Assiut University
Faculty of Science
Department of Zoology

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

May, 2018

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(1) Choose the correct answer: (15 degrees)

1- The acrosome of human sperm is formed by:
a- Mitochondria b- Centriole C-Golgi apparatus

2- Cotyledonary placenta is found in:
a-Sheep b- Cat C-Bat d- Pig

3- Primitive streak is not found in:
a-Aves b- Mammals c- Fish

4- Which of the following is not found during development of Amphioxus:
a-Blastocoel b- Neural tube c- Notochord d- Embryonic membranes

5- Placenta is absent in which the following group of mammals:
a-Eutheria b-Marsupials c-Prototheria

6- Which of the following possesses archenteron:
a-Blastula b- Morula c- Gastrula d- Hydra

7- Blastocoel is a circular cavity lined by one layer of cells in:
a- Chick b- Frog c- Amphioxus

8- Yolk plug forms during:
a- Morulation b- Blastulation c-Gastrulation d- Neurulation

9- Region of area pellucida without mesoderm is:
a- Preamnion b-Postamnion c-Mesoamnion d-Proamnion

10-The chorion is composed of:
a-Cytotrophoderm b- Syncytial trophoblast c-Ectoderm and mesoderm
d-All of these

11-In frog gastrulation is completed by:
a-Epiboly b- Emboly c- Delamination d- Both epiboly and emboly

12-Cumulus oophorus is present in:
a-Avian egg b- Mammalian egg c-Amphibin egg d- Reptilian egg

13-A good example of centrolecithal egg is:
a-Mollusc b-Bird c- Insect d-Eutherian mammals

14-The acrosome of sperm contains:
a-Hydrolytic enzymes b-DNA c- Mitochondria d- Fructose

15-Liver, small intestine and pancreas are derived from:
a- Ectoderm b- Mesoderm c- Endoderm d- None

(2) Answer the following questions: (15 Marks)

A- Discuss the differentiation of the mesoderm in Amphioxus.

B- Explain the formation of gray crescent in frog.

C- Describe briefly the various steps of spermatocytogenesis.

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5. "There are many sampling methods to estimate population size and density". Mention the main sampling techniques of animal populations.

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6. Illustrate the important aspects of life histories

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أنتهت الأسئلة مع خالص الدعوات بالنجاح والتوفيق،،،،،،،،،،،

أ.د. خالد فؤاد عبد الوكيل

K. F. Wakeil

3. In a mark – recapture study of snowshoe hares population, 50 snowshoe hares are captured in box traps, marked with ear tags and released. Two weeks later, 100 hares are captured and checked for ear tags. If 10 hares in the second catch are already marked (10%). What approximately, is the estimated population size of hares?

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4. The following table illustrates the fifteen largest countries and their annual population increases (comment).

Rank	Country	2001 Population (millions)	Rate of Increase (%)
1	China	1,273	0.9
2	India	1,033	1.7
3	United States	285	0.6
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9	Japan	127	0.2
10	Nigeria	127	2.8
11	Mexico	100	1.9
12	Germany	82	–0.1
13	Vietnam	79	1.4
14	Philippines	77	2.2
15	Egypt	70	2.1

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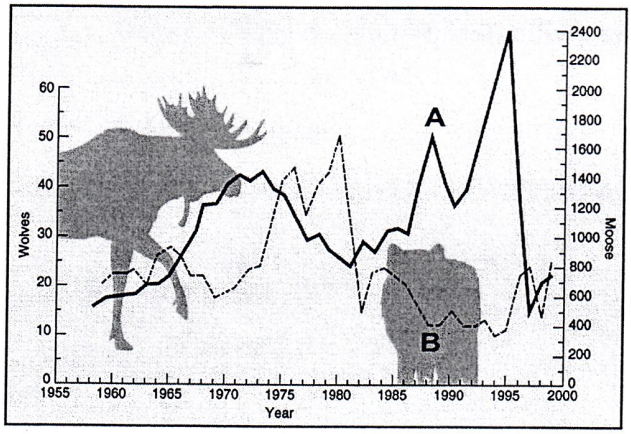
III- Answer <u>ONLY FIVE</u> questions of the following: **(20 marks)**

1. This following graph shows the relationship between prey population density and predator population density over an extended period of time



a) The solid line **(A)** represents .... population while the dotted line **(B)** represents .....population.

b) The prey population will grow..... ..... when the predator is absent.

c) A predator is .....

(e.g.....) While the prey is .....

(e.g.....).

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2. Complete the following table to show the differences between 'r' and 'K' selection species

	r-selected species	K-selected species
Mortality		
Survivorship		
Population size		
Length of life		

3- .....is a biological reaction that takes place between two organisms, one of which is a victim.

A) Predation
B) Mutualism
C) Commensalism
D) None of the above

4- Which of the following factors will affect population growth rates?

A) net emigration
B) net immigration
C) birth rate
D) all of the above

5- ... is an association between two different species in which one is inhibited and the other is unaffected.

A) Amensalism
B) Predation
C) Competition
D) Parasitism

6- What type of population associated with age pyramid which has an extremely broad base?

A) a rapidly expanding population
B) a stable population
C) a population where the birth rate = the death rate
D) a population with more males than females

7- Choose the factor that limits population growth.

A) predation
B) harsh weather
C) disease
D) All are factors that could limit population growth

8- One of the following is <u>Not</u> an examples of commensalism.

A) Barnacles - Whales
B) Remora fish - Sharks
C) Fishes – Sea anemones
D) Pseudoscorpions - Insects

9- Factors allow a population to increase under ideal conditions, potentially leading to exponential growth.

A) environmental resistance
B) Biotic Potential
C) population growth
D) Both A and B

10- The age distribution of a population reflects its .....

A) history of survival
B) reproduction
C) potential for future growth
D) all of the above

Answers table

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

3- Type of competition occurs between members of the same species in an ecosystem

A) Interspecific competition
B) contest competition
C) Intraspecific competition
D) Both A and B

4- Some protozoan populations live in digestive tract of termites and help termites to digest.....

A) fats
B) cellulose
C) proteins
D) all of the above

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

A) Drosera
B) Dionaea
C) Water- flea
D) Water-filled

6- Which one of the following is NOT a density-dependent factor.

A) Competition
B) Predation
C) Parasitism
D) None of the above

7- ..... Is chemical inhibition of plant seeding of the same species..

A) Antibiosis
B) Autotoxicity
C) Allelopathy
D) All of the above

8-The relationship between Oxpecker and Zebra populations is .....

A) Commensalism
B) Mutualism
C) Amensalism
D) Parasitism

9- The mortality rate of organisms following a type III survivorship curve is

A) constant throughout life
B) higher in post-reproductive years
C) lower after the organisms become established
D) unrelated to age

10- What type of survivorship curve do humans have?

A) Type I
B) Type II
C) Type III
D) Type IV

11- Intraspecific competition regulates population growth in ..... manner

A) density-independent
B) density-dependent
C) interspecific
D) all of the above

12- The number of individuals per unit area determines the population's

A) survivorship
B) density
C) mortality
D) age distribution

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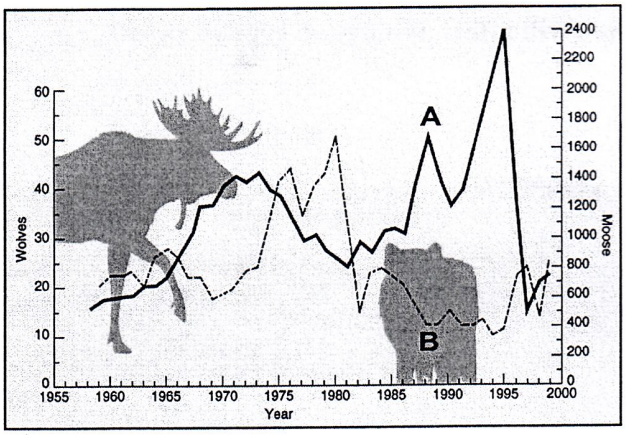

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draw this table in your answer sheet and make your answer therein

Question no.	1	2	3	4	5	6	7	8	9	10
Answer										

III- Write the scientific term(s) that describe the following sentences, *(10marks, two marks for each)*

1- The start codon of all types of mRNA.

2- Cellular organelle which contains sulfotransferase enzyme that adds sulfur to the secretory products

3- A process of removing non coding sequence and rejoining of coding ones during mRNA processing

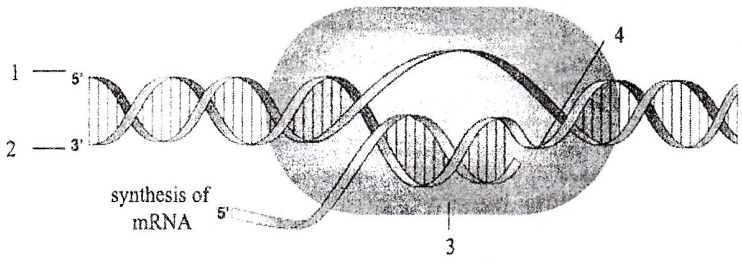
4- 20-25 special sequence found in the 5' end of mRNA that will be translated upon RER.

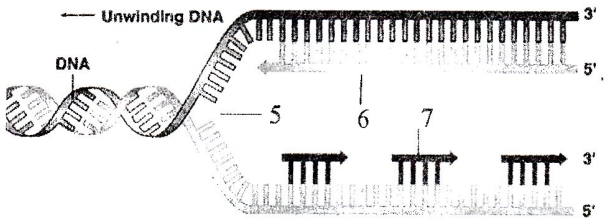
5- Cellular structures which can direct polymerization of tubulin to form microtubules

draw this table in your answer sheet and make your answer therein

Question no.	1	2	3	4	5
Answer					

IV- Complete the missing labels of the following diagrams. *(10 marks, one mark for each)*





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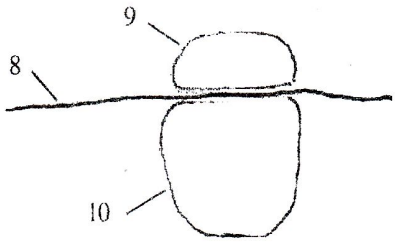

Ribosome

End of questions, Best wishes

Course coordinator and Examiner

Prof. Abo baker Eltayeb

15- Degradation of proteins marked with ubiquitin occurs at the.....

a- Lysosome b- peroxisome c- proteasome D- ribosome

16- .....is the protein which punches holes in the outer mitochondrial membrane during apoptosis

a- Caspase 8 b- Caspase 3 c- bax d- bcl-2

17- The inactive genes is found in.....

a- Chromatid b- hetrochromatine c- euochromatine d- all the mentioned

18- The part of nucleolus which consists of maturing ribosomes

a- Pars fibrosa b- pars granulose c-nucleolar organizer DNA d- Bare body

19- Microtubules consists of ..... units of tubulin heterodimers arranged into a spiral.

a- 3 b- 13 c- 9 d- 2

20- ..... is the pigment found in long lived cells and come from residual bodies of the secondary lysosomes

a- Melanin b- Lipofusion c- Carotene d- hemoglobin

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II- Correct the underlined part of the following sentences. *(10 marks, one mark for each)*

1- Phospho-diester bond forms between the complimentary base pairs in DNA.

2- Ribosomes contain catalase that decomposes H_2O_2 to water and oxygen.

3- DNA replication is conservative process.

4- RNA helicase unwind the DNA double helix during replication.

5- In Human cells, the regulation of transcription is controlled by an operon.

6- Okazaki fragments are formed in leading strand during DNA replication.

7- The name of Guanine nucleoside in RNA is deoxyguanosine.

8- Caspase 9 is activated in extrinsic pathway of apoptosis.

9- Lysosomal digestion of cellular organelles is called necosis.

10- Introns are the coding sequence.

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Assiut University, Faculty of Science

Zoology Dept., chem., geology programs

Time allowed: 2hr

50 marks

final exam, 25-05-2018

2nd semester, 2017-2018

Cell and molecular biology (318 Z)

I- **Choose the best answer.** *(20 marks, one mark for each)*

1- The Okazaki fragments are joined together by .....

a- DNA ligase b- DNA polymerase c- DNA helicase d- none of the mentioned

2- Which enzyme of the following catalyzes the formation of 5'-3'ester bonds during DNA synthesis

a- DNA Helicase b- DNA polymerase c- RNA polymerase d- DNA ligase

3- Saturated lipids are characterized by.....

a- Problematic to heath b- no double bond c- high melting temperature d- all the mentioned

4- .....is responsible for formation of the sperm acrosome

a- Mitochondria b- ribosomes c- Golgi apparatus d- centriole

5- secondary lysosomes are characterized by .....

a- obvious membranes b-large size c- homogeneous contents d- none of the mentioned

6- .....is the process of digestion of material taken from extracellular.

a- Apoptosis b- Autophagy c- Polyphagy d- Heterophagy

7- .....Form hydrophilic pores in membrane through which ions can diffuse

a- Carrier proteins b- Channel proteins c- cytoplasmic proteins d- b and c

8- .....diffuses rapidly through synthetic lipid bilayer.

a- Amino acid b- oxygen gas c- Glucose d- hydrogen ion

9- Rough endoplasmic reticulum contains.....

a- Ribophorin I b- Ribophorin II c- Ribosomes d- all the mentioned

10- Between A and T bases of DNA there are..... Hydrogen bonds

a- two b- three c- four d- five

11- DNA is wrapped around proteins called..... to form nucleosomes.

a- actins b- vinmentins c- histones d- ribophorins

12- ..... is the intermediate filaments found in muscle cells

a- Myosin b- Desmin c- Cytokeratin d- Actin

13- The most abundant RNA in the cell is.....

a- mRNA b- tRNA c- rRNA d- siRNA

14- Formation of α helices and β sheets in amino acid chains is called..... structure of protein

a- Primary b- secondary c- tertiary d- quaternary

C- Put a suitable(√) or (X) adjacent to the following: (10 marks)

1- Final host, is the host harbouring sexual forms of Protozoa ( )
2- Metacercaria are encysted cercariae without tails ( )
3-The mature proglottid of *Dipyllidium caninum* has two genital pores ( )
4- Infection with parasitic *Taenia saginata* occurs through ingestion of larval forms in undercooked beef. ( )
5- Oncosphere is the egg-encased embryo of cyclophyllidean Tapeworms ( )
6-Tapeworms have un-complete digestive system ( )
7- The insect vectors of *Plasmodium* sp. is male anopheles ( )
8- Chagas disease is caused by *Trypanosoma rhodesiense* ( )
9- Infective stage of *Taenia solium* is encysted metacercariae ( )
10- The scolices of pseudophyllidean cestodes have rostellum ( )

D- Write briefly on five only of the following: (25 marks)
(illustrating your answer with labeled drawings whenever possible)

1-Nutrition and reproduction in Protozoa

2- *Entamoeba histolytica* and *E. coli* trophozoites

3- Types of eggs in *Ascaris* sp.

4- Types of cercariae in different species of trematodae.

5- Intermediate host, habitat and mode of infection in each of the following parasites:
Diphyllobothrium latum- Schistosoma haematobium- Fasciola heptica

6- Infective stage, mode of infection and habitat of the following parasites:
Hymenolepis nana - Trypansoma cruzi – Trichomonas vaginalis

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Good luck

Prof. dr., Gamal H. Abed

Assiut University
Faculty of Science
Zoology Department

Final examination
Course number 324 Z
(Protozoa & Parasitology)
Time: 2 hours
May 2018

Answer the following question (Write the answer only in your paper)

A- Fill in the blanks: (10 marks)

1- The protozoan ciliates, *Paramecium* sp. lives in.....but *Balantidium coli* lives in.....They mainly feeding on.....and they may reproducing sexually by.....

2- In some Protozoa the cytoplasmic contractile vacuoles used for.....

3- The association between two organisms may be symbiosis, which means.....and Parasitism, which means.....

4- Zoonoses.....

5- The final host of *Toxoplasma gondii* is .....but the intermediate host is .....

B- Choose the one correct answer: (5 marks)

1- The mature cyst of *Giardia lamblia* have (One nucleus– Two nuclei- Three nuclei- four nuclei- Five nuclei- Six nuclei- Non of them)

2-The intermediate host of *Fasciola gigantic* is (Cattle-Frogs- Pigs- Cyclops - Snails - None of them)

3- *Dipyllidium caninum* is the cestode parasites, to complete its life cycle requires (one host- Two hosts- three host- four hosts-None of them)

4- The second intermediate host of *Heterophyes heterophyes* is (cattle-frogs - pigs-Cyclops - snails - None of them)

5- *Trypanosoma* vectors is (male *Anopheles* - house fly - sand fly – *Pulex irritans* - None of them)

انظر خلفه

Assiut University
Faculty of Science
Zoology Department

Genetic Engineering (May 2018)

Time: 3 hours
Level: 3rd
Course Code: Z314

Answer the following questions (50 marks)

I: Choose the correct answer (15 marks)

1- Alkaline comet assay is specific for quantitative analysis of .....
a) DNA DSBs b) DNA SSBs c) Base excision d) All are true

2- During DNA extraction ..... is used to chelates meta ions
a) Tris-buffer b) KOH c) EDTA d) PCNA

3- Non-homologous end joining repair is .....
a) Fast and accurate b) Slaw and accurate c) Error prone and fast d) Error prone and slow

4. The site at which crossover may occur between non homologous chromosomes is called
a) Centromere b) Telomere c) Chiasmata d) Spindle

5. Homologous recombination repair is
a) Fast and accurate b) Slaw and accurate c) Error prone and fast d) Error prone and slow

6. I have never heard about a study in which Human was used as an experimental model, irradiated or treated
a) TRUE b) FASE c) I do not know

7. Formed of four subunits, two of them are smc1 and smc3
a) SPB b) Centromere c) Sister Chromatids Cohesion d) All are true

8. A single round of chromosomes replication followed by two rounds of segregation
a) Mitosis b) Meiosis c) Spermatogenesis d) Embryology

9- Among mammalian species, the elephant rarely develops cancer because it has
a) Thick skin b) more copies of TP53 gene c) less copies of TP53 d) a and c are true

10- During DNA extraction, NaCl is used to
a) Denatures proteins c) Dissociates in to metal ions that attract the negatively charged DNA
d) help to allow DNA to clump together d) All are true

11. Among mammals..... is the best model used as a transgenic animal
A) Elephant b) rat c) monkey d) mouse

12- Meiotic recombination major steps are
a) Recombination, pairing and then synapsis
b) Synapsis, pairing and then recombination

c) Paring, synapsis and then recombination

13- A technique used for the separation of large DNA molecules (such as Yeast chromosomes) in agrose gel by applying electric field that periodically changes direction.

In situ hybridization b) Pulse Field gel electrophoresis c) Southern blot technique d) Northern blot Technique

14- A gene knockout technique has helped to eliminates many of the side effects of classical gene knockout (such as death of -/- embryos).

a) Conditional knockout b)Artificial knockout c) traditional knockout d) All are true

15) The 1st segregation during meiosis (meiosis I) is the segregation (disjunction) of

a) Homologous chromosomes b) Sister chromatids c) Both are true

II: Define the following terms (5 marks)

Transgenesis

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Genetic engineering

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Conditional Knockout Mice

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Cosmid

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Palinodromic sequences

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III: Please put TRUE or FALSE and correct the false. (15 marks)

1- The flow of genetic information from DNA to RNA to protein, via the processes of transcription and translation is known as the Central Dogma of molecular biology ( )

2- The point mutation is a type of mutation that causes a single nucleotide base substitution, insertion, or deletion of the genetic material ( )

3- A Northern blot is a method used in molecular biology for detection of a specific RNA sequence in RNA sample ( )

4- There are two ways are being used to transfer DNA from gel to membrane: Vacuum transfer and electric transfer ( )

5- Of the methods used to produce transgenic mice, the transformed ES cells are injected in inner cell mass of gastrula stage ( )

6- Proteinase K is used during DNA extraction to precipitate Protein ( )

7- In live bacteria, restriction enzymes function is to defend the cell against invading viral bacteriophages ( )

8- The science of genetics derived from the term 'genesis', which relates to the origin of something, tried to explain how organisms both resemble their parents and differ from them. ( )

9- The codon AUC serves as a start signal, therefore the first amino acid incorporated into all proteins. ( )

10- The region between the start-methionine and the first stop codon is referred to as the open reading frame (ORF). ( )

11-The Cre recombinase/loxP System is used to produce mutation at specific time or in specific tissue ( )

12- Redundancy in genetic code allows more than one codon to specify a particular amino acid ( )

13- The draft of human genome sequence been published in 2002. ( )

14- Sticky ends produced by Restriction Enzymes are less cohesive compared to blunt ends. ( )

15- Germany used biotechnology in chemistry and medicine to win the 1st World War ( )

IV: List Only FIVE of the following with brief description when possible (10 marks)

1- The commonly used methods (three) in DNA extraction.

2- Types of DNA damage induced after exposure to endogenous or exogenous agents.

3- Types of chromosomes.

4- Steps of gene cloning.

5- Four types of mutations.

6- The four common properties that Cloning vectors share

V: Mention only the full name the following (5 marks)

CRISPER cas9

YAC

BAC

NHEJ

HR

Good Luck, Dr Emad Abdelaziz Ahmed

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Good Luck, Dr Emad Abdelaziz Ahmed

Assiut University
Faculty of Science
Dept. of Zoology

Final Exam. of Cell Biology (312Z) for Zoology Students

May 2018 **Time 2 hours**

I- Choose the correct answer: (12 Marks)

1- The hormone like chemical messengers that control the activities of the immunologic reaction cells is called:

a) Interleukins b Interferons

c) Immunoglobulins d) growth factors

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- Epstein-Barr Virus (EBV) which associated with some lymphomas produces a protein similar to:

a) Bcl-2 b) Apaf-1

c) Bax d) caspase 9

10- The point where microtubules of the spindle apparatus attach to chromosome is called:

a) centromere b) chromatid

c) centriole d) kinetochore

11- The Enzymes that do the unwinding the double-helical structure that makes up DNA called:

a) dublicases b) helicases

c) deamerases d) helicase enzymes

12- 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

1	2	3	4	5	6	7	8	9	10	11	12

II- Fill in the spaces (15 Marks)

1- Growth factors include substances which ....many of the actions of hormones.

2- The most efficient DNA repair going on in..... .....

3- The immune system uses ....to destroy bacteria and other pathogens.

4- SOD converts an oxygen radical known as superoxide anion into ....,.....

5- In a process called ....., ... glucose molecules attach themselves to proteins.

6- The centromeres remain intact in ....

7- *The antiproliferative gene .... produces a protein that limits cell proliferation and is called tumor* suppressor gene.

8- The progressive deterioration of many bodily functions over time is called: .....

9- One of the genes that control a special stage in the worm's development called dauer formation known as: .....

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- In humans, the capsule and trabeculae of the spleen contain ....

14- Meiosis is a special type of nuclear division which segregates one copy of each .... into each new cell.

15- The aster is thought to serve as a ....for the functioning of the spindle fibers.

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?

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2-

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2-

IV-Write on two only of the following: (10 Marks)

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2- Hormone replacement.
3- Apoptosis and tissue transplantation.

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5. **Jacobson's organ is**

a) Mechanoreceptor

b) Photoreceptor

c) Chemoreceptor

6. **Lepidosauria includes**

a) Sphenedon

b) Lizards

c) Snakes

d) All of the above

7. **Feather may perform**

a) Sensation

b) Sexual display

c) Maintenance of body temperature

d) All of the above

8. **Diaphragm exists in**

a) All Reptiles

b) Crocodiles only

c) Birds

d) All mammals and crocodiles

9. **Terrestrial type of reptiles excrete**

a) Ammonia

b) Urea

c) Uric acid

d) Urin

10. **There are pair copulatory organs in**

a) Sphenedon

b) Lizard and Snakes

c) Crocodiles

d) Tortoises

11. The expiratory avian air sacs are

a) All of them

b) The cervical, interclavicaular and anterior thoracis

c) Cervical and interclavicular

d) The posterior Thoracic and abdominal

12. Diapsidian skull is characterized by

a) Disappearance of fossae

b) Upper temporal fossa

c) Lower temporal fossa

d) Upper and lower temporal fossae

13. Which of the following is untrue in the avian skin

e) Contains sweat gland

f) Horny scales

g) Contains parotid gland

h) Has mucous gland

14. Accessory cranial nerves in amniotes are

a) Optic and olfactory

b) Trigeminal and auditory

a) Spinal accessory and hypoglossal

15. Urodaeum performs

a) Excretion

b) Reproduction

c) Osmoregulation

d) Maintenance of the body temperature

16. Mammalian group exhibit an egg laying habit

a) Prototheria

b) Metatheria

c) Eutheria

d) Non of the above

17. Which of the following is oviviporous

a) Snake

b) Certain skink

c) Chameleon

d) All lizards

18. Mammalian teeth are

a) Thecodont

b) Pleurodont

c) Homodont

d) Polyphyodont

19. Which of the following move on inverted surface

a) Geckos

b) Skinks

c) Chameleans

d) Amphisbanians

20. Tetrapods arose from

a) Sarcopterygian ancestors

b) Dipnoi

c) Neopterygii

d) Crossopterygianss

Question 2: (10 p.)

- **List only, no commentary needed**

1. Diaphragmaticus is .....
2. Sinus venosus incorporated in.....of.....heart.
3. Reptilian head carried off the ground by .....
4. The embryonic membranes develop from....., while the egg shell develops from.....

5. Characters of Ratites are.....

.....

.....

.....

Question 3: (5 p.)

- ***Compare between the Reptilian and Avian arterial system.***

Question4: (10 p.)

- **Describe two items only from the following**

a) The middle ear in the amniotic vertebrates

b) The distribution of neurons inside the spinal cord and the exit of the spinal nerve.

c) Snake skull

Question5: (10 p.)

- **What are the difficulties associated with the transmission of vertebrate life from water to the earth.**