

***Question 2: Answer the following questions (10 marks)**

(A) Put True or False

- 1- The lady bugs belong to order Heteroptera. ()
- 2- All the exopterygotes are hemimetabolous. ()
- 3- Both moths and butterflies spin chrysalis. ()
- 4- All wasps, bees and white ants have waist. ()
- 5- Silverfish and Mayflies undergo molting only during younger stage. ()
- 6- Naiads are ecological indicators of good quality water. ()
- 7- Tympanum is located in fore tibia in Caelifera. ()
- 8- Biting lice are primarily wingless insects. ()
- 9- Short-horned grasshopper belongs to family Tettigonidae. ()
- 10- Dipterans are the only order having two wings. ()

■ (B) Define Four only of the following terms:

Alate, Paleoptera, Anamorphosis, Dichotomous key, Cornicles

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●○ (C) You went in a trip to collect insects with your class mates and you collected many aquatic insects including different kinds of nymphs. How can you distinguish the nymphs of stoneflies, damselflies, dragonflies and mayflies?

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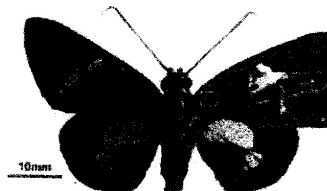
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 (G) Common name:	 (H) Suborder:
 (I) Suborder: Common name:	 (J) Order:

Prof. Dr. Ali Mohamed Ali Mahmoud

End of Exam

& Best Wishes

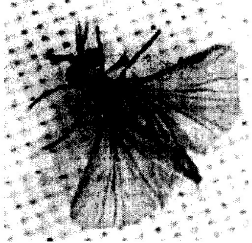
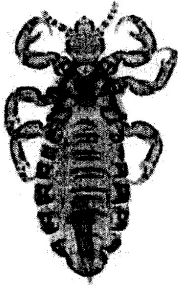
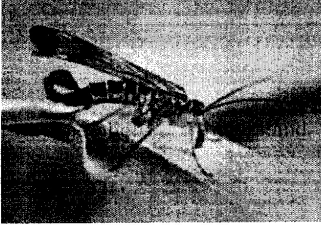
	Assiut University- Faculty of Science Second Semester- Final Exam 2025-2026 Zoology and Entomology Department	Program: Zoology Level : (3) Date: 10/6/2026 Time: 2 h	
Course Title: Cell Biology		Code: 312 Z	
Instructors: Prof. Dr.			
Important:	No. of pages 4	No. Of questions 4	Total Mark: 50 degree

I- Choose the correct answer: ■

(12 Marks)

- 1- Depending on its species, the animal's ability to repair certain types of DNA damage is directly related to:
 - a) telomeres
 - b) genes
 - c) the lifespan
 - d) the cell cycle
- 2- Cellular immunity is mediated by:
 - a) B-lymphocytes
 - b) T-lymphocytes
 - c) phagocytes
 - d) memory lymphocytes
- 3- The immunoglobulin that crosses the placental barrier is:
 - a) IgG
 - b) IgA
 - c) IgD
 - d) IgM
- 4- Which one of the following statements regarding B-lymphocytes is **TRUE**:
 - a) represent 75% of circulating lymphocytes
 - b) represent 55% of circulating lymphocytes
 - c) represent 65% of circulating lymphocytes
 - d) c) represent 60% of circulating lymphocytes
- 5- The stimulation and differentiation of B-cells into plasma cells is completed by:
 - a) Killer cells
 - b) Helper cells
 - c) Suppressor cells
 - d) phagocytic cells
- 6- The interleukin, rise with age, and it is speculated that interfere in some way with the immune response is called:
 - a) interleukin-2
 - b) interleukin-4
 - c) interleukin-8
 - d) interleukin-6
- 7- The sequence of activities exhibited by cells is called:
 - a) mitosis
 - b) cell division
 - c) the cell cycle
 - d) cell growth
- 8- The immunoglobulin that disappear immediately after its secretion is
 - a) IgA
 - b) IgE
 - c) IgG
 - d) IgM
- 9- The hallmark of AIDS is the decline in the number of patient's:

Δ ■ Question 5: Identify the order and/or suborder of the following insects (10 marks)

 (A) Order:	 (B) Order:
 (C) Order:	 (D) Order: Common name:
 (E) Order: Common name:	 (F) Order: Common name:

- [illegible]

(15 Marks)

- △ Remember ■ Understand ● Apply ◇ Analysis * Evaluate ○ Create

- 10- The senescent cells continue to respond to hormones and other outside stimuli, but can't
- 11- The proliferative gene is thought to regulate the expression of other genes important in cell division.
- 12- Testosterone supplementation might trigger excessive red blood cell production in some men which can increase a man's risk of.....
- 13- Filtration and sedimentation are used in:
- 14- In the programmed cell death, Bcl-2 is bound to a molecule of protein which called:
- 15- Cytochrome C binds to the protein Apaf-1 and aggregate to form

III- Write the following data: •

(13 Marks)

A- Cells that are damaged by injury undergo a characteristic series of changes such as:

- 1-
- 2-
- 3-

B- Crosslinking interests gerontologists for several reasons these are:

- 1-
- 2-
- 3-
- 4-

C- Why mitochondrial DNA is injured at a much greater rate than nuclear DNA?

- 1-
- 2-

D- What role HSPs play in the aging process?

1-

2-

E- Why yeast, nematodes and fruit flies have attracted a lot of attention from gerontologists?

1-

2-

IV-Write on two only of the following: •

(10 Marks)

1- Proliferative genes.

2- Hormone replacement.

3- Apoptosis and tissue transplantation.

End of Exam

Best Wishes Prof. Dr. Gamal El-Sokkary

Δ Remember

■ Understand

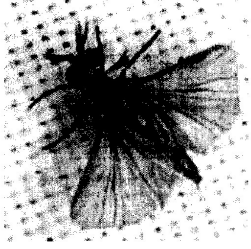
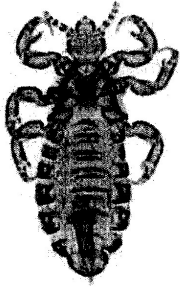
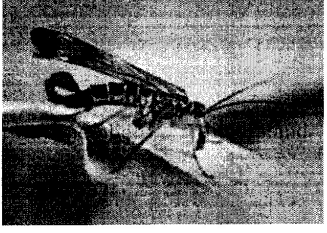
● Apply

◊ Analysis

* Evaluate

○ Create

Δ ■ Question 5: Identify the order and/or suborder of the following insects (10 marks)

 (A) Order:	 (B) Order:
 (C) Order:	 (D) Order: Common name:
 (E) Order: Common name:	 (F) Order: Common name:

	Assiut University- Faculty of Science Second Semester- Final Exam 2025-2026 Zoology and Entomology Department	Program: Chemistry and Entomology Level : (3) Date: 20/5/2026 Time: 2 h	 كلية العلوم جامعة أسيوط
Course Title: Economic Entomology		Code: 342 Z	
Instructors: Dr. Asmaa Metwaly Elsayed			
Important:	No. of pages 6	No. Of questions 4	Total Mark:50 degree

Answer the following questions

First Question: Choose the best correct answer from a, b,c or d: (10 marks)

- The Khapra beetle (*Trogoderma granarium*) is particularly dangerous because its larvae can:
 - Go long distances to find new food sources.
 - Enter a diapause and survive without food for years.
 - Only feed on processed flour, not whole grains.
 - Produce toxins that kill other insects.
- The primary damage caused by the Green Stink Bug (*Nezara viridula*) to cotton is:
 - Cutting the stem at the base.
 - Creating holes in the leaves.
 - Staining the lint and causing boll rot.
 - Spinning a cocoon around the boll.
- The spiny bollworm (*Earias insulana*) differs from other bollworms because it pupates:
 - Deep in the soil.
 - Inside the cotton seed.
 - On the plant stems.
 - Inside the root system.
- Why are young plants often more tolerant to pest injury than seedlings?
 - They have chemical defenses that seedlings lack.
 - Pests prefer the taste of seedlings.
 - They have fast, vigorous growth.
 - They are not attacked by pests until they mature.
- The Red Palm Weevil is considered the most dangerous pest for date palms because:
 - It feeds on the nectar of the flowers.
 - It is a subterranean pest that eats the roots.
 - Its larvae tunnel deep into the stem.
 - It changes the color of the leaves to silver.
- What is the indirect damage caused by Scale Insects on orchard trees?
 - Consumption of wood.
 - Secretion of honeydew.
 - Transmission of the Tomato Spotted Wilt Virus.
 - Breaking the branches due to the weight of the insects.
- Bee Propolis is collected by bees from:
 - Flower nectar.
 - Tree resins.
 - Pollen grains.
 - Secretions from the queen's glands.
- The life cycle of the black carpet beetle (*Attagenus unicolor*) is unusual because the larval stage:
 - Is the only stage that does not feed.
 - Can last from three months to nearly two years.
 - Is spent entirely inside a single grain kernel.
 - Lasts only 5-10 days.

	Assiut University – Faculty of Science Second Semester – Final Exam 2025 – 2026 Zoology and Entomology Department	Program: Zoology and Entomology Level: 3 Date: 24/5/2026 Time: 2 h	
Course Title: Molecular and Cell Biology		Course Code: 318 Z	
Instructors: Prof. Dr. Gamal H. Abdelrahman & Dr. Mahmoud S. M. Abdelrasoul			
Important:	No. of pages 3	No. of questions 3	Total Mark: 50 marks

I- Choose the correct answer for the following questions (30 marks):

- 1- Recall the main component of the plasma membrane. △
 - A. Triglycerides
 - B. Cellulose
 - C. Phospholipid bilayer
 - D. Peptidoglycan
- 2- Apply your understanding to predict where proteins for secretion are synthesized. ■
 - A. Golgi
 - B. Ribosomes attached to ER
 - C. Mitochondria
 - D. Lysosomes
- 3- Apply your understanding to predict where proteins for secretion are synthesized. ●
 - A. Free ribosomes
 - B. Mitochondria
 - C. Ribosomes attached to ER
 - D. Lysosomes
- 4- Recall the protein subunits forming microtubules. △
 - A. Actin and myosin
 - B. α- and β-tubulin
 - C. Collagen and elastin
 - D. Keratin dimers
- 5- Apply diffusion principles to predict movement O₂ of across membranes. ●
 - A. Requires ATP
 - B. Directly through lipid bilayer
 - C. Via protein channels only
 - D. From low to high concentration
- 6- Analyze why cholesterol is important in animal cell membranes. ●
 - A. Prevents protein synthesis
 - B. Increases membrane rigidity only
 - C. Forms ion channels
 - D. Regulates membrane fluidity
- 7- Recall the function of the glycocalyx. △
 - A. ATP synthesis
 - B. DNA replication
 - C. Cell recognition
 - D. Protein folding
- 8- Identify the organelle involved in protein modification and sorting. △
 - A. Nucleus
 - B. Ribosomes
 - C. Golgi apparatus
 - D. Lysosomes
- 9- Differentiate between prokaryotic and eukaryotic cells based on the nucleus. ■
 - A. Both cell types have a true nucleus
 - B. Only eukaryotic cells have a true nucleus
 - C. Only prokaryotic cells have a nuclear envelope
 - D. Neither cell type contains DNA
- 10- Describe the role of nuclear pores. △
 - A. Regulate transport between nucleus and cytoplasm
 - B. DNA replication
 - C. Protein synthesis
 - D. Ribosome assembly

△ Remember ■ Understand ● Apply ◇ Analysis * Evaluate ○ Create

9. "Shot holes" in stored wheat kernels are a characteristic sign of:

- a) Secondary pests like Saw-toothed beetles. b) Internal feeders like *Sitophilus* weevils.
c) Surface feeders like Indian meal moths. d) Scavengers like Spider beetles.

10. "Mummies" is a term used to describe aphids that have been parasitized by:

- a) Ladybugs. b) Braconid wasps. c) Tachinid flies. d) Green lacewings.

Second Question: Put (True) or (False) in front of the following substances: (10 Marks)

1. Minor pests are species that inflict slight damage on a host, and their effect is often indiscernible. ()
2. Whitefly crawlers are immobile and stay on the same leaf where eggs were laid. ()
3. Only larvae of ladybird contribute to biological control by preying on soft-bodied insects. ()
4. Thrips damage appears as silvery patches on the leaves that shine in the sun. ()
5. The black soldier fly is primarily valued for its role as a pollinator in greenhouses. ()
6. Mole crickets prefer light soil because it is easier for them to create subterranean tunnels. ()
7. Dermestid beetles are primarily known as primary pests of whole, sound grains. ()
8. The spiny bollworm is considered the most dangerous cotton pest as it feeds entirely inside the boll. ()
9. The Angoumois grain moth is unique because it can attack crops in the field as well as in storage. ()
10. In Sericulture, the silk thread is obtained by unwinding the cocoon created by the adult moth. ()
11. Spontaneous generation suggested that pests arise from non-living matter. ()
12. A large hole in a seed caused by an internal feeder indicates exact spot where the insect entered. ()
13. The saw-toothed grain beetle gets its name from the saw-like projections on its abdomen. ()
14. Bee Propolis is used to sterilize the hive and has powerful antimicrobial properties for human use. ()
15. Flour beetle larvae prefer the grain germ, which prevents the grain from germinating. ()
16. Cat-facing damage is a symptom of defoliators that eat leaf tissues. ()
17. Larder beetle larvae bore into wood primarily for feeding purposes. ()
18. Gall formers stimulate plants to grow abnormal tissues for food and shelter. ()
19. Drones are produced from fertilized eggs through a process called parthenogenesis. ()
20. Carpet beetles are easily distinguished from clothes moths by the absence of silk webbing. ()

Third Question: Write the suitable terminology of the following sentences. (10 Marks)

1. The density of an insect on a crop at which it is necessary to carry out a control operation.
(.....).
2. The death of the growing tip of a plant, usually caused by stem-boring insects. (.....).

△ Remember ■ Understand ● Apply ◇ Analysis * Evaluate ○ Create

3. A condition caused by whitefly honeydew being deposited on open cotton lint. (.....).
4. A milky white substance secreted from the hypopharyngeal glands of young worker bees. (.....).
5. A species that has been brought into a new area where it often lacks natural enemies, allowing it to spread rapidly and cause damage. (.....).
6. A thin, transparent layer of the grain skin left by the Angoumois grain moth larva before emergence, acting as a diagnostic sign. (.....).
7. A primary pest of legumes where the elytra are short and do not cover the entire abdomen, leaving the last segments exposed. (.....).
8. A waxy secretion used by female *Sitophilus* weevils to seal the hole after depositing an egg inside the grain kernel. (.....).
9. A resting stage in the Pink Bollworm where two cotton seeds are joined by silk with a larva inside. (.....).
10. A chemical substance secreted by the Queen bee to inhibit the development of workers' ovaries and maintain colony order. (.....).

Fourth Question: Write short notes about FIVE parts only of the following: (20 marks)

- 1- Differentiate between direct and indirect damage caused by sap-sucking insects, using aphids and whiteflies as specific examples.
- 2- Compare the life cycle, host range, and damage symptoms of the Rice Weevil (*Sitophilus oryzae*) and the Angoumois Grain Moth (*Sitotroga cerealella*).
- 3- Compare between Braconid Wasps and Tachinid Flies in terms of: Insect Order, method of attacking the host, and the external evidence of infestation.
- 4- Thrips (*Thrips tabaci*) exhibit a very peculiar and unique feeding behavior compared to other sap-sucking insects. Discuss this mechanism and describe in detail the resulting symptoms of damage and the economic importance of this pest on crops.
- 5- The Pink Bollworm (*Pectinophora gossypiella*) and the American Bollworm (*Helicoverpa armigera*) represent two different strategies of internal feeding. Compare them regarding their host range, Mechanism of Infestation, Symptoms of Damage, and Economic Importance.
- 6- Discuss the economic importance of the Cochineal insect (*Dactylopius coccus*), highlighting its industrial applications and the natural purpose of its primary product.
- 7- Define the role of "Scavengers" in stored product entomology. Provide three examples of scavenger beetles and describe the types of materials they degrade.

	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Zoology and Entomology Department	Program: Zoology and Chemistry Level : (3) Date: 3/1/2026 Time: 2 h	
Course Title: Insect Taxonomy		Code: 340 E	
Instructors: Prof. Dr. Ali Mohamed Ali			
Important:	No. of pages 7	No. Of questions 5	Total Mark:50 degree

Δ Question 1: Choose the best single correct answer (15 marks)

- Cornicls are found in.....
a) Leafhoppers b) Whiteflies c) Coccids d) Aphids
- Members of Ensifera are.....
a) Diurnal b) Nocturnal c) Crepuscular d) Matinal
- Sawflies are grouped under the order.....
a) Diptera b) Hymenoptera c) Coleoptera d) Plecoptera
- Thysanopterans have wings oftype.
a) Hemelytra b) Tegmina c) Elytra d) Fringed
- Antennae are clubbed with curved tip in.....
a) Skippers b) Moths c) Butterflies d) Housflies
- Stridulatory organs are found in.....
a) Orthoptera b) Phasmida c) Mecoptera d) Dictyoptera
- Rock crawlers are found inregion.
a) Warm b) cool c) Hot d) All
- Which one of the following orders lack cerci?
a) Hemiptera b) Thysanoptera c) Psocoptera d) All
- Ectognathous mouthparts are present in.....
a) Zygentoma b) Collembolla c) Protura d) Diplura
- The pronotum covers most of the insect head in.....
a)Mantis b) Cockroaach c) Grylloblatodea d) Mantophasmatodea
- Moniliform antennae are found in the following insects except.....
a) Isoptera b) Zoraptera c) Diplura d) Dragonflies
- Which of the following is NOT a characteristic of Orthoptera?
a) Chewing mouthparts b) Camouflage c) Absence of cerci d) Stridulation
- Which one of the following orders is NOT holometabolous?
a) Hymenoptera b) Neuroptera c) Siphonaptera d) Phthiraptera
- The cerci are asymmetrical in order.....
a) Diplura b) Dermaptera c) Ephemeroptera d) Embioptera

15. Piercing/Sucking mouthparts are NOT found in.....
- a) Fleas b) Lice c) Flies d) Ants
16. All ametabolous insects are.....
- a) Exognathous b) Predatory c) Endognathous d) Wingless
17. The lion aphid and ant aphid belong to order.....
- a) Homoptera b) Hemiptera c) Psocoptera d) Neuroptera
18. Which of the followings are not belonging to order Coleoptera?
- a) True bugs b) Fire flies c) ladybird beetles d) Weevils
19. Mantodea, Dermaptera, Blattodea and Isoptera share the following.....
- a) Wingless b) Herbivory c) Chewing mouthparts d) All
20. The adults only live for 1-2 days and don't feed in.....
- a) Ephemeroptera b) Diptera c) Dermaptera d) Blattodea
21. Book lice belong (s) to order.....
- a) Phthiraptera b) Siphonaptera c) Zoraptera d) Psocoptera
22. Which one of the following orders is NOT ametabolous?
- a) Zoraptera b) Protura c) Zygentoma d) Diplura
23. Which of the following insects go through their immature stage in water?
- a) Damselflies and dragonflies b) Stone flies c) Mayflies d) All
24. The word Noctuidea is a (an).....name.
- a) Order b) Family c) Superfamily d) Genus
25. The forelegs are modified into sensory organ in order.....
- a) Diplura b) Protura c) Zoraptera d) Embioptera
26. Which of the following orders has sucking mouthparts as adults?
- a) Orthoptera b) Coleoptera c) Dermaptera d) Lepidoptera
27. If two genera are in the same phylum, they must be in the same.....
- a) Order b) Family c) Class d) Kingdom
28. Halplodiploidy phenomenon is common in.....
- a) Thrips b) Aphids c) Honey bee d) All
29. Lamellate and flabellate antennae are common in.....
- a) Wasps b) Butterflies and moths c) Beetles d) Ants
30. Which insect does NOT have wings at any time in its life cycle?
- a) Fleas b) lice c) Springtail d) All

*** Question 2: Answer the following questions**

(10 marks)

(A) Put True or False

- 1- The lady bugs belong to order Heteroptera. ()
- 2- All the exopterygotes are hemimetabolous. ()
- 3- Both moths and butterflies spin chrysalis. ()
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- 6- Naiads are ecological indicators of good quality water. ()
- 7- Tympanum is located in fore tibia in Caelifera. ()
- 8- Biting lice are primarily wingless insects. ()
- 9- Short-horned grasshopper belongs to family Tettigonidae. ()
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●○ (C) You went in a trip to collect insects with your class mates and you collected many aquatic insects including different kinds of nymphs. How can you distinguish the nymphs of stoneflies, damselflies, dragonflies and mayflies?

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■ Question 4: (A) List the taxonomical differences between each pair of the following (15 marks)
(Three only)

(A)	Suborder Adephaga	Suborder Polyphaga
1)		
2)		
3)		
4)		
(B)	Anisoptera	Zygoptera
1)		
2)		
3)		
4)		
(C)	Butterflies	Moths
1)		
2)		
3)		
4)		

- 11- Recall where ribosome assembly occurs. △
 A. Cytoplasm B. Golgi
 C. Nucleolus D. ER
- 12- Apply knowledge of membrane transport to identify "cell drinking." ●
 A. Phagocytosis B. Pinocytosis
 C. Exocytosis D. Facilitated diffusion
- 13- Identify the longest phase of the cell cycle. △
 A. Prophase B. Metaphase
 C. Interphase D. Cytokinesis
- 14- Identify the tiny structures that help organize the spindle during division. △
 A. Nucleoli B. Ribosomes
 C. Centrioles D. Lysosomes
- 15- Explain the function of cristae in mitochondria. ■
 A. Protein synthesis B. DNA storage
 C. Contain enzymes for oxidative phosphorylation D. Waste digestion
- 16- Explain the role of mRNA in the cell. ■
 A. Transports amino acids B. Provides structural framework for ribosomes
 C. Transfers genetic information from genes to ribosomes D. Catalyzes peptide bond formation
- 17- Analyze the structural difference between DNA and RNA sugars. ◇
 A. DNA has ribose, RNA has deoxyribose B. DNA has deoxyribose, RNA has ribose
 C. DNA has glucose, RNA has fructose D. Both have the same pentose sugar
- 18- Apply knowledge of transcription factors to identify TFII's role. ●
 A. Degrades DNA B. Stabilizes the pre-initiation complex and recruits RNA Pol II
 C. Synthesizes lipids D. Transports proteins
- 19- Describe the role of DNA helicase during replication. ■
 A. Synthesizes RNA primers B. Joins Okazaki fragments
 C. Unwinds the DNA helix D. Proofreads DNA
- 20- Identify the enzyme that synthesizes RNA primers. △
 A. DNA polymerase I B. Helicase
 C. DNA ligase D. Primase
- 21- Recall the type of bond that joins nucleotides in an RNA chain. △
 A. Peptide bond B. 3' → 5' phosphodiester bond
 C. Hydrogen bond D. Glycosidic bond
- 22- Describe the function of DNA ligase. ■
 A. Separates DNA strands B. Synthesizes nucleotides
 C. Joins DNA fragments D. Removes RNA primers
- 23- Describe the promoter's role in transcription. ■
 A. Terminates RNA synthesis B. Binds ribosomes
 C. Removes introns D. Binds RNA polymerase
- 24- Understand the functional unit of DNA known as an operon. ■
 A. A single gene in eukaryotes B. The end of a chromosome
 C. A cluster of genes under a single promoter in bacteria D. An enzyme that copies DNA
- 25- Describe the function of rRNA. ■
 A. Genetic storage B. Enzymatic and structural role in ribosome
 C. Amino acid transport D. Lipid synthesis

△ Remember ■ Understand ● Apply ◇ Analysis * Evaluate ○ Create

26- Analyze why the lagging strand is synthesized discontinuously.

- A. DNA polymerase works slowly
- B. DNA strands are antiparallel
- C. Helicase activity stops
- D. RNA primers are absent

27- Recall the enzyme primarily responsible for proofreading DNA.

- A. Helicase
- B. DNA polymerase
- C. Primase
- D. Ligase

28- Identify the complex known as a nucleosome.

- A. DNA winds around eight histone proteins
- B. A type of ribosome
- C. The center of the nucleus
- D. An RNA-protein hybrid

29- Apply knowledge to identify the "antisense" strand.

- A. The coding strand
- B. The mRNA strand
- C. The polypeptide chain
- D. The template strand used for RNA synthesis

30- Apply base-pairing rules to DNA structure.

- A. Adenine pairs with Cytosine
- B. Purines pair with Pyrimidines (A-T, G-C)
- C. Guanine pairs with Thymine
- D. Uracil pairs with Guanine

II- Answer TWO ONLY from the following "Cell Biology" questions (10 marks):

- 1- Distinguish between simple diffusion and active transport.
- 2- How do the Rough Endoplasmic Reticulum (rER) and Golgi apparatus cooperate in protein secretion?
- 3- What is the function of glycocalyx on the cell surface?

III- Answer TWO ONLY from the following "Molecular Biology" questions (10 marks):

- 1- Describe the specific roles of Helicase and DNA Ligase during DNA replication.
- 2- What is the function of the promoter sequence during transcription?
- 3- Explain the significance of the 5' cap and the 3' poly-A tail added to pre-mRNA.

End of Exam

Best Wishes

Δ Remember ■ Understand ● Apply ◇ Analysis * Evaluate ○ Create

	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Zoology & Entomology Department	Program: Zoology Level : (3) Date: 7/6/2026 Time: 2 h	 كلية العلوم جامعة أسيوط
Course Title: Principles of Embryology		Code: Z. 334	
Instructors: Prof. Dr. Reda A. Ali			
Important:	No. of pages: 1	No. Of questions: 5	Total Marks: 50

Answer the following questions using illustrations when it is possible:

- 1- Write on the scientific idea behind two different contraceptive tools with examples (10 marks)
- 2- Compare between viviparous and oviparous animals with examples. (10 marks)
- 3- Show with labeled drawings and explain the different phases of fertilization. (10 marks)
- 4- a) Compare between ovum and sperm. (5 marks)
b) What are the differences between neural tube formation in Amphioxus and toad? (5marks)
- 5- Write short note on the following: (10 marks)
a) a) Gastrulation in Amphibia. (5 marks)
b) b) mesodermal somite differentiation in Amphioxus and toad. (5 marks)

End of Exam

Best Wishes

Prof. Dr. Reda A. Ali



Assiut University
Faculty of Science
Zoology/Entomology
Department



Time: 2 hour
Level: Third
Course Code: 344Z

Medical Entomology Exam (14/05/ 2026)

Answer the following questions: (50 marks)

I: Choose the best single correct answer (15 marks)

- 1- Temperature data affects the determination of time since death.....
a- True b- False
- 2-is the most common vector for WNV virus
a- *Aedes aegyptii* b- *Culex pipiens* c- *Tabanus sp* d- *Anopheles gambiae*
- 3- The genome of Zika virus is composed of
a- Double stranded DNA b- Double stranded RNA
c- Single stranded RNA d- Ribosomal RNA
- 4- The amplifying hosts for WNV are
a- Fleas b- Birds c- Rodents d- All are true
- 5- Bubonic plague is primarily transmitted by.....
a- Cat flea b- *Anopheles* mosquito
c- *Aedes* mosquito d- Rat flea
- 6- Zika virus has nonsegmented genetic material
a- True b- False
- 7- Septicemic plague is the first symptom of plague disease.....
a- True b- False
- 8- The vector of tularemia causing agent is
a- Mosquito b- Tabanid flies c- Rodents d- Fleas
- 9- An insect where both males and females bite people.....
a- *Aedes* b- *Culex* c- *Tse Tse* d- *Tabanus*
- 10- Microcephaly is a characteristic feature ofinfection
a- WNV b- Dengue c- Zika d- All are true

II: Complete the following sentences (10 marks)

- 1- House flies can transmit pathogens by
- 2- Stages of decomposition of cadavers are
- 3- Insect succession refers to.....
- 4- Myiasis can be eitheror

III- Define the following terms (5 marks)

- 1- Maggots
- 2- Corpse
- 3- Propagative biological transmission

- 4- Calabar swellings
- 5- PMI

IV-Write about FOUR only of the following

(16 marks)

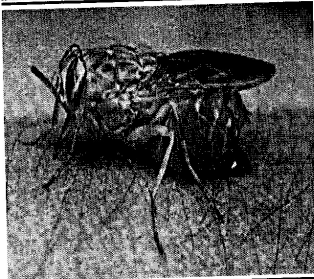
- (1) List 3 methods of biological transmission of diseases by arthropods
- (2) Categories of forensic Entomology
- (3) Differences between rural and urban plaque
- (4) Challenges of forensic Entomology
- (5) Write brief notes on the genome of dengue virus (with drawing)

V-Identify the following images

(4 marks)



(1) identify the disease name - (2) The insect vector



(3) Identify this insect species - (4) List 2 diseases transmitted by this

insect

	Assiut University- Faculty of Science Second Semester- Final Exam 2026 Zoology Department	Program: Zoology Level : (3) Date: 14/5/2026 Time: 2 h	
Course Title: Vertebrate Taxonomy		Code: Z 433	
Instructors: Dr. Fatma Essa			
Important:	No. of pages 4	No. Of questions 3	Total Mark:50 degree

First Question: Choose the correct answer:

- 1- Which order lacks a true crop? Δ
(Galliformes – Gruiformes – Passeriformes – Accipitriformes)
- 2- Theory of classification in which numerous characters are used ■
(Phenetics - Cladistics - Phylogenetic Systematics)
- 3- has four-chambered heart Δ
(Turtles - Squamata – Crocodiles)
- 4- Which mammal has electroreception? Δ
(Elephant -Kangaroo -Platypus -Bat)
- 5- Bird wings and insect wings arestructures. ■
(Homologous – Analogous – Convergent)
- 6-types of respiration occur in amphibians. Δ
(One – Two – Three)
- 7- Cyclostomes possess: Δ
(Paired fins - Median fins only- No fins- Limbs)
- 8- Which adaptation allows sharks to maintain buoyancy? Δ
(Swim bladder - Air sacs - Oily liver- Lungs)
- 9- Derived traits shared by two or more taxa.◇
(plesiomorphy - Synapomorphy- Sympleiomorphy)
- 10- Sharp canines and predatory behavior are typical of: ■
(Carnivora – Rodentia – Lagomorpha -Diprotodontia)
- 11- Odd number of toes is characteristic of: Δ
(Artiodactyla - Rodentia - Carnivora- Perissodactyla)
- 12- Midbrain mainly controls: ■
(Memory- Sensory processing- Digestion- Movement)
- 13- Which respiration occurs in amphibian larvae? Δ
(Pulmonary -Cutaneous -Branchial- Tracheal)
- 14- Which order has powerful hind limbs? Δ
(Apoda -Urodela -Anura -Mammalia)
- 15- Birds have highly developed: ■
(Olfactory bulbs – Cerebellum- Gills- Cortex folds)

- 16- Which subclass lacks nipples? Δ
 (Metatheria – Prototheria – Eutheria – Primates)
- 17- Which structure is unique to mammals? ■
 (Heart – Diaphragm - Brain -Kidney)
- 18- Which of the following is a distinctive feature of Struthioniformes. Δ
 (Webbed feet - Keel sternum- Two toes per foot -Hooked beak)
- 19- A key adaptation in penguins for thermoregulation is ●
 (Large ears - Thin feathers -Thick fat layer- Hollow bones)
- 20- Salt glands are present in: Δ
 (Desert birds - Marine birds -Forest birds -Flightless birds)

Second Question: Write the scientific term for each sentence:

1. Male reproductive structure in cartilaginous fish Δ . ()
2. Gas-filled organ controlling buoyancy in fish Δ . ()
3. Elongated kidney extends along most of body cavity, is made up of repeated nephrons, ancestral type of kidney ■. ()
4. Light-weight bones containing air spaces in birds Δ . ()
5. Structure replacing teeth in birds Δ . ()
6. Scientific study of amphibians and reptiles Δ . ()
7. Organ responsible for grinding food in birds Δ . ()
8. A taxon that body divided into head and trunk, Neck poorly developed (1-2 vertebra). $\Diamond$ ()
9. Teeth are attached to the crest (upper edge) of the jawbone. ■ ()
10. A structure present in reptiles and divided into three chambers. ■ ()
11. A branching diagram showing the hierarchical relationships among taxa based upon shared derived characters. ■ ()
12. A structure of cloaca in reptiles that receives urine and reproductive products. ■ ()
13. Tooth-like structure found in sharks. ■ ()
14. Includes ancestor and some, not all of its descendants. $\Diamond$ ()
15. A taxon with no cutaneous respiration, no mucous glands. $\Diamond$ ()
16. The ordering of plants and animals into groups based on their similarity and relationship ■. ()
17. Jawless vertebrates with eel-like body and slimy skin Δ . ()

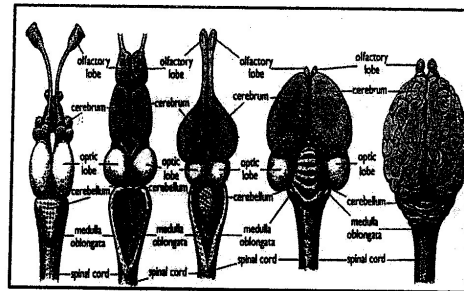
18. Sensory organ for detecting water movement in fish Δ. ()
19. The group of organisms that are being studied Δ. ()
20. Subclass of pouch-bearing mammals Δ. ()

Third Question: Answer the following:

1) How do ectothermic reptiles regulate their body temperature? •

2) Write main characters of order Caecilians? Δ

3) Explain the brain development in vertebrates, showing the highly developed region in each class? ◇



4) Mention the specific Characters of mammals? Δ

End of Exam

Best Wishes Dr. Fatma Essa

	Assiut University – Faculty of Science First Semester – Final Exam 2025 – 2026 Zoology and Entomology Department	Program: Zoology and Entomology Level: 3 Date: 17/5/2026 Time: 3 h	
Course Title: Genetic Engineering		Course Code: 314 Z	
Instructors: Dr. Mahmoud S. M. Abdelrasoul			
Important:	No. of pages 4	No. of questions 3	Total Mark: 50 marks

I- Choose the correct answer for the following questions (30 marks, one mark each):

- 1- Identify the natural biological source of restriction endonucleases. △
 - A. Bacteriophages
 - B. Eukaryotic nuclei
 - C. Bacterial cells
 - D. Recombinant plasmids
- 2- Describe the chemical mechanism by which restriction enzymes cut DNA. ■
 - A. Dehydration of the sugar-phosphate backbone
 - B. Hydrolysis of the phosphodiester bond between nucleotides
 - C. Methylation of adenine bases
 - D. Oxidation of the 3'-hydroxyl group
- 3- Identify the primary function of the "Origin of Replication" (Ori) in a plasmid. △
 - A. It provides resistance to antibiotics.
 - B. It serves as the site for DNA insertion.
 - C. It dictates host compatibility and controls plasmid copy number.
 - D. It initiates the transcription of the target gene.
- 4- Explain the importance of a "Selectable Marker" such as *ampR* in cloning. ■
 - A. It allows the plasmid to replicate independently.
 - B. It identifies which bacteria successfully took up the plasmid through antibiotic resistance.
 - C. It drives high-level protein expression.
 - D. It prevents the vector from self-ligating.
- 5- Which vector is most suitable for cloning DNA fragments up to 2 million base pairs (2 Mb)? ●
 - A. Plasmid
 - B. Yeast Artificial Chromosome (YAC)
 - C. Cosmid
 - D. Bacteriophage Lambda
- 6- Identify the specific role of the "Multiple Cloning Site" (MCS). △
 - A. To initiate DNA replication
 - B. To provide a site for ribosome binding
 - C. To terminate transcription of the inserted gene
 - D. To offer a short segment with several unique restriction sites for easy DNA insertion
- 7- Distinguish between a "Cloning Vector" and an "Expression Vector." ◇
 - A. Cloning vectors lack an Origin of Replication.
 - B. Expression vectors are always much smaller than cloning vectors.
 - C. Expression vectors include a promoter and ribosome binding site (RBS) to produce protein.
 - D. Cloning vectors are used only in mammalian cells.
- 8- Determine which verification method provides "absolute base-pair perfection" and confirms the absence of point mutations. *
 - A. Colony PCR
 - B. Restriction Digest Mapping
 - C. Sanger or Next-Generation Sequencing
 - D. Functional Fluorescence Assay

△ Remember ■ Understand ● Apply ◇ Analysis * Evaluate ○ Create

- 9- RNA Interference (RNAi) acts primarily at which level of gene expression? Δ
 A. Transcriptional (DNA) B. Epigenetic (Chromatin)
 C. Post-translational (Protein) D. Post-transcriptional (mRNA)
- 10- Identify the catalytic core protein of the RNA-induced Silencing Complex (RISC). Δ
 A. Cas9 B. Dicer
 C. Argonaute 2 (AGO2) D. Reverse Transcriptase
- 11- Compare CRISPR interference (CRISPRi) with standard CRISPR-Cas9 editing. ■
 A. CRISPRi uses DNA instead of RNA as a guide. B. CRISPRi only works in bacterial cells.
 C. CRISPRi uses a "dead" Cas9 (dCas9) that binds DNA but does not cut it. D. CRISPRi requires two different guide RNAs to function.
- 12- In RNAi, what typically happens to the "passenger strand" during RISC assembly? ■
 A. It becomes the template for cDNA. B. It is used to recognize the target mRNA.
 C. It is discarded and degraded. D. It is ligated into the host genome.
- 13- Analyze the role of "Homology Arms" in a targeting vector. ◇
 A. They provide resistance to neomycin. B. They allow the vector to align with and recombine at a specific genomic locus.
 C. They terminate the transcription of the selectable marker. D. They act as a nuclear localization signal for the DNA.
- 14- Determine the ultimate goal of breeding a chimeric mouse with a normal mouse. ■
 A. To produce more chimeric offspring. B. To observe the knockout phenotype immediately.
 C. To achieve germline transmission of the targeted allele. D. To test the strength of the neomycin marker.
- 15- Distinguish between a "Gene Knockout" and a "Gene Knock-in." ◇
 A. Knockouts are reversible, while knock-ins are permanent. B. Knockouts require CRISPR, while knock-ins require RNAi.
 C. Knockouts inactivate a gene; knock-ins insert or replace a specific sequence. D. There is no functional difference between them.
- 16- Identify the promoter used in the 1982 "Giant Mouse" experiment to drive rat growth hormone. Δ
 A. CMV promoter B. T7 promoter
 C. Mouse Metallothionein promoter D. MMTV promoter
- 17- Explain the specific purpose of the Harvard "OncoMouse." ■
 A. To produce human growth hormone. B. To reliably develop mammary tumors for cancer research.
 C. To test the efficiency of the Cre-Lox system. D. To act as a source for organ transplantation.
- 18- Apply your knowledge: Transgenic goats producing ATryn (antithrombin) secrete the protein into: ●
 A. Their blood B. Their saliva
 C. Their milk D. Their eggs
- 19- Analyze the benefit of using mRNA as source material for cloning instead of genomic DNA. ◇
 A. mRNA is more stable during the extraction process. B. mRNA represents only the coding sequence (introns are already removed).
 C. mRNA contains all the control and regulatory regions of a gene. D. mRNA can be inserted directly into a plasmid vector.
- 20- How does "dead Cas9" (dCas9) silence a gene in a CRISPRi system? ■
 A. By cutting the DNA at the promoter site. B. Through steric hindrance, physically blocking RNA polymerase.

Δ Remember ■ Understand ● Apply ◇ Analysis * Evaluate ○ Create

- C. By degrading the mRNA after it is produced. D. By inserting a stop codon into the DNA sequence.
- 21- Which property makes restriction enzymes useful in genetic engineering? Δ
 A. Ability to replicate DNA B. Ability to synthesize RNA
 C. Ability to recognize specific DNA sequences and cut them D. Ability to repair DNA
- 22- Restriction enzyme recognition sequences are usually: Δ
 A. Random nucleotide sequences B. AT-rich noncoding sequences
 C. RNA sequences D. Palindromic DNA sequences
- 23- pBR322 contains resistance genes for: Δ
 A. Tetracycline and kanamycin B. Penicillin and chloramphenicol
 C. Ampicillin and tetracycline D. Streptomycin and ampicillin
- 24- A plasmid contains an origin of replication, antibiotic resistance gene, and MCS. A gene is successfully inserted, but no protein is produced. What is missing? ■
 A. Restriction enzyme site B. Promoter
 C. DNA ligase D. Cos site
- 25- Compatible plasmids can: Δ
 A. Replicate only once B. Coexist in the same host cell
 C. Express identical genes D. Integrate into chromosomes
- 26- Col plasmids encode: Δ
 A. Antibiotic resistance B. Bacteriocins
 C. Nitrogen fixation enzymes D. Replication proteins
- 27- The process by which bacteria take up foreign DNA is called: Δ
 A. Transformation B. Replication
 C. Translation D. Transcription
- 28- Sticky ends are characterized by: ■
 A. Single-stranded overhangs B. Double-strand breaks only
 C. Circular DNA ends D. Absence of base pairing
- 29- Based on the Ethical Analysis Framework, which question is central to evaluating transgenic animal use? *
 A. How many base pairs is the transgene? B. Are there non-animal alternatives (e.g., cell culture) that can achieve the same goal?
 C. Which restriction enzyme was used to build the plasmid? D. How many copies of the plasmid are in the host bacteria?
- 30- Which of the following is a major ecological concern regarding transgenic fish? ■
 A. High cost of production B. Escape into the wild and potential impact on biodiversity
 C. Reduced nutritional value D. Inability to reproduce in captivity

Δ Remember ■ Understand ● Apply ◇ Analysis * Evaluate ○ Create

II- Answer FOUR ONLY from the following questions (10 marks, 2.5 marks each):

- 1- What are the three essential components of a Yeast Artificial Chromosome (YAC) that allow it to function like a natural chromosome? Δ
- 2- What is the specific function of the "Kozak sequence" in a mammalian expression plasmid? Δ
- 3- Briefly describe the role of the enzyme "Dicer" in the RNA interference (RNAi) pathway. Δ
- 4- Why is the Origin of Replication (Ori) in a plasmid typically an A=T rich region? ■
- 5- Name one advantage of using a Phage vector over a standard Plasmid vector. *
- 6- How does the addition of a "KRAB" domain to dCas9 enhance the effects of CRISPR interference (CRISPRi)? ■

III- Answer TWO ONLY from the following questions (10 marks, 5 marks for each):

- 1- "Animals may be engineered so that their waste contains less phosphorus or nitrogen, reducing pollution from farming. "Are you with or against the development and implementation of these 'environmentally friendly' transgenic animals in commercial agriculture? Provide scientific and ethical justification for your opinion. ○
- 2- Outline the step-by-step molecular mechanism of the RNA interference (RNAi) pathway. Δ
- 3- Describe the mechanism of CRISPR interference (CRISPRi) and how it blocks gene expression. Δ

End of Exam

Best Wishes

Δ Remember ■ Understand ● Apply ◇ Analysis * Evaluate ○ Create

	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Zoology and Entomology Department	Program: Microbiology Level : (3) Date: 7/6/2026 Time: 2 h	 كلية العلوم جامعة اسيوط
Course Title: Protozoology and Parasitology		Code: 324Z	
Instructors: Prof. Dr. Gamal H. Abed; Dr. Sara Salah Abdel-Hakeem			
Important:	No. of pages 2	No. Of questions 4	Total Mark: 50 degree

A- Choose the correct answer for each of the following (one mark/ each)

1. Infective stage of *Heterophyes heterophyes* is encysted in
 - (a) Grasses
 - (b) Snails
 - (c) Sheep
 - (d) Fish
2. Diagnostic stage of *Trypanosoma* is
 - (a) Cyst
 - (b) Amastigotes
 - (c) Trypomastigotes
 - (d) Crithidia
3. Platyhelminthes and Nematodes are different in the following except
 - (a) Triploblastic
 - (b) Monocicous
 - (c) Digestive system
 - (d) Adhesive organs
4. The following are zoonotic disease except
 - (a) Taeniasis
 - (b) Heterophyiasis
 - (c) Leishmaniasis
 - (d) Enterobiasis
5. Large trophozoite of *Entamoeba histolytica* feeds on
 - (a) RBC and mucosa
 - (b) blood
 - (c) Digested food
 - (d) Mucosa in the colon
6. Infection with *Trypanosoma cruzi* occurs by
 - (a) Contamination of wound with feces
 - (b) Blood transfusion
 - (c) Congenital transmission
 - (d) All the above
7. Which of the following parasite passes its life cycle through three hosts?
 - (a) *Heterophyes heterophyes*
 - (b) *Clonorchis sinensis*
 - (c) *Diphylobothrium latum*
 - (d) All of the above
8. All the following parasites are motile except
 - (a) *Plasmodium*
 - (b) *Balantidium coli*
 - (c) *Trichomonas hominis*
 - (d) *Acanthamoeba* spp.
9. Autoinfection could be propagated by
 - (a) *Ascaris* sp.
 - (b) *Ancylostoma* sp.
 - (c) *Taenia saginata*
 - (d) *Enterobius vermicularis*
10. Vector host of Malaria in Egypt is
 - (a) Culex
 - (b) House fly
 - (c) Sand fly
 - (d) tse tse fly
11. Cercariae of *Schistosoma* and *Fasciola* are different in the following except
 - (a) Tail
 - (b) Penetrating glands
 - (c) a and b
 - (d) Alimentary canal
12. The ootype in trematoda connect with
 - (a) Oviduct
 - (b) Vitelline canal
 - (c) Uterus
 - (d) all the above

13. Amastigotes in *Leishmania* sp are present in

- (a) WBCs
- (b) RBCs
- (c) Plasma
- (d) Sand fly

14. *Entamoeba gingivalis* habits in

- (a) Small intestine
- (b) Large intestine
- (c) Oral cavity
- (d) Blood

15. All the following lead to bloody diarrhea except

- (a) *Schistosoma mansoni*
- (b) *Entamoeba histolytica*
- (c) *Schistosoma haematobium*
- (d) *Trypanosoma* spp.

16. Amoebic meningitis is a disease can be caused by

- (a) *Entamoeba histolytica*
- (b) *Naegleria fowleri*
- (c) *Entamoeba gingivalis*
- (d) *Entamoeba coli*

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

- (a) *Diphyllobothrium latum*
- (b) *Dipylidium caninum*
- (c) *Fasciola hepatica*
- (d) *Clonorchis sinensis*

18. The infective stage of *Ancylostoma duodenale* is

- (a) Rabdoid larva
- (b) Embryonated egg
- (c) Filariform larva
- (d) Microfilaria

19. Which of the following parasites is viviparous?

- (a) *Diphyllobothrium latum*
- (b) *Echinococcus granulosus*
- (c) *Wuchereria bancrofti*
- (d) *Schistosoma haematobium*

20. Sputum swab is used to diagnose

- (a) *Ascaris lumbricoides*
- (b) *Enterobius vermicularis*
- (c) *Wuchereria bancrofti*
- (d) *Schistosoma haematobium*

B- Compare with labelled diagram between *Schistosoma haematobium* and *Schistosoma mansoni* in regards (habitat, egg, diagnostic stage, and intermediate stage)? (8 marks)

C- Enumerate the protozoal parasites that may affect the brain of man, mention the infective stage (s) and mode (s) of infection in each case? (6 marks)

D- Give an account on meat as a source of helminthic parasitic infection? (8 marks)

E- Make labelled diagram of the helminth eggs that may infect man by the oral route? (8 marks)

Best Wishes.....Prof. Dr. Gamal H. Abed; Dr. Sara S. Abdel-Hakeem

	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Zoology and Entomology Department	Program: Zoology Level : (3) Date: 6/6/2026 Time: 2 h	
Course Title: Parasitology		Code: 321Z	
Instructors: Prof. Dr. Gamal H. Abed; Dr. Sara Salah Abdel-Hakeem			
Important:	No. of pages 2	No. Of questions 4	Total Mark: 50 degree

A- Choose the correct answer for each of the following (one mark/ each)

- Infective stage of *Heterophyes heterophyes* is encysted in
 - Grasses
 - Snails
 - Sheep
 - Fish
- Diagnostic stage of *Trypanosoma* is
 - Cyst
 - Amastigotes
 - Trypomastigotes
 - Crithidia
- Giardia lamblia* cyst contains
 - 2 nuclei
 - 4 nuclei
 - 6 nuclei
 - 8 nuclei
- The following are zoonotic disease except
 - Taeniasis
 - Heterophyiasis
 - Leishmamiiasis
 - Enterobiasis
- Large trophozoite of *Entamoeba histolytica* feeds on
 - RBC and mucosa
 - blood
 - Digested food
 - Mucosa in the colon
- Which of the following protozoans is transmitted primarily by the motile trophozoite form?
 - Balantidium coli*
 - Entamoeba histolytica*
 - Giardia lamblia*
 - Trichomonas vaginalis*
- Which of the following parasite passes its life cycle through three hosts?
 - Heterophyes heterophyes*
 - Clonorchis sinensis*
 - Diphylobothrium latum*
 - All of the above
- The intermediate host of *Fasciola gigantica* is
 - Cattle
 - Pigs
 - Cyclops
 - Snails
- Autoinfection could be propagated by
 - Ascaris* sp.
 - Ancylostoma* sp.
 - Taenia saginata*
 - Enterobius vermicularis*
- Vector host of Malaria in Egypt is
 - Culex
 - House fly
 - Sand fly
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- Cercariae of *Schistosoma* and *Fasciola* are different in the following except
 - Tail
 - Penetrating glands
 - a and b
 - Alimentary canal
- The ootype in trematoda connect with
 - Oviduct
 - Vitelline canal
 - Uterus
 - all the above

13. Amastigotes in *Leishmania* sp are present in
- (a) WBCs
 - (b) RBCs
 - (c) Plasma
 - (d) Sand fly
14. *Entamoeba gingivalis* habits in
- (a) Small intestine
 - (b) Large intestine
 - (c) Oral cavity
 - (d) Blood
15. All the following lead to bloody diarrhea except
- (a) *Schistosoma mansoni*
 - (b) *Entamoeba histolytica*
 - (c) *Schistosoma haematobium*
 - (d) *Trypanosoma* spp.
16. The second intermediate host of *Diphylobothrium latum* is
- (a) Snails
 - (b) Fish
 - (c) Frogs
 - (d) Cyclops
17. Which one of the following can be called "Incidental Parasite?"
- (a) *Diphylobothrium latum*
 - (b) *Dipylidium caninum*
 - (c) *Fasciola hepatica*
 - (d) *Clonorchis sinensis*
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- (a) *Diphylobothrium latum*
 - (b) *Echinococcus granulosus*
 - (c) *Wuchereria bancrofti*
 - (d) *Schistosoma haematobium*
20. Sputum swab is used to diagnose
- (a) *Ascaris lumbricoides*
 - (b) *Enterobius vermicularis*
 - (c) *Wuchereria bancrofti*
 - (d) *Schistosoma haematobium*
21. The infective stage of *Plasmodium falciparum* is
- (a) Oocyst
 - (b) Sporozoite
 - (c) Bradyzoite
 - (d) Tachyzoite
22. The diagnostic stage of *Taenia* spp. is
- (a) Blood in urine
 - (b) Egg in feces
 - (c) Egg in urine
 - (d) Cercariae in water
23. The infective stage of *Ascaris lumbricoides* is
- (a) 1st larval stage
 - (b) 2nd larval stage
 - (c) 3rd larval stage
 - (d) Egg
24. In definite host, *Balantidium coli* habits in
- (a) Small intestine
 - (b) Blood
 - (c) Liver
 - (d) Large intestine
25. Which of the following is not a flagellate?
- (a) *Leishmania*
 - (b) *Giardia*
 - (c) *Trichomonas*
 - (d) *Plasmodium*

- B- Discuss with labelled diagram the life cycle of *Plasmodium* spp.? (7 marks)
- C- Enumerate the different sources of parasitic infections? (6 marks)
- D- Compare between *Taenia saginata* and *Taenia solium* in regards (scolex, gravid proglottids, infective stage, and intermediate stage)? (7 marks)
- E- Give an account on different types of *Ascaris* spp. eggs? (5 marks)

Best Wishes.....Prof. Dr. Gamal H. Abed; Dr. Sara S. Abdel-Hakeem

	Asiut University- Faculty of Science Second Semester- Final Exam 2025-2026 Zoology & Entomology Department	Program: Zoology Level: (3) Date: 22/05/2026 Time: 2 h	
Course Title: Microtechniques		Code: 317 Z	
Instructors: Prof. Dr. Mona M. Atia and Dr. Ahmad U. M. Mahmoud			
Important: -	No. of pages 7	No. Of questions 2	Total Mark:50 degree

I: Choose the correct answer from “A, B, C, or D”, then put your answer inside the empty box, under the black arrow: (45 marks, one mark for each)

1 Δ	The running buffer for SDS-PAGE contains Tris Base, Glycine, and SDS at pH 8.3. What is the primary role of glycine in this buffer system? A) To maintain pH only B) To act as the trailing ion in the discontinuous buffer system C) To denature proteins D) To polymerize the gel	
2 Δ	When protein samples are heated to 95°C for 4 minutes in sample buffer, what structural changes occur? A) Only disulfide bonds are broken B) Complete denaturation ensuring only primary structure remains C) Proteins become positively charged D) Glycerol evaporates from the sample	
3 ■	What would be the consequence of using a stacking gel with the same pH as the separating gel? A) Better protein separation B) Faster migration time C) Poor resolution due to lack of protein concentration into tight bands D) Complete prevention of protein migration	
4 Δ	In SDS-PAGE, why do all proteins migrate toward the positive electrode despite having different amino acid compositions? A) All amino acids are negatively charged B) SDS coating provides uniform negative charge regardless of protein composition C) The gel matrix neutralizes positive charges D) Heat treatment creates negative charges	
5 ■	The separating gel is described as providing "good resolution for low M.W protein." Why is this specification important? A) The 10% concentration and small pores effectively discriminate between similar-sized small proteins B) High molecular weight proteins cannot enter the separating gel C) Low molecular weight proteins are positively charged D) The pH 8.8 only affects small proteins	
6 ■	What is the molecular mechanism by which bisacrylamide functions in polyacrylamide gel formation? A) It initiates free radical polymerization B) It catalyzes the polymerization reaction C) It creates cross-links between linear acrylamide polymer chains D) It acts as the monomer unit	
7 ■	In the three-step free radical polymerization (Initiation, Propagation, Termination), what specifically occurs during the propagation phase? A) APS breaks down to form free radicals	

	B) Successive addition of monomers to growing polymer chains C) The gel solidifies completely D) Cross-linking agents terminate the reaction	
8	■ The document states that stacking gel "gives better resolution" while separating gel "gives poor resolution." What does this statement actually mean in the context of the two-gel system? A) The stacking gel separates proteins better than the separating gel B) The stacking gel concentrates proteins into sharp bands; the separating gel actually performs the size separation C) The separating gel should be avoided D) Only the stacking gel is necessary for electrophoresis	
9	■ Which combination of conditions is MOST critical during sample preparation to prevent protein degradation? A) Room temperature + EDTA + glycerol B) 37°C + Tris buffer + bromophenol blue C) Ice + SDS + mercaptoethanol + protease inhibitors D) Freezing + detergent + reducing agents	
10	■ What is the CRITICAL difference between running buffer and transfer buffer composition? A) Transfer buffer contains methanol (20%) while running buffer does not B) Running buffer has higher SDS concentration C) Transfer buffer has lower glycine content D) Running buffer contains Tris base only	
11	Δ PVDF membrane is preferred over nitrocellulose when: A) Working with low molecular weight proteins B) The blot needs to be stripped and reprobed multiple times C) Maximum protein binding capacity is needed D) Cost reduction is the primary concern	
12	Δ The purpose of Ponceau S staining is to: A) Block non-specific binding sites B) Detect the target protein specifically C) Quickly visualize total protein transfer before antibody probing D) Enhance chemiluminescent signals	
13	• Why is blocking with BSA or non-fat milk essential before antibody incubation? A) To denature unwanted proteins B) To prevent non-specific antibody binding to the membrane C) To enhance protein transfer efficiency D) To maintain membrane hydration	
14	■ Tween 20 is added to PBS or TBS to create PBST or TBST for what purpose? A) Increase membrane porosity B) Reduce background staining and non-specific binding C) Enhance primary antibody affinity D) Accelerate enzymatic reactions	
15	• The primary antibody is typically incubated overnight at 4°C rather than for a few hours at room temperature to: A) Prevent antibody degradation B) Allow slower, more specific binding and reduce background C) Maintain membrane integrity D) Prevent protein elution from membrane	
16	■ In Western blotting, the term "stripping/reprobing" refers to: A) Removing bound antibodies to detect a different protein on the same membrane	

Δ Remember

■ Understand

• Apply

◊ Analysis

* Evaluate

○ Create

	B) Removing protein bands from the gel C) Cleaning the membrane before initial use D) Separating proteins by molecular weight	
17 Δ	What is the PRIMARY distinction between a primary culture and a cell line? A) Cell lines have undergone transformation making them immortal B) Primary cultures are always derived from embryonic tissue C) Primary cultures grow faster than cell lines D) Cell lines cannot be cryopreserved	
18 •	Which characteristic is NOT typical of secondary cultures? A) Infinite lifespan in vitro B) Derived from primary cell culture C) Mainly anchorage dependent D) Exhibit contact inhibition	
19 ■	What concentration of DMSO is typically used as a cryopreservant for cell preservation? A) 5% B) 20% C) 15% D) 10%	
20 ■	At what temperature and duration is serum heat inactivation performed? A) 37°C for 30 minutes B) 80°C for 10 minutes C) 65°C for 15 minutes D) 56°C for 30 minutes	
21	Which statement about aneuploid cells is correct? A) They have exactly 46 chromosomes B) They represent exact multiples of the haploid number C) They are always diploid D) They have an abnormal number of chromosomes	
22	Why is PBS washing necessary before enzymatic digestion of adipose tissue? A) To remove blood that interferes with enzymatic digestion B) To increase enzyme activity C) To kill bacteria D) To change tissue pH	
23	What indicates completion of collagenase digestion in adipose tissue processing? A) Color change to blue B) Formation of a homogeneous emulsion without tissue pieces C) Temperature drop D) pH change	
24	What is the purpose of adding warm culture medium after collagenase digestion? A) To increase digestion speed B) To activate stem cells C) To inhibit enzymatic activity D) To kill bacteria	
25	Which characteristic do adult muscle stem cells demonstrate? A) Totipotency B) Pluripotency C) Unipotency with self-renewal D) No self-renewal capacity	
26 Δ	Identify who is credited with making significant early microscopic observations of tissues in the late 17th century.	

	A) Marcello Malpighi. B) Robert Hooke. C) Anton van Leeuwenhoek. D) Louis Pasteur.	
27 ■	Explain why electron microscopes have higher resolution than light microscopes. A) They use stronger glass lenses. B) They use visible light with a longer wavelength. C) They use electron beams with a shorter wavelength. D) They require simpler sample preparation.	
28 ●	Determine which type of microscopes would be most appropriate for observing live cells in a culture dish. A) Stereo Microscope. B) Inverted Light Microscope. C) Scanning Electron Microscope (SEM). D) Transmission Electron Microscope (TEM).	
29 ◇	Analyze the following scenario: A researcher needs to study both the surface morphology of intestinal villi and the internal ultrastructure of mitochondria within epithelial cells in a mouse model. Which combination of microscopes would provide the most comprehensive analysis? A) Brightfield microscope and phase-contrast microscope. B) Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM). C) Confocal microscope and stereo microscope. D) Simple microscope and compound microscope.	
30 △	Recall which surgical tool is described as a sharp, precise cutting tool for making incisions with minimal tissue damage. A) Forceps. B) Scissors. C) Needle Holder. D) Scalpel.	
31 ■	Explain why formalin is the most commonly used fixative despite its limitations. A) It is the cheapest fixative available. B) It causes no tissue shrinkage or hardening. C) It penetrates tissue rapidly and preserves antigenicity well. D) It is completely non-toxic and safe to handle.	
32 ●	Determine the most appropriate fixative for a study requiring both routine histology and subsequent immunohistochemistry. A) 10% neutral buffered formalin (NBF). B) Glutaraldehyde. C) Ethanol. D) Osmium tetroxide.	
33 ◇	Analyze this troubleshooting scenario: During routine histological processing, cleared liver tissue samples exhibit a cloudy appearance in xylene and produce wax blocks that yield soft, mushy sections that crumble during microtomy. Which combination of factors most likely explains both the cloudy xylene and the mushy, poorly infiltrated sections? A) Over-dehydration and incomplete clearing. B) Proper dehydration but prolonged exposure to fresh xylene. C) Insufficient wax impregnation time despite correct dehydration and clearing. D) Inadequate dehydration and water-contaminated xylene.	

34 ○	Design a FIXATION protocol for a delicate embryonic tissue sample that must be analyzed by both light and electron microscopy. A) 10% formalin for 24h → Dehydration → Embedding. B) Glutaraldehyde-paraformaldehyde mixture → Post-fixation with osmium tetroxide → Dehydration. C) Ethanol overnight → Xylene → Paraffin embedding. D) Freeze immediately in liquid nitrogen → Cryosectioning.	
35 Δ	Identify the correct order of steps in tissue processing. A) Dehydration, Fixation, Clearing, Infiltration, Embedding. B) Fixation, Dehydration, Infiltration, Clearing, Embedding. C) Fixation, Dehydration, Clearing, Infiltration, Embedding. D) Clearing, Dehydration, Fixation, Embedding, Infiltration.	
36 ■	Explain why ascending grades of alcohol are used during dehydration rather than starting with 100% alcohol. A) 100% alcohol is too expensive for initial dehydration. B) Lower grades of alcohol work faster than higher grades. C) Ascending grades are only used for certain tissue types. D) Gradual dehydration minimizes tissue shrinkage and distortion.	
37 ◇	Analyze this problem: Paraffin sections of skeletal muscle tissue crumble and fragment during microtomy, and the resulting stained sections appear brittle with uneven, patchy staining in different tissue regions. Which combination of processing errors most likely explains both the sectioning difficulty and the uneven staining pattern? A) Over-dehydration and incomplete wax infiltration. B) Under-dehydration and over-clearing. C) Proper dehydration but incorrect embedding orientation. D) Correct processing but dull microtome blade.	
38 ○	Design a tissue processing protocol for a large, dense tissue sample (e.g., bone) that MINIMIZES processing time while maintaining histological quality for subsequent analysis. Which approach represents the most effective and balanced protocol for this type of sample? A) Standard processing times for all steps. B) Extended dehydration and clearing times with standard infiltration. C) Microwave-assisted processing with monitored time and temperature adjustments. D) Skip the clearing step and proceed directly from dehydration to infiltration.	
39 Δ	State which type of microtome is most common for routine paraffin-embedded sections. A) Cryostat. B) Vibratome. C) Rotary Microtome. D) Ultramicrotome.	
40 ●	Select the appropriate sectioning method for intraoperative diagnosis requiring rapid results. A) Paraffin sectioning with rotary microtome. B) Frozen sectioning with cryostat. C) Resin embedding with ultramicrotome. D) Whole mount preparation.	
41 ●	Determine the most appropriate microtome type for obtaining a 50 nm thick section of liver tissue for viewing mitochondrial cristae.	

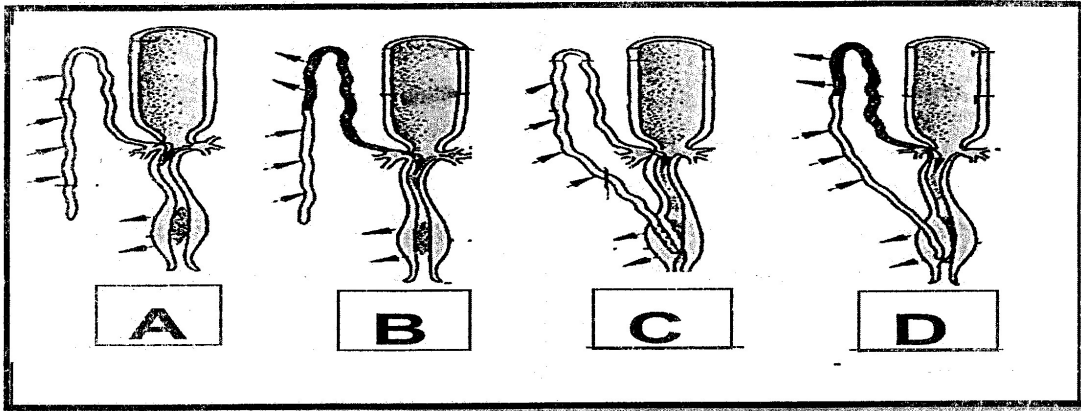
Δ Remember ■ Understand ● Apply ◇ Analysis *Evaluate ○ Create

	A) Rotary microtome. B) Cryostat. C) Vibratome. D) Ultramicrotome.	
42 ◇	Analyze the following lab result: After H&E staining, a kidney tissue section shows excellent nuclear detail but very pale and barely visible cytoplasmic staining. Which step in the staining protocol was most likely mishandled? A) Inadequate hematoxylin staining time. B) Inadequate eosin staining time or pH imbalance. C) Insufficient dehydration before mounting. D) Over-fixation in formalin.	
43 *	Evaluate this laboratory policy: "To ensure consistency, all tissue samples must be fixed in 10% formalin for exactly 48 hours, regardless of tissue type or size". What is the most critical defect in this policy? A) Formalin is not a suitable fixative for all tissues. B) 48 hours is insufficient for proper fixation of any tissue. C) All tissues should be fixed for at least 72 hours. D) Fixation time should be adjusted based on tissue size, density, and type to avoid under- or over-fixation.	
44 Δ	State the primary chemical action by which formalin acts as a fixative. A) Forms methylene bridges between protein amino groups. B) Precipitates cellular proteins. C) Denatures proteins by disrupting hydrogen bonds. D) Dissolves membrane lipids.	
45 ■	Describe the main consequence of inadequate clearing during tissue processing. A) Prevents proper wax infiltration, leading to soft and mushy blocks. B) Improves wax infiltration and sectioning quality. C) Causes excessive tissue hardening and brittleness. D) Has no effect on subsequent steps.	

II- Define the following terms. (Choose any Five of the eight options provided). (5 marks, one mark for each). (Δ ■)

(Scanning Electron Microscope [SEM] - Tissue Sampling – Tissue Fixation - Cryostat – Cross-linking Fixative – Dehydration – Vibratome - Vacuum Impregnation)

Part (B): Define, the type of arrangement, and the order of each one:



Sixth Question: Write short notes about five parts only of the following: (10 Marks)

- 1- Segmentation of head.
- 2- The digestive tract shape varies depending on the type and nature of the food.
- 3- Cuticular Respiration.
- 4- The components of central nervous system.
- 5- The ecdysis (moulting) process.
- 6- The appendicular ovipositors.

With best wishes

Dr/ Douda S. Mohamed

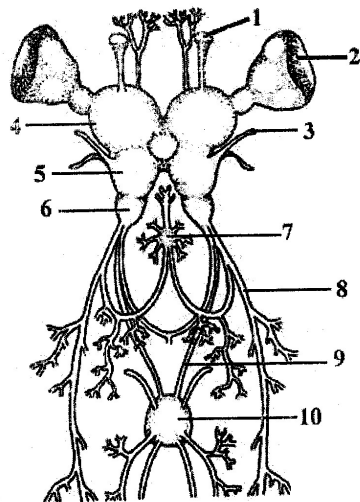
.....
.....
3. Circulatory system.

.....
.....
4. Antenna of insects.

.....
.....
5. Brain hormone.

Fifth Question: Define and labeling the following diagram. (10 Marks)

Part (A)



	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Zoology and Entomology Department	Program: Zoology and Chemistry Level : (3) Date: 3/1/2026 Time: 2 h	
Course Title: Insect Taxonomy		Code: 340 E	
Instructors: Prof. Dr. Ali Mohamed Ali			
Important:	No. of pages 7	No. Of questions 5	Total Mark:50 degree

Δ Question 1: Choose the best single correct answer (15 marks)

1. Cornicls are found in.....
 - a) Leafhoppers
 - b) Whiteflies
 - c) Coccids
 - d) Aphids
2. Members of Ensifera are.....
 - a) Diurnal
 - b) Nocturnal
 - c) Crepuscular
 - d) Matinal
3. Sawflies are grouped under the order.....
 - a) Diptera
 - b) Hymenoptera
 - c) Coleoptera
 - d) Plecoptera
4. Thysanopterans have wings oftype.
 - a) Hemiellytra
 - b) Tegmina
 - c) Elytra
 - d) Fringed
5. Antennae are clubbed with curved tip in.....
 - a) Skippers
 - b) Moths
 - c) Butterflies
 - d) Housflies
6. Stridulatory organs are found in.....
 - a) Orthoptera
 - b) Phasmida
 - c) Mecoptera
 - d) Dictyoptera
7. Rock crawlers are found inregion.
 - a) Warm
 - b) cool
 - c) Hot
 - d) All
8. Which one of the following orders lack cerci?
 - a) Hemiptera
 - b) Thysanoptera
 - c) Psocoptera
 - d) All
9. Ectognathous mouthparts are present in.....
 - a) Zygentoma
 - b) Collembolla
 - c) Protura
 - d) Diplura
10. The pronotum covers most of the insect head in....
 - a) Mantis
 - b) Cockroaach
 - c) Grylloblatodea
 - d) Mantophasmatodea
11. Moniliform antennae are found in the following insects except.....
 - a) Isoptera
 - b) Zoraptera
 - c) Diplura
 - d) Dragonflies
12. Which of the following is NOT a characteristic of Orthoptera?
 - a) Chewing mouthparts
 - b) Camouflage
 - c) Absence of cerci
 - d) Stridulation
13. Which one of the following orders is NOT holometabolous?
 - a) Hymenoptera
 - b) Neuroptera
 - c) Siphonaptera
 - d) Phthiraptera
14. The cerci are asymmetrical in order.....
 - a) Diplura
 - b) Dermaptera
 - c) Ephemeroptera
 - d) Embioptera