) non-human primates.
b) birds.
c) honeybees.

Part II. Answer *only three* of the following questions: (24 marks)

1) Write an account on the types of human pheromones, giving examples.

2) Discuss the Lee-Boot effect and the Bruce effect, explaining the biological significance of them.

3) Classify allelochemicals, supplying at least one example of each.

4) Explain how "ethology" is distinguished from other schools of studying animal behavior.

End of questions

Examiner: Prof. Dr. Medhat M. Sadek

15) **Of the animals that are able to pass the mirror test are:**

a) dolphins and cats.
b) bonobos and gorillas.
c) mice and magpies.

16) **The theory of mind in animals refers to:**

a) the ability to exchange roles with others.
b) the ability to solve others' problems.
c) the ability to know what others believe.

17) **Clever Hans Effect refers to the:**

a) unintentional communication between researcher and subject.
b) effect of the sizes of two numbers on the ability of comparing between them.
c) effect of primer pheromones on the estrus cycle of mice.

18) **One of the stereotyped behaviors in animals is:**

a) the use of tools in sequence.
b) carrying straws in bill in peach-faced lovebirds.
c) flying in aphids as they receive alarm pheromone.

19) **The response to supernormal releasers in humans is:**

a) innate.
b) acquired.
c) cognitive.

20) **Trial and error learning can be described as the learning through:**

a) the observation of a model.
b) reasoning and problem-solving.
c) repeated attempts to solve a problem, while eliminating wrong trials.

21) **Imprinting in graylag goose is adaptive because it:**

a) helps the baby birds to communicate with each other.
b) makes the baby birds follow their mother and walk in a group.
c) teaches the young birds how to collect food.

22) **Hans, the German horse, was able to:**

a) learn simple mathematical processes.
b) read the faces of people.
c) understand numbers.

7) The ability of mathematical extrapolation was found in:

a) termites.
b) honeybees.
c) greylag goose.

8) The first person who attempted to teach a horse how to calculate was:

a) Ivan Pavlov.
b) Karl von Frisch.
c) Wilhelm von Osten.

9) A pigeon is able to categorize images based on shared elements such as plants or water bodies, because:

a) it has cognitive neural networks in its brain.
b) it has Gestalt abilities.
c) it flies most of the time.

10) An example of deliberate deception in animals is:

a) changing color in an animal as its surrounding color changes.
b) having the shape and color of another animal.
c) hiding food from other members of the population.

11. Aristotelian logic in animals is manifested by animal's ability to:

a) classify and group shapes.
b) understand spoken language.
c) pass the mirror test.

12) Some animals with mathematical abilities may NOT be able to:

a) recognize themselves in a mirror.
b) do simple counting.
c) compare quantities and qualities.

13) Among the animals that were shown to understand human spoken language is:

a) dolphins and elephants.
b) chimpanzees, bonobos, and parrots.
c) cats and dogs.

14) An example of problem-solving behavior in gorilla is:

a) manufacturing tools.
b) hunting in groups.
c) making sounds when threatened.

*The exam comes on **four** pages*
Total: 50 marks

Part I. Choose the correct answer and transfer its number to the answering notebook: (26 marks)

1) The behavior of building magnetic termite mounds has been studied by:
a) ethology researchers.
b) comparative psychology researchers.
c) sociobiology researchers.

2) The numerical distance effect appears in the difficulty of comparing:
a) between two numbers when they are too large.
b) between two weights when they are too large.
c) between two quantities when they are close to each other.

3) A chimpanzee may not quickly answer when asked which is larger a bee or an ant, because:
a) it apparently knows that bees and ants are large.
b) it has a concept of which thing is large and which thing is small.
c) a bee is much larger than an ant.

4) "The larger the size of two numbers, the more difficult it is to tell which of them is larger". This phenomenon is called:
a) semantic congruity effect.
b) number size effect.
c) Vandenbergh effect.

5) Among the discoveries made by Nicolaas Tinbergen is:
a) imprinting in greylag goose.
b) problem solving in chimpanzees.
c) hunting and nest-building behavior in the digger wasp.

6) According to Weber's law:
a) Humans and animals have similar neural mechanisms for processing numbers.
b) Both humans and animals have difficulties in understanding numbers.
c) Animals do not have arithmetic abilities.

V- Write short notes about the following. *(10 marks, 5 marks for each)*

1- Classes of Template dependent polymerases.

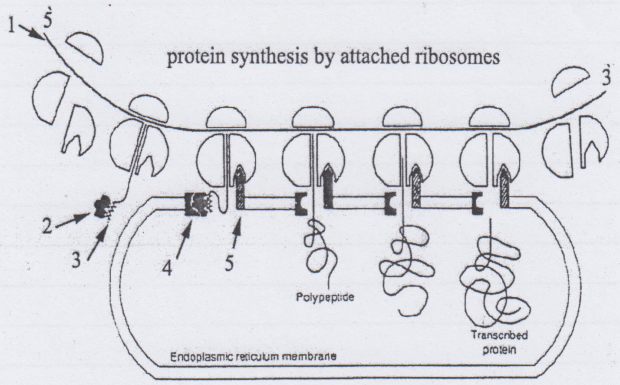
2- General types of gene promoters.

III- Write the scientific term(s) that summarize the following sentences, *(5 marks, one mark for each)*

1- A mobile genetic element that can change its location in the genome
2- DNA sequence which is the same from **5′ to 3′ and 3'ACC 5′**
3- A cellular structure responsible for the degradation of proteins marked with ubiquitin.
4- The 6 proteins complex found in mammalian telomerase
5- The DNA sequence from the start codon to the stop codon

1	2	3	4	5

IV- Complete the missing labels in the following diagram. *(5 marks, one mark for each)*



1	2	3	4	5

17- Number of times a particular mutation occurs in a population of cells or individuals. **a-Germ line mutation b- frame shift mutation c- mutation frequency d- mutation rate**	18- In tRNA, the amino acid attachment site is…. **a-5′ACC 3′ b- 5′CCA 3′ c- 5′AAC 3′ d- 5′CAA 3′**
19- The loop of the anticodon arm of tRNA contains ……. nucleotides. **a-5 unpaired b-7 unpaired c- 7 paired d- 5 paired**	20- In *E. coli* mismatch repair system……. $bind_{(s)}$ the mismatch site and $scan_{(s)}$ the DNA for GATC sequence. **a- MutS b- MutL c- both MutS and MutL d- MutH**

1	2	3	4	5	6	7	8	9	10
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**

II-Put (T) or (F) for true or false sentences, respectively. *(10 marks, one mark for each)*

1- Transversion mutations are more frequent than transition mutations.	2-Both mRNA and Small nuclear RNAs (snRNAs) have 5` cap.
3- Reverse transcriptase is not engaged in pseudogenes processing	4-TATA box is usually surrounded by GC rich sequence.
5- Most non-coding DNA is transcribed into RNA.	6- The loop of the T Ψ C arm of tRNA contains 5 paired nucleotides.
7- Histone deacetylases do not have DNA-binding domains.	8- DNA methylation of CpG occurs in 5` position cytosine.
9-In prokaryotes, both transcription and translation occur simultaneously.	10-Eukaryotes have 3 types of RNA polymerases.

1	2	3	4	5	6	7	8	9	10

Assiut University, Faculty of Science

Zoology Dept., Zoology program

Time allowed: 2 hours

50 marks

Final exam, 10-01-2025

1st semester, 2024-2025

Molecular biology (311 Z)

I- Choose the correct answer: *(20 marks, one mark for each)*

1- The mitochondrial intrinsic polymerase is……. **a- Pol ε b- Pol δ c- Pol β d- Pol γ**	2- Which of the following Indels results in frame shift mutations ……. **a- 4 pb b- 6 pb c- 13 pb d- 8 pb**
3- …is a conserved eukaryotic promoter element usually located close to -80 pb from the start point. **a-TATA box b- CAAT box c- CAP site d- GC box**	4- A type of mutation where a nucleotide change results in a different amino acid. **a- indels mutation b- silent mutation c- missense mutation d- Nonsense mutation**
5- RNA polymerase III makes..... in eukaryotes. **a- tRNA b- snRNA c- 28 S rRNA d- hnRNA**	6- An example of high copy number genes is……. **a- ribosomal genes b- Transposons c- pseudogenes d- a and b**
7- In prokaryotes, the sequence of Pribnow box is... **a-5'-TATAAA-3' b- 5'-TATAAT-3' c - 5'-TATA-3 d- 3'-TATAAA-5'**	8- telomerase…… **a- is a DNA polymerase b- uses DNTPs c- is a reverse transcriptase d- all answers are correct**
9- Poly A polymerase is ……polymerase. **a-DNA-dependent DNA b- RNA-dependent RNA c- DNA-dependent RNA d- all answers are incorrect**	10- the correct polyadenylation sequence of mRNA is…… **a- AAAUU b- UUAAA c- AAUAA d- UUAUU**
11- In base excision repair system……. excises a damaged nucleotide base. **a- 5′-dRP b- AP endonuclease c- glycosylase d- UvrD**	12- Which of the following eukaryotic enzymes has both DNA and RNA polymerase activity **a- Pol ε. b- Pol δ c- Pol β d- Polα**
13- ……. is engaged in cap synthesis of mRNA. **a-Acetyltransferase b- 5' triphosphatase c- demethylase d- adenyltransferase**	14- Which of the following transcription factors stay until elongation of mRNA is finished. **a- TFIIB b- TFIID c- TFIIE d- TFIIH**
15- Which of the following arms of tRNA contains pseudo uridine **a-D arm b- T Ψ C arm c- anti codon arm d- amino acid acceptor arm**	16- …… Humans' genes are intronless **a-Hemoglobin b- ribosomal c- histone d- immunoglobulin**

21- Jaws bear thecodont teeth in reptile and mammals.

22- The amniote radiation is composed of three major lineages, the Sauropsida, therapsida and Synapsida.

23- All amniotes are achieved complete separation of the respiratory and systemic circulation

24- The Skull elements exhibit varying degrees of mobility most extensive motions are found in the skulls of lizards and especially snakes.

25- The sternum is a midventral skeletal structure that is dermal in embryonic origin.

6- The diaphragm of crocodiles consists of crural and sternal parts, all of which converge on a central tendon.

7- The in crocodilians, the coprodeum and urodeum and, to a lesser extent, the proctodeum are more or less united into a single large chamber.

8- In venomous snakes, have a hollow channel down the base of the tooth through which venom passes from the venom duct into the prey.

9- In reptiles, the sinus venosus are reduced to a small but still anatomically discrete area.

10- All birds have gizzard and crop.

11- Duvernoy's gland is situated along the posterior lower lip, releases serous secretion in many nonvenomous snakes.

12- Only birds and bats evolved the capacity for powered flight.

13- Modern snakes, lizards, Sphenodon, and their ancestors constitute the Lepidosauromorpha.

14- All mammals possess short the external auditory meatus with pinna.

15- Chameleon is manipulated their prey by using their jaws.

16- In mammals, five distinct regions are differentiated within the vertebral column.

17- The anterior air sacs include single interclavicular sac and paired cervical and anterior thoracic.

18- Water retention for reptiles has been done in copredaeum.

19- Birds is close association with dinosaurs comes especially from similarities in hip, wrist, and wishbone.

20- The irregular shape of the pinna helps to differentiate sounds approaching from different directions and channel them into the middle ear.

c) None of above

20- The primary functions of down feather are

a) Display and insulation

b) Aerodynamic and insulation

c) Thermal insulation

21- Acrodont tooth are prominent in

a) Only Reptilian b) Reptilian and Mammals c) Monotremes

22- Which mammalian has mammary gland without nipple?

a) Placental mammals b) Marsupials c) Monotremes

23- Reptile's braincase distinguishes from ……..

a) Mesosaurs b) synapsidia c) Cotylosauria

24- Head movements of Amniota is allowed by the

a) Cervical vertebrae

b) Neck region

c) Two first cervical vertebrae

25- Urodaeum of reptiles performs

a) Excretion

b) Reproduction

c) All of the above

Question II: Choose whether the statement is true or false and correct it:

1- Separation between the air way and food way passages allow by tongue.

2- Terrestrial vertebrates face the force gravity by development of the pentadactylus limbs

3- The aspiration mechanism in snakes depends on activity of the intercostal muscles during feeding process.

4- In primitive amniotes, as well as in their non-amniotes ancestors, the temporal region is not pierced.

5- In turtle, the cavum pulmonale receive blood from the cavum arteriosum moving across the muscular ridge.

8- Which of the following is a unique characteristic that distinguishes snakes from other Reptilian?

a) Have one lung, no tympanum, lack the temporal arches

b) lack temporal fenestrae and breathing by help the intercostal muscle

c) Ectothermic and have two temporal fenestrae

9- The occlusion of teeth is precisely controlled in.....

a) Crocodiles b) lizard c) mammals

10- What do we call the sixth aortic arch in amniotes?

b) Systemic arch

c) Pulmonary arch

d) Carotid arch

11- What is the function of vomeronasal organ in Gecko?

a) Chemoreceptors

b) Respiration

c) All of above

12- Stylopodium is composed of..... bone

a) One b) two c) three

13- Which of following appear in turtles?

a) Anapsidian skull, lack sternum, gastralia

b) Have keratinized jaws without teeth, sternum, gastralia

c) Anapsidian and prokinetic skull, lack sternum

14- Which of the following have dikinetic skull and movable quadrate?

a) Amphisbaenians b) Lizards c) Snakes

15- The lacrimal bone absent in.....mammals

a) Marsupials b) Monotremes c) Eutherian

16- In birds, the zeugopodium of forelimb is composed of..... bones

a) Two separated b) Two fused c) None of above

17- Which of the following have responsive to seismic and airborne sounds

a) Crocodile b) Lizards c) Snakes

18- Which of the following have metanephric kidneys?

b) Amphibian b) All reptiles c) All amniotes

19- The aspiration pump in the turtle uses.....

a) Back-and-forth movements of the liver like a piston on the lung

b) The movement of the rib cage

Assiut University
Faculty of Science
Zoology Department

Third year Exam (Zoology)
Vertebrate 2 (330-Z)
Time: one hour
3/1/2024

Question I: Choose the correct answer of the following

1- Which of the following statements is not true?
   a) The pinna is present is all mammals
   b) The pinna is absent in monotremes, but present in therian mammals
   c) The single stapes is joined by the incus and malleus

2- **Which of the following is a characteristic of amniotes?**
   a) It is composed of three major lineages
   b) Embryos enveloped in extraembryonic membranes.
   c) All of above

3- **Which of the following is using the intercostal muscle to change the walls of the lung's shape and induce airflow in or out?**
   a) Crocodiles b) lizard c) all of above

4- **Which of the following features apply to birds?**
   a) Lack temporal fenestrae and breathing by help air sacs
   b) Endothermic and have pair temporal fenestrae
   c) Endothermic, have developed sternum, and pair of ovary

5- **There were ..... major lineages arise of the parareptilian radiation**
   a) three b) one c) two

6- **Which of the following is a unique characteristic that distinguishes a crocodiles from other reptiles?**
   a) Presence the gizzard, ectothermic and have one temporal fenestrae
   b) lack temporal fenestrae and breathing by help the diaphragmaticus muscle
   c) None of above

7- **Choose the answer below that correctly matches the parareptilian with its structural characteristics**
   a) Reptiles, lack temporal fenestrae and breathing by help some abdominis muscles
   b) Reptiles, ectothermic and have one temporal fenestrae
   c) Reptiles, lack temporal fenestrae and breathing by help the diaphragmaticus muscle

س٣: أكتب المصطلح العلمى الدال على كل عبارة مما يأتى: (١٥ درجة):-

1- A substance –comes from volcanic vents- and can be eaten by chemosynthetic bacteria in benthic marine ecosystem
2- Salt tolerant organisms.
3- A marine area located between high and low tide.
4-The areas where the soil is saturated or inundated for at least part of the time.
5-The middle portion of the lake where the rate of temperature change with depth is the greatest.
6- Floating or weakly swimming animals.
7- Organisms which burrow beneath the mud surface.
8-Compounds which change the ionic state of metals that otherwise be toxic.
9- The chemical material used by plants and animals that inhibit the growth of their competitors.
10- One of the limiting factors of corals responsible for renewing plankton and provides corals with fresh oxygen.

س ٤: (٥ درجات):-

أكتب الكلمة أو الكلمات الناقصة فيما يلي:

1- .....is an ecosystem located in water bodies.
2- 85% of the dissolved materials in sea water are..... and .....
3- The.....zone is the relatively shallow part of the ocean that lies over the continental shelf.
4- .....has an adverse effect on corals.
5- One of the importance of corals is:.....

س ٥:

ماذا تتوقع فى الحالات الآتية: (٥ درجات):-

1- Increasing of acid rains at certain aquatic habitat.
2- Reducing of the coral reefs in The Red sea.
3- Collecting all algae and plants in an aquatic habitat.
4- Increasing turbidity of water in the Red Sea.
5- Adding sewage water to the River Nile.

With best wishes

س٢: ضع الرقم المناسب من فقرات العمود (A) أمام ما يناسبه من فقرات العمود (B) (١٥ درجة):-

A	B
1- Recycling of nutrients	+ Acts as toxicants or as growth stimulators ( )
2-Marine ecosystem	+ Are common nutrients needed in large quantities for cell development ( ).
3- The profundal zone	+ Are important nursery areas for fish and birds ( ).
4- Freshwater ecosystem	+ Have swift unidirectional water flow ( ).
5-Lentic water	+ Are stronger swimming animals ( ).
6- Biological interactions	+ It means the increase of organic material in aquatic habitat ( ).
7-The pelagic zone	+ Measures the rate of oxygen consumption by a sample of water ( ).
8- Humic acid	+Generates 32% of the world`s net primary production ( ).
9-BOD	+ Is one of the functions of aquatic ecosystem ( ).
10- Eutrophication	+ Is the bottom or deep water ( ).
11- Nekton	+ Generates nearly 3% of the world's net primary production ( ).
12-Streams and Rivers	+ Is the slow moving water ( ).
13- Estuaries	+ Is considered as one factor that determines any aquatic structure ( ).
14- CO2- No3- SIO2	+ Is the open water of the lake ( ).
15- Cu- Zn	+ Belongs to the refractory compounds in natural waters ( ).

جامعة أسيوط - كلية العلوم
قسم علم الحيوان
اختبار مادة البيئة المائية ٢٠٢٤-٢٠٢٥
الزمن: ساعتان.

أجب عن الأسئلة الآتية:

س١: اختـــر الإجابة الصحيحة من بين الأقواس:(١٠ درجات):

1- One of the functions of aquatic ecosystem is (purify air – attenuate floods-both)
2-Light and heat in aquatic habitat can be considered as (biotic characteristics- Physical factors- both).
3- (The autotrophic organisms- Stenohaline – Chemosynthetic bacteria- all) in aquatic habitat can be considered as biotic factors.
4-Autotrophic organisms in aquatic habitat include (stenohaline – algae -both).
5-Organisms found in marine habitat include (brown algae- cephalopods-both).
6- The first step in eutrophication of aquatic ecosystem is (the increasing of minerals like phosphate and nitrite- algal bloom- formation of detritus).
7- A high BOD means (less of organic materials- lots of organic material- both).
8- The benthic organisms include (epibenthic – infauna – both).
9- Horizontal meanders in rivers occur in (high portions- flatter portion- both).
10-Optimal reef development occurs where the mean annual temperature is about (32:35- 30:35- 23:25).

اقلب الصفحة من فضلك

(2) Differentiate between:- (10 Marks)

A- Interlecithal and centrolecithal ova. Give examples.
B- Blastula of Amphioxus and that of Toad. Use labeled drawing.

(3) Describe the spermiogenesis process. Use labeled drawing. (10 Marks)

(4) State True (T) or False (F): (10 Marks)

1- The midpiece of the sperm contains axoneme surrounded by mitochondria.

2- Meroblastic cleavage occurs in frog.

3- Epiboly means the growth of one layer of cells and spread out over another layer.

4- Yolk plug forms during blastulation.

5- Polar bodies are formed during the formation of sperm.

6- The gray crescent of frog is formed after fertilization.

7- Polyspermy leads to abnormalities in most mammals.

8- Vitelline membrane is secondary egg envelope.

9- Secondary spermatocyte contain a diploid number of chromosomes (2n).

10- The type of placenta found in human is cotyledonary placenta.

(5) Answer the following questions:- (10 Marks)

A- Mention the factors that contribute to the success of external fertilization.
B- Discuss the process of gastrulation in Amphioxus.

Best wishes
Dr. Dalia Elzahraa Farouk

Assiut University
Faculty of Science
Department of Zoology& Entomology

The Third level
Principles of Embryology (Z 334)
Time: Two hours

(Exam in 2 pages) 2024/2025

(1) Choose the correct answer:- (10 Marks)

1- Gastrulation in toad involves:

a- Epiboly. b- Invagination. c- Involution. d- All.

2- Sperms are produced in the:

a- Seminiferous tubules. b- Interstitial cells.
c- Vas deferens. d- Prostate gland.

3- The ovum of mammals are:

a- Alecithal. b- Mesolecithal. c- Microlecithal. d- Megalecithal.

4- Brain of vertebrates develops from:

a- Endoderm. b- Mesoderm. c- Ectoderm. d- Mesendoderm.

5- Change that occur to the ovum due to penetration of sperm:

a- Fertilization cone. b- Shell membrane.
c- Zona pellucida. d- All.

6- Stage of embryonic development in which the germ layers are formed

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

7- Development of an egg without fertilization is called:

a- Gametogenesis. b- Parthenogenesis.
c- Oogenesis. d- Embryogenesis.

8- External fertilization is seen in:

a- Fish. b- Bird. c- Rabbit. d- Reptiles.

9- The muscles originate during the development from:

a- Yolk plug. b- Ectoderm. c- Endoderm. d- Mesoderm.

10- Acrosome is the structure that found in:

a- Spermatid. b- Sperm. c- Fertilized egg. d- Ovum.

9. Cercariae of *Schistosoma* and *Fasciola* are different in the following except

(a) Tail (b) Penetrating glands

(c) a & b (d) Alimentary canal

10. Consumption of uncooked fish is likely to cause which of the following helminthic disease

(a) *Diphyllobothrium latum* (b) *Taenia saginate*

(c) *Fasciola hepatic*a (d) *Echinococcus granulosus*

B- Fill in the blanks: (5 marks)

1- Infection with *Clonorchis sinensis* is due to …….. , but infection with *Fasciolopsis buski* is due to ……..

2- *Giardia lamblia* lives in …….. it multplies by……

3- The intermediate host of *Fasciola gigantica* is ……..and that of *Echinococcus granulosus* is ……..

4- The infective stage of *Balantidum coli* is…….. and that of *Trichomonas hominis* is……..

5- Infection with *Diphyllobothrium latum* is due to …….. but infection with *Dipylidium caninum* is due to ……..

C- Make labelled diagrams of the diagnostic and infective stage of three protozoa habits in the intestine? (6 marks)

D- Enumerate the helminths parasites can be transmitted to human via contaminated fish? Describe the life cycle of one of them? (10 marks)

E- Enumerate the protozoa that may affect human eye? Mention the stage that may be found? (3 marks)

F- Compare between *Giardia lamblia* and *Trichomonas vaginalis* (infective stage, habitat, mode of infection)? (6 marks)

G- Compare between *Schistosoma mansoni* and *Schistosoma haematobium* in the following items (habitat, intermediate host, infective stage, and eggs)? (10 marks)

Good luck…….. *Prof. Dr., Gamal H. Abed*

Dr. Sara S. Abdel-Hakeem

Assiut University
Faculty of science
Zoology Department

Final exam: Parasitology
Course number: 321 Z
Time: 2 hours

2025

Answer the following question (illustrating your answer with labeled drawings whenever possible)

A- Select the single best answer for each of the following (1 marks/ each)

1. Which one of the following can be called "Incidental Parasite?"

(a) *Diphyllobothrium latum* (b) *Dipylidium caninum*

(c) *Fasciola hapatica* (d) *Clonorchis sinesis*

2. Human acts as intermediate host of

(a) *Taenia solium* (b) *Fasciolepsis buski*

(c) *Balantidium coli* (d) none of the above

3. All the following protozoa live in the intestine except

(a) *Trichomonas hominis* (b) *Plasmodium* spp

(c) *Entamoeba coli* (d) *Balantidium coli*

4. Which one of the following is a good general statement about the life cycle of digenetic trematodes?

(a) A snail intermediate host is required.

(b) The infective (metacercarial) stage always encysts on aquatic vegetation.

(c) The second intermediate host is always a vertebrate.

(d) The adult fluke is always found in the small intestine of the definitive host.

5. The second intermediate host of *Diphyllobothrium latum* is

(a) Cyclops (b) Cattle

(c) Sheep (d) Frogs

6. Humans get infected with the hydatid cyst of *Echinococcus granulosus* when they ingest:

(a) a flea that contains the larval tapeworm.

(b) the tapeworm egg from dog feces.

(c) the tapeworm cysticercus from raw beef.

(d) the tapeworm procercoid stage in a freshwater copepod.

7. The ootype in female genital system of trematodes connect with

(a) Oviduct (b) Vitelline canal

(c) Uterus (d) all the above

8. Autoinfection could be propagated by

(a) *Ascaris* sp. (b) *Enterobius vermicularis*

(c) *Taenia saginata* (d) *Heterophyes heterophyes*

IV- Define the following terms: Choose any <u>five out of the seven</u> options provided. *(5 marks, one mark for each)*

(<u>Inverted microscope</u>, <u>Biopsy punch</u>, <u>Non-invasive sampling</u>, <u>Teased sampling</u>, <u>Formalin pigment</u>, <u>Compound fixatives</u>, <u>Vacuum impregnation</u>)

End of Questions, With Our Best Wishes!

Prof. Mona M. Atia & Dr. Ahmad U. M. Mahmoud

IV

III- **Define the following terms: Choose any <u>five out of the seven</u> options provided.** *(5 marks, one mark for each)*

<u>(Polyclonal antibodies, Stacking gel , Separating Gel, Western blotting Agarose gel electrophoresis, Pluripotent, stem cell)</u>

27	The proteins are moved from the gel onto a nitrocellulose membrane by electrophoresis buffer in western blot.	
28	Adipose tissue–derived stem cells (ADSCs) are isolated from umbilical cord tissue.	
29	Anchorage – independent, grown in suspension, as blood cells.	
30	Secondary cells culture that derived from a primary culture.	
31	Xylene is one of the most commonly used clearants in histological laboratories.	
32	The brightfield microscope is commonly used to visualize 3D structures of large and opaque specimens and is often employed in dissection work.	
33	The buffering capacity of formaldehyde as a fixative is important to enhance tissue coloration during tissue fixation.	
34	Prolonged exposure to clearing agents in tissues may cause over-hardening.	
35	Paraffin wax is typically used at room temperature during the impregnation step.	
36	The primary aim of impregnation/infiltration in histological tissue processing is to enhance tissue coloration.	
37	Standardizing sampling techniques for tissue collection in histology is important to maintain consistency and reliability in histological results.	
38	Using xylene contaminated with water in histology may cause a cloudy appearance in the tissue.	
39	Impregnation paraffin wax solidifies to a hard consistency, while embedding paraffin wax remains soft.	
40	Isaac Newton made significant contributions to the study of anatomy through pioneering microscopic observations of tissues during the late 17th century.	

DO NOT forget to answer the essay questions on the following pages!!!

18	**Which common fixative is most frequently used in histology for tissue preservation?** **A)** Glutaraldehyde. **B)** Ethanol. **C)** Xylene. **D)** Formaldehyde.	
19	**What is the advantage of gradually introducing the dehydrant during the dehydration process?** **A)** To speed up tissue dehydration. **B)** To minimize tissue shrinkage and distortion. **C)** To enhance tissue coloration. **D)** To remove all cellular components from tissue.	
20	**What type of microscope is typically used for observing live cells in culture, with the objective lens below the specimen and the light source above?** **A)** Inverted microscope. **B)** Brightfield microscope. **C)** Phase-contrast microscope. **D)** Simple microscope.	

II- Write the letter (T) if the statement is true, and write the letter (F) if the statement is false, then put your answer inside the empty box, under the black arrow: *(20 marks, one mark for each)*

21	The avidin-biotin complex method of IHC staining relies upon the strong affinity avidin has for biotin.	
22	DAB stain is a colorless chemical compound that can be used in immunohistochemistry.	
23	Ammonium persulfate is considered Polymerization catalyst in gel electrophoresis	
24	Stacking gel is a low concentrated polyacrylamide gel layer in SDS-PAGE technique.	
25	Electrophoresis tank for agarose gel filled with 1x of Tris-acetate-EDTA buffer.	
26	Crystal violet requires the use of a green -light transilluminator for DNA visualization.	

11	**What is the primary aim of vacuum impregnation?** A) Increases tissue hardness. B) Causes tissue shrinkage. C) Facilitates penetration of molten impregnating medium. D) Enhances tissue coloration.	
12	**Which technological advancements revolutionized histology in the 20th century, enabling deeper insights into cellular and subcellular structures?** A) The invention of the compound microscope. B) Electron microscopy and immunohistochemistry. C) Advancements in staining techniques. D) The discovery of antibiotics.	
13	**What is the primary purpose of tissue fixation in histology?** A) To enhance tissue coloration. B) To accelerate tissue decomposition. C) To stimulate bacterial growth. D) To preserve tissue integrity and cellular details.	
14	**What is the primary cause of tissue fragility during embedding?** A) Inadequate dehydration. B) Excessive clearing agent. C) Overheating. D) Insufficient heating.	
15	**Which type of paraffin wax remains relatively soft after solidification and is suitable for tissue permeation?** A) Impregnation paraffin wax. B) Embedding paraffin wax. C) Both have similar characteristics. D) Neither is suitable for tissue permeation.	
16	**Which tissue sampling technique involves spreading a thin layer of tissue or fluid onto a slide, often using a controlled second slide, for the diagnosis of diseases and identification of abnormalities?** A) Smear sampling. B) Cryostat sampling. C) Biopsy sampling. D) Teased sampling.	
17	**When are confocal microscopes particularly useful in histological studies?** A) For studying opaque specimens. B) For observing basic cellular structures. C) For visualizing thick specimens and studying dynamic processes within cells. D) For visualizing thin and unstained tissue sections.	

10

5	**Electrophoretic cell of Sodium dodecyle sulphate polyacrylamide gel electrophoresis is .....** A) oblique B) Vertical C) horizontal D) Non of the above	
6	**Detection with specific x-ray film known as.....** A) Colorimetric B) Chemiluminescent C) CCL D) B &C	
7	**..... is characterized by high affinity with bind proteins during transfer process in western blot** A) Blotting Membrane B) nitrocellulose membrane C) PVDF membrane D) All of previous	
8	**When cells are reach to 70-80% confluency in flask/dishes/plates must be.....** A) sub-culture B) cryopreserved C) a &b D) Non of the above	
9	**..... is a media that is used in cryopreservation of cells in cell culture techniques.** A) DMEM B) DEMSO C) Mr Frosty D) Trypsin	
10	**.....cells is intermediated cells between stem cells and specialized cells that divide to allow a large number of specialized cells.** A) The totipotent B) The progenitor C) The Multipotent D) The pluripotent	

كلية العلوم جامعة أسيوط	**Final-term exam, 1st semester, 2024/2025** **Microtechniques (Z 317)** **Time limit: 2 hours, Date: Jan. 12th, 2025** **Total score: 50 marks** **(7 Pages)**	جامعة أسيوط

A- Choose the correct answer from "A, B, C, or D", then put your answer inside the empty box, under the black arrow: *(20 marks, one mark for each)*

1	**…… process can be performed the cross-links formed by formalin fixation must be removed in immunohistochemistry.** A) Antigen unmasking B) Fixation C) Antigen retrieval D) A &C	
2	**……is refers to the strength which the epitope binds to an individual paratope (antigen-binding site) on the antibody.** A) Avidity B) Specificity C) Sensitivity D) Affinity	
3	**Most agarose gels are 0.7% gel will show good separation for ……** A) large protein fragments B) small DNA fragments C) large DNA fragments D) small protein fragments	
4	**Ethidium bromide (EtBr) is added to the gel to visualize the separated DNA under……..** A) UV hood B) inverted microscope C) light microscope D) UV transillumination	

١٤