

الفريق الثاني



Assiut University Faculty of Science Zoology Department	Final exam of Principles of Embryology (Z 334) for Chemistry- Zoology & Zoology students	June, 14th 2023 Time: Two hours Total marks: 50
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The exam is in four pages

Click the right answers in the Answer sheet (One mark each)

Choose the right answer:

1- Sex chromosomes in male chick are:

- a) ZZ b) ZW c) XY d) none

2- The surface of chick oocyte is covered by an area called

- a) corona radiata b) zona radiata c) zona pellucida d) vitelline membrane

3- An example of oviparous animals is

- a) Chick b) mice c) deer d) kangaroo

4- In the equatorial cleavage, the cleavage line passes

- a) through the animal-vegetal axis b) through the horizontal axis
c) above the equator d) below the equator

5- Cleavage type in the toad is

- a) equal holoblastic b) unequal holoblastic c) meroblastic d) superficial

6- If nondisjunction occurs in the second meiosis, trisomy probable percentage is

- a) 100% b) 75% c) 50 d) 25%

19- spermiogenesis is hormonally controlled by

- a) inhibin & T4 b) LH & T4 c) FSH & T4 d) LH & FSH

20- Blastula of Amphioxus is converted into gastrula by the process of

- a) involution b) invagination c) evagination d) delamination

21- Yolk sac is not found in

- a) Amphioxus b) frogs c) birds d) human

22- Polyspermy in human is

- a) pathological b) physiological c) healthy d) none

23- Human sperm head shape is

- a) spoon-shaped b) spherical c) cylindrical d) pear shaped

24- Kartagener triad syndrome patient suffers from

- a) immotile sperm b) respiratory problems c) right sided heart d) all

25- Tertiary egg membranes are formed by

- a) ovum b) follicle cells c) oviduct d) a and b

26- Lamp brush chromosomes are important for the embryo to

- a) accelerate development b) delay development c) feed embryo d) none

27- Normally during ovulation cycle one oocyte is released from the human ovary after

- a) 13 days b) 14th day c) 15 days d) 28 day

28- Yolk sac is not found in

- a) Amphioxus b) frogs c) birds d) mammals

29- In which part in the sperm are mitochondria concentrated?

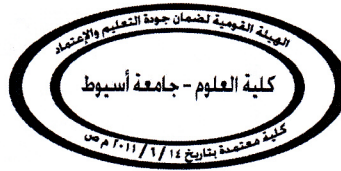
- a) neck b) middle piece c) tail d) a & b

30- In vertebrates, yolk is synthesized in

- a) mitochondria of oocyte b) liver of mother c) fat bodies d) a and b



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Final Exam: Physiology 2 (317Z)

Date of Exam: 3-6-2022

Time: Two Hours

Second Semester, total marks: 50

Part 1 (Nervous Coordination, 25 marks)

Q1- Choose the correct answer (8 marks)

1- Which of the following is one of the parts of the hindbrain?

- a. hypothalamus b. cerebellum c. corpus callosum d. spinal cord

2- Control of temperature, endocrine activity, metabolism, and thirst are functions associated with the:

- a. cerebellum b. hypothalamus c. thalamus d. cerebrum

3- Which of the following cells supports, nourishes, and protect the neurons?

- a. Nissl bodies b. Perikaryon c. Ganglia d. Glial cells

4- Name the multipolar neuron which is located entirely within the central nervous system.

- a. Motor neuron b. Efferent neuron c. Afferent neuron d. Interneuron

5- Which of these cells are not a type of neuroglia found in the CNS.

- a. astrocytes b. Schwann cells c. ependymal cells d. oligodendrocytes

6-The neuron processes that normally receives incoming stimuli are called.....

- a. axons b. dendrites c. neurolemmas d. Schwann cells

7- Collections of nerve cell bodies inside the PNS are called:

- a. ganglia b. tracts c. nuclei d. tracts or ganglia

8.Impulse conduction is fastest in neurons that are:

- a. myelinated b. unmyelinated c. sensory d. motor

9-After an action potential is propagated, which ions rapidly diffuses out of the cell .

- a. sodium b. chloride c. calcium d. potassium

10-The nerve that contains sensory fibers that are involved in hearing is.....

- a. cranial nerve II b. cranial nerve III c. cranial nerve V d. cranial nerve VIII

11- Preparing the body for "fight-or-flight" response during threatening situations is the role of the:

- a. sympathetic NS b. parasympathetic NS c. somatic NS d. afferent NS

12-The brain and spinal cord are protected by membranes knowns as the

- a. Nodes of Ranvier b. meninges c. neurolemma d. myelin sheath

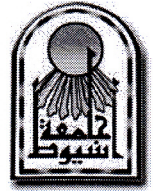
13- Electrical impulses accumulate in which part of a neuron, to initiate an action potential?

- a. Dendrites b. Axon hillock c. Axon terminal branches d. Node of Ranvier

14- Which ONE of the following is found in the synapse during inhibitory synaptic transmission?



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- a. GABA b. Acetylcholine c. Noradrenaline d. Glutamate

15. The difference in voltage between the inside and outside of a resting cell is called.....

- a. actions potential b. repolarization c. resting potential d. depolarization.

16- The biggest CN which splits into 3 divisions: ophthalmic, maxillary, and mandibular is....

- a. CN5 b. CN7 c. CN10 d. CN11.

Q2- Sign true (✓) or false (×): (8 marks)

1. In Mollusca the NS is composed of nerves with pedal and visceral nodes. ()
2. Serotonin receptors are coupled to G-proteins that affect the activities of either adenylate cyclase or IP3. ()
3. Functional center for emotional memory includes parts of the thalamus, hypothalamus, and cerebral cortex. ()
4. Lateral horns of gray matter are located ONLY in thoracic and lumbar regions. ()
5. The 3rd order neuron of AT carries signal from thalamus to sensory region of medulla oblongata. ()
6. Tyrosine is produced in the liver from phenylalanine by the action of phenylalanine hydroxylase. ()
- 7- Corpus collosum is a thick bundle of nerve fibers that connects the two cerebral hemispheres. ()
- 8- Tyrosine is converted in the rate-limiting step in basal ganglia cells to dopamine in basal ganglia. ()
- 9- Limbic system includes parts of the thalamus, hypothalamus, and cerebral cortex. ()
- 10- Frontal lobe has activity associated with reasoning, planning, and problem solving. ()
- 11- A site of communication between neurons is called synaptic cleft. ()
- 12- The cell bodies for motor neurons are in the dorsal horn of the spinal cord. ()
- 13- Endoneurium is collagen framework which supports axons within a peripheral nerve. ()
- 14- The ACh is rapidly hydrolyzed by the enzyme acetylcholinesterase (AChE). ()
- 15- Neuropeptides such as endorphins and enkephalins inhibit pain. ()
- 16- The sodium-potassium pump extrudes 3 sodium ions for every 2 potassium ions that it brings in. ()

Q3: Answer on the TWO ONLY of the following (9 marks, 3 marks each)

- 1- Write on the differences between the ascending and descending tracts.
- 2- Compare between the voltage gated and ion gated channel.
- 3- Explain the mechanism of neurotransmitter release from the presynaptic neuron.
- 4- Discuss how the postsynaptic neuron response to the neurotransmitter.

إنتهاء الأسئلة

د. حسام الدين محمد عمر أستاذ الفسيولوجي وقسم علم الحيوان بكلية العلوم - جامعة أسيوط

Part (2): Endocrinology

Q1: Choose the correct answer:(10 marks)

1. The following hormone is secreted by the anterior pituitary gland:

- a) Cortisol b) TRH c) CRH d) TSH

2. Stimuli for aldosterone regulation includes:

- a) High sodium in the distal renal tubule b) High serum potassium
c) ACTH as a potent stimulator d) Increased renal blood flow

3. Which of these is not an endocrine property?

- a) hormones reach targets through the blood b) effects are slow and cyclic
c) rapid acting effects d) effects caused by chemicals.

4. The primary target of the releasing and inhibiting hormones of the hypothalamus is the:

- a) Liver and adipose tissue b) Gonads c) Anterior pituitary d) Bone marrow

5. Which gland controls basal metabolic rate (BMR)?

- a) Thyroid. b) Parathyroid. c) Testes. d) Pancreas.

6. The posterior pituitary stores and releases:

- a) Growth hormone and prolactin. b) Prolactin and oxytocin.
c) Oxytocin and antidiuretic hormone (ADH). d) ADH and growth hormone.

7. Which of the following hormones are responsible for the "fight-or-flight" response?

- a) Epinephrine and norepinephrine. b) Insulin and glucagon.
c) Esrtogen and progesterone. d) Thyroxin and melatonin.

8. Most hormones of the endocrine system are regulated by a:

- a) Negative feedback mechanism. b) Positive feedback mechanism.
c) Hormone-receptor complex. d) Hormone-gene complex.

9. Calcium level in the blood is regulated by the:

- a) Thyroid. b) Parathyroid. c) Posterior pituitary. d) A and B.

10. Clinical uses of oxytocin include:

- a) Stimulation of milk ejection in breastfeeding women
b) Stimulation of ejaculation in infertile men
c) Stimulation of uterine contraction in pregnant women
d) Induction of breast development in adolescent girls

11. The following are actions of insulin, except:

- a) Inhibition of protein degradation b) Inhibition of gluconeogenesis
c) Inhibition of ketogenesis d) Increased renal tubular absorption of glucose

12. A major regulator of bone growth is:

- a) Parathyroid hormone b) Calcitonin c) Growth hormone d) Prolactin

13. Calcitonin:

- a) Increases serum calcium by stimulation of osteoclasts b) Prevents postprandial hypercalcemia
c) Is stimulated by a hypothalamic releasing hormone d) Is released during stress

14. Insulin can be described as:

- a) Gluconeogenic b) Ketogenic c) Protein anabolic d) Diuretic

15. The main effect of somatostatin secreted by the the islets of Langerhans appears to be:

- a) Inhibition of the secretion of growth hormone b) Stimulation of glucagon secretion
c) Inhibition of gastric acid secretion d) Inhibition of insulin secretion

16. Which of the following inhibits the secretion of growth hormone by the anterior pituitary?

- a) Sleep b) Stress c) Puberty d) Somatomedins

17. Which of the following anterior pituitary hormones plays a major role in the regulation of a nonendocrine target gland?

- a) Adrenocorticotrophic hormone b) Thyroid-stimulating hormone
c) Prolactin d) Follicle-stimulating hormone

18. Release of which of the following hormones is an example of neuroendocrine secretion?

- a) Growth hormone b) Cortisol c) Oxytocin d) Prolactin

19. Inhibition of the iodide pump would be expected to cause which of the following changes?

- a) Increased synthesis of thyroxine (T4)
- b) Increased synthesis of thyroglobulin
- c) Increased metabolic rate
- d) Decreased thyroid-stimulating hormone secretion

20. The relatively constant internal environment of the body is maintained by.

- a) negative feedback.
- b) positive feedback.
- c) homeostasis.
- d) metabolism

Q2: Sign true or false (10 marks):

1. Hypothalamic-hypophyseal portal circulation connects between the posterior portion of hypothalamus and the posterior pituitary.
2. Antidiuretic hormone is secreted in response to low blood volume .
3. Insulin inhibits fat deposition and stimulates lipolysis in the adipose tissues.
4. Hypocalcemia inhibits parathormone secretion.
5. Water deprivation increases osmolality of plasma which stimulates antidiuretic hormone-producing neuron .
6. Gastrointestinal hormones stimulate calcitonin secretion to prevent postprandial hypercalcaemia.
7. Increased secretion of calcitonin-releasing hormone from the hypothalamus stimulates the secretion of calcitonin.
8. The hormones can act on the cells lacking their specific receptors.
9. Thyroid hormone increases gradually if the body is exposed to hot for prolonged period of time.
10. Normal development of the central nervous system depends on normal production of thyroid hormone in fetal life and the first months after birth .
11. Lack of thyroid hormone results in impaired capacity for physical exercise and slow intellectual performance.
12. Adrenal medullary hormones are essential for life.
13. Glucocorticoids stimulate the release of histamine from mast cells.
14. Estrogen causes maturation and maintenance of the fallopian tubes, uterus and vagina.
15. Estrogen and progesterone provide negative feedback except in the midcycle shifts to positive direction permitting ovulation.
16. Human chorionic gonadotropin causes persistence of corpus luteum and prevents menstruation.
17. Negative feedback control is self-reinforcing.
18. Hormones of posterior pituitary are synthesized and secreted by hypothalamus.
19. Insulin decreases uptake of glucose into target cells.
20. Estrogen and progesterone are polypeptide hormones.

Q3: Illustrate with labeled diagram two items from the following (5 marks):

1. Mechanism of parturition.
2. Negative feedback control of hormonal secretion.
3. Regulation of thyroid hormone secretion.
4. Tropic hormones of hypothalamus and anterior pituitary.

Good Luck

Dr. Sohair M. M. Ragab



50 marks

I- Choose the right answer. (40 marks, one mark for each)

- 1- During DNA replication.....removes the RNA primer and replaces it with DNA nucleotides.
a- DNA polymerase I b- DNA polymerase III c- primase d- topoisomerase
- 2- There are..... base pairs forming a link between adjacent nucleosomes.
b- 166 b- 48 c- 66 d- 148
- 3- is the organelle where ubiquitinated proteins are degraded.
a- Lysosome b- Peroxisome c- Proteasome d- spliceosome
- 4- The active genes are found in the form of
a- Chromatid b- heterochromatin c- euchromatin d- none of the mentioned
- 5- The sequence of amino acid acceptor stem in tRNA is
a- 5'-TCC-3' b- 3'-TCC-5' c- 5'- CCA- 3' d- 3'-CCA-5'
- 6-unwind the DNA double helix during transcription.
a- DNA helicase b- DNA polymerase c- RNA polymerase
d- transcription factors
- 7- Which of the following represents stop codon in protein synthesis by ribosome?
a- GAU b- AGU c- UGA d- AUG
- 8- The nitrogenous base Thymine belongs to.....
a- Purines b- pyrimidines c- double rings nitrogenous bases d- b and c

- 9- The 3' carbon of the nucleotide at the end of one DNA strand is linked with.....
- a- OH group b- phosphate group c- nitrogenous base d- deoxyribose sugar
- 10- RNA..... in Eukaryotes makes tRNAs
- a- polymerase I b- polymerase II c- polymerase III d- polymerase IV
- 11- In prokaryotes, the mRNA has sequence to show the ribosome where to start translation.
- a- Polycistronic b- poly A tail c- Shine-Dalgarno d- all answers are incorrect
- 12- RNA-replicase ispolymerase
- a- DNA-dependent DNA b- RNA-dependent RNA c- DNA-dependent RNA d- RNA-dependent DNA
- 13- Reverse transcriptase ispolymerase.
- a- DNA-dependent DNA b- RNA-dependent RNA c- DNA-dependent RNA d- RNA-dependent DNA
- 14- Telomere structure protects DNA fromactivity.
- a- endonuclease b- exonuclease c- polymerase d- telomerase
- 15- Which of the following arms of tRNA is the ribosome binding site.
- a- D arm b- T Ψ C arm c- anti codon arm d- amino acid acceptor arm
- 16-prevents knotting and tangling during DNA replication
- a- Helicase b- shine- Dalgarno sequence c- telomere d- not mentioned
- 17- The telomeric sequence in Human is.....
- a- TTGAAA b- TTAGGG c- GGATTT d- TTAGGA

18- Telomerase enzyme is.....

- a- Specialized RNA polymerase b- specialized reverse transcriptase c-
ribonucleoprotein d- b and c

19- There are 64 different codons in mRNA,..... of them code for amino acids.

- a- 63 b- 62 c- 61 d- 60

20- The E site of the large ribosomal subunit bindsbefore it exits the ribosome.

- a- aminoacyl-tRNA b- free-tRNA c- peptidyl-tRNA d- all answers are
incorrect

21- Which of the following is a characteristic specific to prokaryotic organisms and not found in eukaryotic organisms?

- A) Presence of membrane-bound organelles B) Cell division by binary fission
C) Having cytoplasm D) Possessing linear DNA

22- The nucleolus is composed of?

- A) DNA and lipids B) Proteins and carbohydrates
C) RNA and proteins D) DNA and proteins

23- What is the end product of peroxisomal conversion of hydrogen peroxide?

- A) Carbon dioxide B) Hydrochloric acid
C) Nitrogen gas D) Water and oxygen

24- The globular structures in the membrane of mitochondrial cristae are involved in?

- A) DNA replication B) Protein synthesis
C) ATP production D) Lipid production

25- Secretory granules can store some substances such as zymogens that can?

- A) Protect the cells B) Destroy the cells

- C) Regulate cell growth D) Enhance cell communication

26- The accumulation of residual bodies in long-lived cells is known as?

- A) Lysosomes B) Autophagosomes C) Lipofuscin D) Ribosomes

27- What is the main function of the nuclear envelope?

- A) Protein synthesis B) Nucleocytoplasmic transport
C) DNA replication D) Chromatin packaging

28- The Golgi apparatus is responsible for?

- A) Lipid metabolism B) Protein synthesis
C) DNA replication D) ATP production

29- In the cell cycle, sister chromatids undergo separation and move towards opposite poles during?

- A) Prophase B) Metaphase C) Anaphase D) Telophase

30- Channel proteins facilitate the movement of?

- A) Ions B) Lipids C) Proteins D) Water

31- The cell death process caused by injury, toxins, or nutritional deprivation is called?

- A) Swelling B) Apoptosis C) Digestion D) Necrosis

32- What is the main function of microtubules in the cell?

- A) Energy production B) Cell division
C) Protein synthesis D) Waste elimination

33- What is the role of cyclins and cyclin-dependent kinases (CDKs) in cell regulation?

- A) Chromosome replication B) Cellular respiration
C) DNA repair D) Cell division initiation

- 34- What is the term for the movement of phospholipids within the bilayer where they move sideways along the membrane?
- A) Lateral diffusion B) Flip-flop C) Flexion D) Rotation
- 35- What occurs during the G1 phase of the cell cycle?
- A) DNA replication B) Cell growth and preparation for DNA replication
- C) Chromosome alignment D) Cell division
- 36- Which unit is used to measure the size of ribosomes?
- A) KiloDaltons B) Angstroms C) Picometers D) Svedberg units
- 37- What is the purpose of the S phase in the cell cycle?
- A) Chromosome alignment B) DNA replication
- C) Cell division D) Chromosome condensation
- 38- The lipid bilayer in the cell membrane is primarily composed of?
- A) Phospholipids and proteins B) Cholesterol and proteins
- C) Phospholipids and cholesterol D) Phospholipids, cholesterol, and proteins
- 39- What is the organization of microtubules within centrioles?
- A) Singlets B) Doublets C) Triplets D) Quadruplets
- 40- The breakdown of glycogen in liver and muscle cells occurs in?
- A) Golgi apparatus B) Rough endoplasmic reticulum (rER)
- C) Smooth endoplasmic reticulum (sER) D) Mitochondria

II- Put (T) beside the right sentences and (F) beside the wrong sentences. (10 marks, one mark for each)

- 41- Eukaryote genes are grouped in operons.
- 42- In prokaryotes, transcription of a gene and translation of the resulting mRNA occur simultaneously.
- 43- The existence of introns in prokaryotes is extremely common.
- 44- Prokaryotic protein synthesis initiation begins with N formyl- methionine.
- 45- The name of adenine nucleotide in RNA is adenosine 5'-monophosphate.
- 46- In the cell cycle, chromosomes are connected to spindle fiber at centromere and lined up at equator of cell during metaphase.
- 47- Cyclins regulate the cell cycle in eukaryotic cells.
- 48- The cell membrane appears to be mono-laminar in the electron microscope.
- 49- Cancer cells do not often respond to the signals that normally regulate the growth of most cells.
- 50- Carotene is a pigment that is present in long-lived cells like neurons and cardiac muscles.

End of questions, With Best wishes!

Prof. Abo Bakr M. El-Tayeb & Dr. Ahmad U. M. Mahmoud



Answer the following questions in (8 pages)

Question 1:

(50 marks)

- **Choose the single response that is the correct answer of the following.**

1- Air frequency transmit to the receptor in snakes by

- a) Columella and quadrate
- b) Tympanium and quadrate
- c) inner ear

2- Which of the following is ectothermic

- a) Lizards
- b) Snakes
- c) All of the above

3- Amniota includes

- a) Fish and Amphibian
- b) Reptiles and Aves
- c) d) Reptiles, Aves and Mammals

4- Snakes swallow big prey because

- a) Its big mouth
- b) Have strong tongue
- c) Its streptostylic skull

5. Vertebrate group doesn't have a larval stage

- a) Amphibia

b) Amniotic

c) Fish

6. Head of amniotic vertebrate is carried off the ground

a) Tetrapod limbs

b) Trunk region

c) Cervical region

7. The method of respiration in lizard depend on

a) Intercostal muscle and ribs

b) Aspiration

c) Air sacs

8. Separation between the air way and food way passages allow by

a) The jaws

b) Tongue

c) Palate

9. Stem of reptiles

a) Archosauria

b) Cotylosauria

c) Archopterya

10. Reptiles live in aquatic habitat

a) Crocodiles and Lizards

b) Varanous and Crocodiles

c) Crocodiles, Sphenodon, Varenous

11. Which of the following move on inverted surfaces?

a) Skinks

b) Geckos

c) Chameleon

12. Head movements of amniotic vertebrates achieved by

- a) The cervical vertebrae
- b) The modified second cervical vertebra
- c) Modified centra of cervical vertebrae

13. Skull type is not pierced by temporal openings

- a) Diapsida
- b) Synapsida
- c) Anapsida

14. Terrestrial vertebrates face the force gravity by development of the

- a) Vertebral column
- b) Tetrapod limbs
- c) Cervical region

15. Which of the following has extraembryonic membranes?

- a) Mammals and birds
- b) Birds and Reptiles
- c) All of above

16. Chameleon is manipulated their prey by using its

- a) big mouth
- b) tongue
- c) strong teeth

17. The respiration in bird by

- a) Positive pressure pumping
- b) Aspiration
- c) Air sacs

18. Truncus arteriosus, with spiral valve associated with

- a) Birds and Reptiles
- b) Reptiles and Mammals

c) Amphibian

19. Which of the following is untrue in bird's skin

a) Feather

b) Scales

c) Sweat gland

20. Interventricular septum is incomplete in

a) All amniota

b) Some reptiles

c) Bird only

21. Water retention for reptiles have been done in

a) Copredaeum

b) Urodaeum

c) Intestine

22. Avian order feeds their young by milk secretion

a) Columbiformes

b) Passerformes

c) Charadriiform

23. The second avian exhalent air sacs are

a) Interclavicular and Abdominal

b) Thoracic and Cervical

c) Intreclavicular and anterior Thoracic

24. Synsacrum is

a) A fusion of trunk vertebrae

b) A fusion of sacral vertebrae with the pelvic girdles in birds

c) Constant structure of vertebrae

25. Air frequency transmit to the mechanoreceptor in amphibian by

a) columella

- b) Inner ear
- c) Hyomandibular

26. Jaws bear thecodont teeth in

- a) All reptiles
- b) Birds
- c) Mammals

27. Diaphragm exist in

- a) Birds and Reptiles
- b) Reptiles only
- c) Mammals

28. Terrestrial vertebrates face the dry environment by the development

- a) Exoskeletal structures
- b) Skin glands
- c) Keratinized skin

29. Which of the following is untrue in bird's skin?

- a) Thin, loose and dry
- b) Have only one gland
- c) Have homodont teeth

30. The only vertebrates that achieved complete separation of the respiratory and systemic circulation

- a) Amphibian
- b) Birds and Reptiles
- c) Birds and mammals

31. A structure function as bellow in birds

- a) The Lungs
- b) Air sacs
- c) Diaphragm

32. Paired aortic arches exist in

- a) Mammalian arterial system
- b) Avian arterial system
- c) Reptilian arterial system

33. Pulmonary artery in bird's heart emerges from

- a) Left ventricle
- b) Right ventricle
- c) Right auricle

34. Birds are part of the dinosaur radiation because.

- a) Similarities in hip, wrist, and wishbone
- b) Similarities in locomotion mode.
- c) Similarities in feeding habitat.

35. Amniotic urinary system is

- a) Pronephros
- b) Mesonephros
- c) Metanephros

36. Character not exist in flightless birds

- a) Long legs
- b) Reduced wing
- c) Developed sternal keel

37. Examples of flightless birds or ratites

- a) Parrot
- b) Migrating duck
- c) Ostrich

38. Diaphragmaticus exists in

- a) All terrestrial vertebrates
- b) All amniotic vertebrates

c) Crocodiles

39. Chordates define a mammal

a) Paired lungs

b) Metanephros

c) Hair and mammary glands

40. Mammalian jaw is composed of

a) Multiple bony components

b) Single bone

c) The same components of the Lizard's jaw

41. Mammalian teeth is

a) Epidermal

b) Dermal

c) Both (a and b)

42. Mammalian cervical vertebrae are

a) Acoelous

b) Heterocoelous

c) Procoelous

43. Egg laying mammals

a) Metatheria

b) Eutheria

c) Protheria

44. Mammalian aortic arteries emerges from

a) Left auricle

b) Right ventricle

c) Left ventricle

45. Communication of the embryo with the Eutheria mother is through

a) Oviduct

b) Uterus directly

c) Placenta

46. Mammalian embryo continue his development inside abdominal pouch

a) Spiny ant-eater

b) Kangaroo

c) Armadillo

47. Mammalian has a flattened bill

a) Wheal

b) Platypus

c) Pouched mouse

48. The jaw articulation in mammals

a) Quadrate and Articular

b) Dentary and Squamosal

c) Non of above

49. The female Blind worm snakes consist of.....

a) Right ovary and oviduct absent

b) Left ovary and oviduct

c) Left ovary and oviduct absent

50. Lingual skeleton arise from

a) Hyoid arch only

b) Mandibular arch with hyoid

c) Hyoid arch with the third branchial arch

"والله ولي التوفيق"

Dr Fatma A. Mahmoud - Dr. Dalia Elzahrara Farouk



Answer the following question

(Total 50 marks)

A- Select the single best answer for each of the following (30 marks)

1. Two hosts are required in

(a) *Plasmodium* spp.

(b) *Enterobius vermicularis*

(c) *Giardia* sp.

(d) *Trichomonas hominis*

2. Infective stage of *Heterophyes heterophyes* is encysted in

(a) Grasses

(b) Snails

(c) Sheep

(d) Fish

3. Amoebic meningitis is a disease can be caused by

(a) *Entamoeba histolytica*

(b) *Naegleria fowleria*

(c) *Entamoeba gingivalis*

(d) *Entamoeba coli*

4. All the following live in large intestine except

(a) *Giardia lamblia*

(b) *Entamoeba histolytica*

(c) *Enterobius vermicularis*

(d) *Balantidium coli*

5. Digestive tract is completely absent in

(a) Trematodes

(b) Cestodes

(c) Intestinal Nematodes

(d) Tissue Nematodes

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

(a) *Dipyllobothrium latum*

(b) *Dipylidium caninum*

(b) *Fasciola hepatica*

(d) *Clonorchis sinensis*

7. The infective form of the malaria parasite is

(a) Oocyst

(b) Sporozoites

(c) Tachyzoites

(d) Bradyzoites

8. Infection with *Trypanosoma cruzi* occurs by

(a) Contamination of wound with feces

(b) Blood transfusion

(c) Congenital transmission

(d) All the above

9. The infective stage of *Ancylostoma duodenale* is

(a) Rhabditoid larva

(b) Embryonated egg

(c) Filariform larva

(d) Microfilaria

10. Which of the following protozoans is transmitted by trophozoite

- (a) *Balantidium coli*
- (b) *Entamoeba histolytica*
- (c) *Giardia lamblia*
- (d) *Trichomonas vaginalis*

11. In malarial, gametogony is occurred in

- (a) Blood of human
- (b) Liver cells of human
- (c) Stomach of mosquitoes
- (d) Salivary glands of mosquitoes

12. Fleas are intermediate host of

- (a) *Dipylidium caninum*
- (b) *Diphylobothrium latum*
- (c) *Plasmodium falciparum*
- (d) *Trypanosoma cruzi*

13. The second intermediate host of *Diphylobothrium latum* is

- (a) Fish
- (b) Pigs
- (c) Cyclops
- (d) Snails

14. The vector host of Malaria is

- (a) Female of Anopheles
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- (c) Tse tse
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15. The diagnostic stage of *Schistosoma haematobium* is

- (a) Egg in urine
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- (c) Forked tail cercaria in water
- (d) metacercaria

16. In *Plasmodium* sp., all the following is correct except

- (a) Causes anemia
- (b) The sexual cycle starts in human
- (c) Human is the definitive host
- (d) Causes malaria disease

17. All the following parasites can be transmitted through raw meat except

- (a) *Echinococcus granulosus*
- (b) *Taenia saginata*
- (c) *Taenia solium*
- (d) *Clonorchis sinensis*

18. Amastigotes in *Leishmania* sp. are present in

- (a) Macrophages
- (b) RBCs
- (c) Plasma
- (d) Lymph nodes

19. The ootype in trematoda connect with

- (a) Oviduct
- (b) Vitelline canal
- (c) Uterus
- (d) all of the above

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

- (a) *Diphylobothrium latum*
- (b) *Taenia saginata*
- (c) *Fasciola hepatica*
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21. The commonest intestinal cestoda in Egypt is
- (a) *Taenia saginata* (b) *Hymenolepis nana*
(c) *Dipylidium caninum* (d) *Taenia solium*
22. Which of the following is viviparous?
- (a) *Diphyllbothrium latum* (b) *Echinococcus granulosus*
(c) *Wuchereria bancrofti* (d) *Schistosoma haematobium*
23. Sputum swab is used to diagnose
- (a) *Ascaris lumbricoides* (b) *Enterobius vermicularis*
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24. Urogenital flagellate is transmitted by
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25. *Giardia lamblia* trophozoite contains
- (a) One pairs of nuclei (b) Two pair of nuclei
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- (a) *Schistosoma mansoni* (b) *Entamoeba histolytica*
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27. What cestode has an operculated egg similar to the trematodes?
- (a) *Diphyllbothrium latum* (b) *Echinococcus granulosus*
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28. Which one of the following is a good general statement about the life cycle of digenetic trematodes?
- (a) A snail intermediate host is required
(b) The infective (metacercarial) stage always encysts on aquatic vegetation
(c) The adult fluke is always found in the small intestine of the definitive host.
(d) All life cycles contain redia stage
29. Which one of the following larval stages has not penetrating glands?
- (a) Ookinete (b) Miracidium
(c) Coracidium (d) Filariform larva

30. Which one of the following is a good general statement about the life cycle of cestodes?
- (a) A snail intermediate host is required.
 - (b) The infective larval stage must be ingested: either via the predator / prey interaction or due to accidental ingestion of the intermediate host.
 - (c) There is always an aquatic larval stage, such as the coracidium.
 - (d) Cestodes always require 3 hosts to complete their life cycles.

B- Mention which (True) or (False) of the following sentences (20 marks)

- 31. Infective stage of *Ascaris* sp is cysticercoid larvae ()
- 32. Oocyst is the zygote after the formation of the cyst wall ()
- 33. Metacercariae are encysted cercariae without tails ()
- 34. All cercariae may have both penetration and cystogenous glands ()
- 35. *Schistosoma haematobium* inhabits in the vesicular venous plexuses ()
- 36. *Balantidium coli* can reproduce asexually by budding ()
- 37. All protozoans are motile ()
- 38. Cattle infects with liver flukes by consumption of metacercaria with food ()
- 39. Costa is a cytoplasmic structure seen at the base of undulating membrane of intestinal flagellates ()
- 40. Zoonoses, are the diseases transmissible between animals ()
- 41. The diagnostic stage of *Schistosoma mansoni* is eggs in urine ()
- 42. The infective stage of *Clonorchis sinensis* is metacercaria ()
- 43. The infective stage of *Wuchereria bancrofti* is filariform larva ()
- 44. The habitat of *Trichomonas hominis* is small intestine ()
- 45. Fish are intermediate host of *Heterophyes heterophyes* ()
- 46. Eosinophilia is a blood diagnosis in parasitic diseases ()
- 47. Kinetoplast is conspicuous part of a mitochondrion in some flagellates ()
- 48. *Leishmania* sp is inhabit in macrophages of vertebrates ()
- 49. Metacyclic trypanosome is an infective stage of *Trypanosoma gambiense* ()
- 50. The vector host of *Trypanosoma cruzi* is winged bug ()

Good luck..... Prof. Dr. Gamal H. Abed
Dr. Sara S. Abdel-Hakeem



Answer the following question

(Total 50 marks)

A- Select the single best answer for each of the following (30 marks)

1. Two hosts are required in

(a) *Plasmodium* spp.

(b) *Enterobius vermicularis*

(c) *Giardia* sp.

(d) *Trichomonas hominis*

2. Infective stage of *Heterophyes heterophyes* is encysted in

(a) Grasses

(b) Snails

(c) Sheep

(d) Fish

3. Amoebic meningitis is a disease can be caused by

(a) *Entamoeba histolytica*

(b) *Naeglaria fowleria*

(c) *Entamoeba gingivalis*

(d) *Entamoeba coli*

4. All the following live in large intestine except

(a) *Giardia lamblia*

(b) *Entamoeba histolytica*

(c) *Enterobius vermicularis*

(d) *Balantidium coli*

5. Digestive tract is completely absent in

(a) Trematodes

(b) Cestodes

(c) Intestinal Nematodes

(d) Tissue Nematodes

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

(a) *Diphyllobothrium latum*

(b) *Dipylidium caninum*

(b) *Fasciola hepatica*

(d) *Clonorchis sinensis*

7. The infective form of the malaria parasite is

(a) Oocyst

(b) Sporozoites

(c) Tachyzoites

(d) Bradyzoites

8. Infection with *Trypanosoma cruzi* occurs by

(a) Contamination of wound with feces

(b) Blood transfusion

(c) Congenital transmission

(d) All the above

9. The infective stage of *Ancylostoma duodenale* is

(a) Rabdoid larva

(b) Embryonated egg

(c) Filariform larva

(d) Microfilaria

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Good luck..... Prof. Dr. Gamal H. Abed
Dr. Sara S. Abdel-Hakeem

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

June 2023

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 whichmany of the actions of hormones.

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

3- The immune system usesto 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- Filtration and sedimentation are used in:
- 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 afor 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?

- 1-
- 2-

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

- 1-
- 2-

(10 Marks)

- 1- Proliferative genes.
- 2- Hormone replacement.
- 3- Apoptosis and tissue transplantation.



I- Choose one option from the four choices (A, B, C, or D) and fill in the corresponding bubble completely. (35 marks, one mark for each)

- 1- The general chemical formula for carbohydrates is:
A) $C_n(H_2O)_n$ B) $C_n(H_2O)_{2n}$ C) $C_n(H_2O)_{n+1}$ D) $C_n(H_2O)_{2n+1}$
- 2- Which nucleic acid preferentially stains with pyronin, producing a red color?
A) DNA B) RNA
C) Both DNA and RNA D) Neither DNA nor RNA
- 3- The histochemical method used to detect cholesterol and its ester is:
A) Copper rubeanic acid method B) Schultz method
C) Calcium lipase method D) Acid hematin method
- 4- Which of the following methods is used to demonstrate antigens, antibodies, and antigen-antibody complexes in tissues and cells?
A) Autoradiography B) Histological methods
C) Immunohistochemical methods D) Enzyme labeling
- 5- Acid hematin is a histochemical method used for the demonstration of:
A) Cholesterol esters B) Phospholipids C) Triglycerides D) Plasmalogens
- 6- Which microscopy technique is used after staining with osmium tetroxide?
A) Confocal microscopy B) Light microscopy
C) Fluorescence microscopy D) Electron microscopy
- 7- What is the classification of "Eicosanoids" within the lipid categories?
A) Simple lipids B) Compound lipids
C) Derived lipids D) Miscellaneous Lipids
- 8- The structural unit of nucleic acids is:
A) Monosaccharides B) Nucleotides C) Fatty acids D) Amino acids

- 9- Which histochemical technique used for the detection of free amino groups in proteins?
- A) Ninhydrin-Schiff method B) Sagaguchi method
C) Mercury orange method D) Millon's reaction
- 10- What type of bond links monosaccharide subunits in a polysaccharide?
- A) Peptide bond B) Hydrogen bond
C) Ionic bond D) Glycosidic bond
- 11- What is the recommended type of sections to use in histochemical methods for lipids?
- A) Fixed sections B) Paraffin-embedded sections
C) Celloidin-embedded sections D) Fresh frozen sections
- 12- Which type of enzymes catalyze the rearrangement of chemical bonds within a molecule?
- A) Ligases B) Transferases C) Isomerases D) Hydrolases
- 13- What type of lipid plays a crucial role as a structural component in cell membranes?
- A) Triglycerides B) Phospholipids C) Steroids D) Sphingolipids
- 14- Which of the following staining reactions for proteins depends on their physical configuration rather than their chemical composition?
- A) Sagaguchi method B) Ninhydrin-Schiff method
C) Mercury orange method D) Trichrome stains
- 15- What are the monosaccharide units that compose sucrose?
- A) Glucose and fructose B) Glucose and galactose
C) Glucose and mannose D) Glucose and ribose
- 16- Which histochemical method used to demonstrate free fatty acids?
- A) Copper rubeanic acid method B) Acid hematin method
C) Schultz method D) Calcium lipase method
- 17- What enzyme is commonly used to illustrate lysosomes?
- A) Alkaline phosphatase B) Acid phosphatase
C) Dehydrogenase D) Esterase
- 18- Which microscopy technique is used to identify crystalline cholesterol and cholesterol esters?
- A) Polarizing microscopy B) Fluorescent microscopy
C) Transmission electron microscopy D) Scanning electron microscopy

- 19- Which method involves the simultaneous production and capture of primary reaction product (PRP) and final reaction product (FRP) in one incubating medium?
- A) Self-colored substrate B) Post-incubation coupling
C) Metal precipitation technique D) Simultaneous coupling
- 20- Two pentoses that play crucial roles in nucleic acids and energy molecules are:
- A) Glucose and ribose B) Deoxyribose and fructose
C) Ribose and deoxyribose D) Fructose and glucose
- 21- Which method involves the precipitation of colored PRP at the site of enzyme activity?
- A) Self-colored substrate B) Post-incubation coupling
C) Metal precipitation technique D) Simultaneous coupling
- 22- Which method is used to demonstrate triglycerides in histochemical methods for lipids?
- A) Copper rubeanic acid method B) Acid hematin method
C) Schultz method D) Calcium lipase method
- 23- Which fixation method provides better preservation of enzymatic activity and localization?
- A) Formalin fixation B) Cryostat fresh freezing
C) Paraffin embedding D) Freeze-drying
- 24- What cellular structures can be visualized using dehydrogenase and ATPase enzymes?
- A) Nuclei B) Golgi apparatus C) Mitochondria D) Lysosomes
- 25- Which staining method is specific for glycogen?
- A) Alcian Blue stain B) PAS stain
C) DPAS stain D) None of the above
- 26- The esters of fatty acids with alcohol groups are commonly known as:
- A) Triglycerides B) Phospholipids C) Steroids D) Carotenoids
- 27- Which of the following is a pyrimidine base?
- A) Adenine B) Cytosine C) Guanine D) Inosine
- 28- The primary purpose of using fluorescence microscopy for lipid staining is to examine:
- A) Phospholipids B) Triglycerides C) Waxes D) Fluorescent lipids
- 29- What is the substrate used to visualize peroxidase activity in immunoenzyme staining?
- A) Hematoxylin B) Alcian Blue C) Eosin D) Diaminobenzidine (DAB)

30- What color does the PAS stain produce in areas where carbohydrates are present?

- A) Blue B) Magenta C) Yellow D) Green

31- Which of the following is NOT an example of a simple protein?

- A) Albumin B) Fibrin C) Glycoproteins D) Reticulin

32- Which radioactive nucleotide is used to detect DNA specifically at autoradiography?

- A) Tritiated guanine B) Tritiated cytosine
C) Tritiated thymidine D) Tritiated uracil

33- When osmium tetroxide is reduced by unsaturated fatty acids and their esters, it turns into a:

- A) White oxide B) Yellow oxide C) Black oxide D) Red oxide

34- Which histochemical method is specifically used to demonstrate DNA?

- A) Feulgen method B) Basophilia
C) Acridine red method D) Methyl Green Pyronin method

35- Which of the following is a function of carbohydrates?

- A) Energy storage B) DNA and RNA synthesis
C) Cell-cell recognition D) All of the above

(DO NOT forget the remaining questions on page 5 & 6!)

II- Shade the letter (T) if the statement is true, and shade the letter (F) if the statement is false on your bubble sheet. (15 marks, one mark for each)

- 36- Peptide bonds are the type of bond that links monosaccharide subunits in a disaccharide.
- 37- The staining reactions for proteins or protein-containing substances depend on their amino acid composition.
- 38- Formaldehyde is the best routine fixative for lipid histochemical methods.
- 39- The Sagaguchi method is a histochemical technique used for the detection of tyrosine in proteins.
- 40- Glycogen is a homopolysaccharide composed of only one type of monosaccharide subunit.
- 41- In Immunohistochemical methods, most of disadvantages of fluorochrome have been overcome by using of enzyme-labeling of the antibodies especially with the horseradish peroxidase.
- 42- Histochemical demonstration of proteins is possible only in fresh tissue due to their high sensitivity.
- 43- Cerebrosides are a type of glycolipids that consist of a fatty acid linked to sphingosine and a single carbohydrate residue.
- 44- A nucleotide is an organic molecule formed of a nitrogenous base, a six carbon-sugar, and a phosphate group.
- 45- Alcian Blue stain is a histochemical method used to detect acidic polysaccharides in tissue samples.
- 46- Sudan Black B is an appropriate histochemical method for the demonstration of phospholipids.

47- In the Malachite green and Acridine red histochemical method, DNA is stained red, and RNA is stained green.

48- Proteins are involved in the synthesis of hormones, such as testosterone and estrogen.

49- Metachromasia is the phenomenon where certain dyes or stains exhibit a color change or shift when they bind to specific tissue components.

50- Verbascose is an example of an oligosaccharide that contains 3 monosaccharide units.

END OF QUESTIONS, WITH BEST WISHES!

Prof. Hanim S. Abdel-Tawab & Dr. Ahmad U. M. Mahmoud



Assiut University

Faculty of Science

Zoology and Entomology Department

Course: Genetic Engineering

Course code: (314Z)

Time: Three hours



Final exam (May, 2023)

Answer the following questions

I: Choose the best correct answer from a, b, c and d (25 marks)

- 1- Production of Human Apolipoprotein (ApoB100) and (ApoB40) in liver and intestine, respectively is an example of.....RNA editing
a- C to U b- U to C c- A to I d- I to A
- 2- Tissue specific..... introduces inframe stop codon giving truncated ApoB48 by ApoB mRNA editing in intestine.
a- Cytidyl deamination b- Cytidyl phosphatase
c- Uridine deaminase d- Uridine phosphatase
- 3- In RNA folding and by the translation machinery, inosine largely behaves like
a- Adenine b- Cytosine c- Thymine d- Guanosine
- 4- A-to-I RNA editing sites are abundantly occur in.....
a- 3'-UTRs of mRNA b- Exonic regions
c- 3'-UTRs of mRNA and intronic regions d- All answers are incorrect.
- 5- ADARs are Adenosine deaminases that acting oncatalyzing A to I transition
a- dsDNA b- ssDNA c- dsRNA d- ssRNA
- 6- CRISPR-Cas system class 2 type II is called.....
a- CRISPR Cas 9 b- CRISPR Cas3 c- CRISPR Cas 10 d- CRISPR Cas7
- 7- In modified CRISPR Cas9 system used in gene editing, crRNA and tracrRNA can be combined into
a- PAM sequence b- Single tracrRNA c- Single crRNA d- sgRNA
- 8- The presence of asequence in CRISPR cas9 prevents the systems from attacking its own CRISPR locus.
a- tracrRNA b- crRNA c- PAM d- sgRNA

9- In gene knock out, Since the implanted blastocyst contains two different types of ES cell, the resulting offspring

- a- Will be chimeric
- b- Will be not chimeric
- c- Will contain original gene
- d- All answers are incorrect

10- Cas is CRISPR-associated

- a- Polymerase
- b- Ligase
- c- Exonuclease
- d- Endonuclease

11- The efficiency of homologous recombination is when there are base pair differences between the donor and recipient DNA.

- a- Increased
- b- Stable
- c- Abundant
- d- Decreased

12- Clustered regularly interspaced short palindromic repeats (CRISPR) is found exclusively in.....

- a- Eukaryotes
- b- Prokaryotes
- c- Only bacteria
- d- Only archaea

13- The DNA used to construct the targeting vector is preferable to originate from as the ES cells in gene knock out.

- a- The same mouse genus
- b- The same mouse strain
- c- Another mouse strain
- d- Another mouse genus

14- The herpes simplex virus thymidine kinase gene (HSVtk) when expressed in ES cells will ES cells expressing this gene in the presence of gancyclovir.

- a- Improve
- b- Kill
- c- Enhance
- d- All answers are incorrect

15- Pre-RNA processing to be mature mRNA includes, capping, poly A tail, splicing and.....

- a- RNA polymerization
- b- RNA fragmentation
- c- RNA editing
- d- RNA migration

16- Base modification RNA editing depends on..... Enzyme

- a- Deaminase
- b- Deoxyginase
- c- Decarboxylase
- d- Dephosphorylase

a- Knockout Animal Generation **b- Knock-in Animal Generation**

c- Gene Activation / Repression **d- All answers are correct**

a- 5'-GGN-3' **b- 5'-NGG-3'** **c- 5'-GNG-3'** **d- 5'-NNGRR(N)-3'**

a- 3-6 b- 4-5 c- 1-3 d- 6-8

a- 3-15 b- 3-5 c- 3-4 d- 15-20

a- Polyadenylation **b- Capping** **c- Splicing** **d- Translation**

a- Neomycin phosphatase gene **b- Neomycin phosphotransferase gene**

23- RNA editing takes place in

24- When homologous recombination occurs, the negative selection marker should.....

c- Inhibit the genome **d- Not insert into the genome**

a- CRISPR Cas 9 b- CRISPR Cas3 c- CRISPR Cas 10 d- CRISPR Cas7

II: Answer 5 only of the following (10 marks)

- 1- Draw a diagram of a plasmid DNA showing and explaining its main components
- 2- Explain with drawing the main steps of RNA interference
- 3- Write notes on structure and how ZFNs generate knockout cells
- 4- Differences between insertion and replacement lambda phage vector
- 5- Compare between siRNA and miRNA
- 6- Methods of introducing DNA clones into the target cells

III: Define 10 only of the following terms (10 marks)

- 1- Gene knock down
- 2- Operon (give example)
- 3- Heat shock for gene delivery
- 4- Homologous recombination
- 5- Restriction nomenclature
- 6- Transcription activator-like effector nucleases
- 7- Sticky and blunt end cutters
- 8- List 3 applications of TALENs
- 9- Expression and cloning vectors
- 10- Chimeric organism
- 11- Palindromic sequence

IV: Mark (T) for true sentences and (F) for false (Correct FALSE) (5 marks)

- 1- Ligation of blunt end cuts by DNA ligase is easier than sticky end cuts ()
- 2- 5' GTTAAC 3' is considered as mirror like restriction sequence ()
- 3- Phosphodiester bonds link nucleotides between the two DNA strands ()
- 4- On target cleavage is a characteristic of ZFNs ()
- 5- Site specific nucleases used in knockout production are artificial restriction enzymes ()

End of questions.....

Good luck



Assiut University
Faculty of Science
Zoology and Entomology Department

Course: Genetic Engineering
Course code: (314Z)
Time: Three hours



Final exam (May, 2023)

Answer the following questions

I: Choose the best correct answer from a, b, c and d (25 marks)

- 1- Production of Human Apolipoprotein (ApoB100) and (ApoB40) in liver and intestine, respectively is an example of.....RNA editing
a- C to U b- U to C c- A to I d- I to A
- 2- Tissue specific..... introduces inframe stop codon giving truncated ApoB48 by ApoB mRNA editing in intestine.
a- Cytidyl deamination b- Cytidyl phosphatase
c- Uridine deaminase d- Uridine phosphatase
- 3- In RNA folding and by the translation machinery, inosine largely behaves like
a- Adenine b- Cytosine c- Thymine d- Guanosine
- 4- A-to-I RNA editing sites are abundantly occur in.....
a- 3'-UTRs of mRNA b- Exonic regions
c- 3'-UTRs of mRNA and intronic regions d- All answers are incorrect.
- 5- ADARs are Adenosine deaminases that acting oncatalyzing A to I transition
a- dsDNA b- ssDNA c- dsRNA d- ssRNA
- 6- CRISPR-Cas system class 2 type II is called.....
a- CRISPR Cas 9 b- CRISPR Cas3 c- CRISPR Cas 10 d- CRISPR Cas7
- 7- In modified CRISPR Cas9 system used in gene editing, crRNA and tracrRNA can be combined into
a- PAM sequence b- Single tracrRNA c- Single crRNA d- sgRNA
- 8- The presence of asequence in CRISPR cas9 prevents the systems from attacking its own CRISPR locus.
a- tracrRNA b- crRNA c- PAM d- sgRNA

9- In gene knock out, Since the implanted blastocyst contains two different types of ES cell, the resulting offspring

a- Will be chimeric

b- Will be not chimeric

c- Will contain original gene

d- All answers are incorrect

10- Cas is CRISPR-associated

a- Polymerase

b- Ligase

c- Exonuclease

d- Endonuclease

11- The efficiency of homologous recombination is when there are base pair differences between the donor and recipient DNA.

a- Increased

b- Stable

c- Abundant

d- Decreased

12- Clustered regularly interspaced short palindromic repeats (CRISPR) is found exclusively in.....

a- Eukaryotes

b- Prokaryotes

c- Only bacteria

d- Only archaea

13- The DNA used to construct the targeting vector is preferable to originate from as the ES cells in gene knock out.

a- The same mouse genus

b- The same mouse strain

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d- All answers are correct

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a- 3-6 b- 4-5 c- 1-3 d- 6-8

a- 3-15 b- 3-5 c- 3-4 d- 15-20

a- Polyadenylation **b- Capping** **c- Splicing** **d- Translation**

a- Neomycin phosphatase gene **b- Neomycin phosphotransferase gene**
c- Neomycin sulfotransferase gene **d- Neomycin sulfatase gene**

a- Nucleus b- Cytosol c- Mitochondria d- All answers are correct

a- Insert into the genome

b- Cloned inside the genome

c- Inhibit the genome

d- Not insert into the genome

a- CRISPR Cas 9 b- CRISPR Cas3 c- CRISPR Cas 10 d- CRISPR Cas7

II: Answer 5 only of the following (10 marks)

- 1- Draw a diagram of a plasmid DNA showing and explaining its main components
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- 7- Sticky and blunt end cutters
- 8- List 3 applications of TALENs
- 9- Expression and cloning vectors
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IV: Mark (T) for true sentences and (F) for false (Correct FALSE) (5 marks)

- 1- Ligation of blunt end cuts by DNA ligase is easier than sticky end cuts ()
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- 3- Phosphodiester bonds link nucleotides between the two DNA strands ()
- 4- On target cleavage is a characteristic of ZFNs ()
- 5- Site specific nucleases used in knockout production are artificial restriction enzymes ()

End of questions.....

Good luck



Answer the following question

(Total 50 marks)

A- Select the single best answer for each of the following (30 marks)

1. *Lymnaea truncatula* is an intermediate host of
 - (a) *Schistosoma haematobium*
 - (b) *Fasciola gigantica*
 - (c) *Schistosoma mansoni*
 - (d) *Fasciola hepatica*
2. Each of the following statements concerning *Ascaris lumbricoides* is correct except
 - (a) It is one of the largest nematode
 - (b) It can cause pneumonia
 - (c) Both dogs and cats are intermediate hosts of it
 - (d) transmitted by embryonated eggs
3. All the following protozoa live in the intestine except
 - (a) *Trichomonas hominis*
 - (b) *Plasmodium* spp
 - (c) *Entamoeba coli*
 - (d) *Balantidium coli*
4. Infective stage of *Heterophyes heterophyes* is encysted in
 - (a) Grasses
 - (b) Snails
 - (c) Sheep
 - (d) Fish
5. The infective stage of *Giardia lamblia* is
 - (a) Binucleated cyst
 - (b) Quadrinucleated cyst
 - (c) Octanucleated cyst
 - (d) Trophozoite
6. Presence of ingested RBCs is characteristics of
 - (a) *Entamoeba ginigivalis*
 - (b) *Entamoeba coli*
 - (c) *Entamoeba histolytica*
 - (d) *Iodamoeba butcheli*
7. Hookworm infection leads to deficiency of
 - (a) Vitamin B12
 - (b) Vitamin A
 - (c) Iron
 - (d) Folic acid
8. The diagnostic stage of *Schistosoma haematobium* is
 - (a) Egg in blood
 - (b) Egg in faeces
 - (c) Egg in urine
 - (d) Cercariae in water
9. The larval form of *Taenia solium* is called
 - (a) Cysticercous cellulosae
 - (b) Cysticercous bovis
 - (c) Cysticercoid
 - (d) Hydatid cyst

10. Definitive host is one

- (a) In which sexual multiplication takes place and harbors adult form
- (b) In which asexual multiplication takes place and harbors adult form
- (c) In which sexual multiplication takes place and harbors larval form
- (d) In which asexual multiplication takes place and harbors larval form

11. Two hosts are required to complete life cycle of

- (a) *Plasmodium falciparum*
- (b) *Enterobius vermicularis*
- (c) *Giardia lamblia*
- (d) *Trichomonas vaginalis*

12. The following are zoonotic diseases except

- (a) Taeniasis
- (b) Leishmiasis
- (c) Enterobiasis
- (d) Fasciolosis

13. In malarial, gametogony is occurred in

- (a) Blood of human
- (b) Liver cells of human
- (c) Stomach of mosquitoes
- (d) Salivary glands of mosquitoes

14. All of the following statements are true regarding the parasite helminths, except?

- (a) It includes intestinal worms, hookworms, and round worms
- (b) They are found only in human's intestines
- (c) Present in soil and can spread to humans through the ingestion
- (d) Common in tropical parts of the world that lack good sanitary practices

15. Which of the following parasite is transmitted to humans through ingestion uncooked meat?

- (a) *Dipylidium caninum*
- (b) *Fasciola gigantica*
- (c) *Echinococcus granulosus*
- (d) *Schistosoma mansoni*

16. Fleas are intermediate host of

- (a) *Dipylidium caninum*
- (b) *Diphyllobothrium latum*
- (c) *Plasmodium falciparum*
- (d) *Trypanosoma cruzi*

17. Embryonated egg is an infective stage of

- (a) *Ascaris lumbricoides*
- (b) *Hymenolepis nana*
- (c) *Ancylostoma duodenale*
- (d) *Hymenolepis diminuta*

18. The commonest intestinal cestoda in Egypt is

- (a) *Taenia saginata*
- (b) *Hymenolepis nana*
- (c) *Dipylidium caninum*
- (d) *Taenia solium*

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

- (a) *Diphyllobothrium latum*
- (b) *Taenia saginata*
- (c) *Fasciola hepatica*
- (d) *Echinococcus granulosus*

20. Which of the following is viviparous?

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

21. The infective form of the malaria parasite is

- (a) Oocyst
- (b) Sporozoites
- (c) Bradyzoites
- (d) Tachyzoites

22. All the following parasites lead to bloody diarrhea except

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

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

- (a) a flea that contains the larval tapeworm
- (b) the tapeworm egg from dog feces
- (c) the tapeworm cysticercus from raw beef
- (d) the tapeworm egg from human feces

24. Nematodes are differentiated from other worms by the following except

- (a) Absent fragmentation
- (b) cylindrical body
- (c) Flat or flashy leaf-like worm
- (d) separate sexes

25. Which one of the following larval stages has not penetrating glands?

- (a) Ookinete
- (b) Miracidium
- (c) Coracidium
- (d) Filariform larva

26. Humans become infected with the adult tapeworm of *Taenia saginata* by

- (a) Ingesting tapeworm eggs from cattle feces
- (b) Ingesting tapeworm cysticercus from raw beef
- (c) Ingesting tapeworm eggs from dog feces
- (d) Ingesting tapeworm eggs from human feces

27. The vector host of *Leishmania* sp. is

- (a) Sand fly
- (b) Winged bug
- (c) tse tse fly
- (d) female of *Anopheles* sp

28. The infective stage of *Ancylostoma duodenale* is

- (a) Rhabdoid larva
- (b) Embryonated egg
- (c) Filariform larva
- (d) Fertilized egg

29. *Biomphalaria alexandina* is an intermediate host of

- (a) *Schistosoma mansoni*
- (b) *Schistosoma haematobium*
- (c) *Fasciola hepatica*
- (d) *Fasciola gigantica*

30. The infective stage of *Diphyllbothrium latum* is

- (a) preceroid larva (b) plerocercoid larva
(c) leptocercous cercaria (d) lophocercous cercaria

B- Mention which (True) or (False) of the following sentences (20 marks)

31. *Giardia lamblia* multiplies by longitudinal binary fission ()
32. *Trichomonas vaginalis* has four anterior flagella and one posterior flagellum ()
33. Metacercariae are encysted cercariae without tails ()
34. *Balantidium coli* causes ulceration of the mucosa of large intestine ()
35. Redia stage is absent in *Schistosoma* sp ()
36. Zoonoses, are the diseases transmissible between animals ()
37. *Plasmodium falciparum* is more dangerous to man than *P.vivax* ()
38. Infective stage of *Trichomonas hominis* is trophozoite ()
39. Parasites is an organism which live at the expense of another ()
40. Chagas disease is caused by *Trypanosoma rhodesiense* ()
41. The infective stage of *Heterophyes heterophyes* is lophocercous cercaria ()
42. *Plasmodium* sp. can be diagnosed through thin blood film ()
43. Parasites which are to a given host, but in abnormal situation are obligatory parasites ()
44. *Schistosoma haematobium* inhabits in the vesicular venous plexuses ()
45. The diagnostic stage of *Fasciola gigantica* is eggs in feces of infected animals ()
46. Infective stage of *Clonorchis sinensis* is metacercaria ()
47. Facultative parasites are those that attack or establish themselves in unusual hosts ()
48. Coracidium is a larval stage of *Diphyllbothrium latum* ()
49. Eosinophilia is a common diagnosis of parasitic disease ()
50. Trematodes possess a well-developed complete digestive system ()

Good luck..... Prof. Dr., Gamal H. Abed
Dr. Sara S. Abdel-Hakeem



الامتحان في 6 صفحات

Answer the following questions:

(50 marks)

I- Choose the correct answer and also write its letter in the answers table below:

(30 marks)

1-.... is a form of competition in which individuals of different species compete for the same resources.

- | | |
|------------------------------|------------------------------|
| A) Intraspecific competition | B) Exploitative |
| C) Apparent | D) Interspecific competition |

2-When members of a population move out of a given area, it is called.....

- | | |
|-----------------|----------------|
| A) survivorship | B) emigration |
| C) mortality | D) immigration |

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

- | | |
|----------------------------|------------------|
| A) Population distribution | B) Age structure |
| C) Sex ratios | D) Fecundity |

4-.... is one of most important population attributes

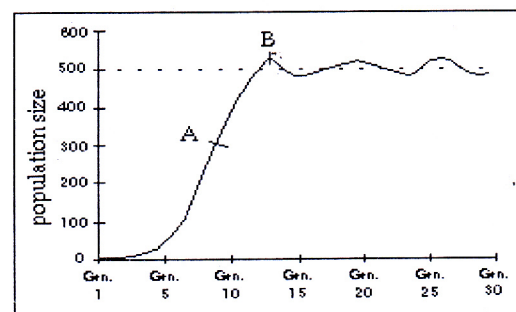
- | | |
|------------------|--------------------|
| A) Fertility | B) Sex ratios |
| C) Age structure | D) Population size |

5-..... are important aspects of life histories.

- | | |
|--|----------------------------------|
| A) Environmental resistance and Biotic potential | B) Lifespan and Biotic potential |
| C) Mortality and Immigration | D) Both A and B |

6-What is the carrying capacity of the population shown?

- A) around 500
B) more than 500
C) around 600
D) less than 500



7-.... is a group of organisms born at the same time.

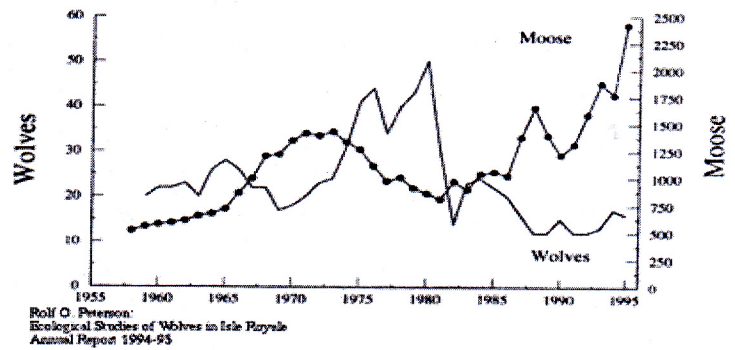
- | | |
|---------------|----------------------|
| A) Population | B) biome |
| C) Cohort | D) None of the above |

8- Species exist under strong competition and are pushed to use available resources more efficiently

- | | |
|------------------------|-----------------------|
| A) r-Selected | B) K-Selected species |
| C) Short-lived species | D) Large species |

9- What happened to the wolf population between 1980 and 1982?

- A) it increased rapidly
- B) it decreased rapidly
- C) stabilize
- D) none of the above



10- is chemical inhibition of plant seeding of the same species

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

11- is a group of spatially separated subpopulations connected by active exchanges of individuals among subpopulations.

- A) Intrapopulation
- B) Postpopulation
- C) Metapopulation
- D) None of the above

12- Which distribution pattern does territoriality produce?

- A) Random
- B) Uniform
- C) Clumped
- D) None of the above

13- ecology deals with the array of ecosystems and their arrangement in a geographic region.

- A) Population
- B) Ecosystem
- C) Landscape
- D) Both A and B

14- The relationship between a fungus and an algae is termed

- A) Obligate mutualism
- B) Facultative Mutualism
- C) lichen
- D) Symbiosis

15- means a community plus the nonliving factors with which it interacts.

- A) Population
- B) Ecosystem
- C) Landscape
- D) Both A and B

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

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

17- The growth rate of a population slows as intraspecific competition becomes more

- A) intense
- B) poor
- C) weak
- D) None of the above

18- is a relationship between two organisms where one is destroyed while the other is unaffected.

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

19- is a type of commensalism where one of the species uses the body of the other organisms as a living.

- A) Phoresy
- B) Metabiosis
- C) Inquilinism
- D) None of the above

1- What type of survivorship curve do humans have?

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

21- The statistical study of populations is called

- A) density
- B) dispersion
- C) demography
- D) fecundity

22- The age distribution of a population reflects its

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

23-is an antagonistic association between an organism and the metabolic substances produced by another.

- A) Antibiosis
- B) Mutualism
- C) Commensalism
- D) None of the above

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

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

25- One of the following is Not related to the others

- A) Predators
- B) Prey
- C) Pathogens
- D) Parasites

26- 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

27-is a form of ecological competition reduces survival chances of competing species.

- A) scramble
- B) Exploitative
- C) contest
- D) interspecific competition

28- Which of the following words means death rate?

- A) Immigration
- B) Emigration
- C) Mortality
- D) Natality

29- All factors which limit the growth of populations.

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

30- are good examples of metabiosis relationship.

- A) Scarab beetles
- B) Hermit crabs
- C) Soil aematodes
- D) all of the above

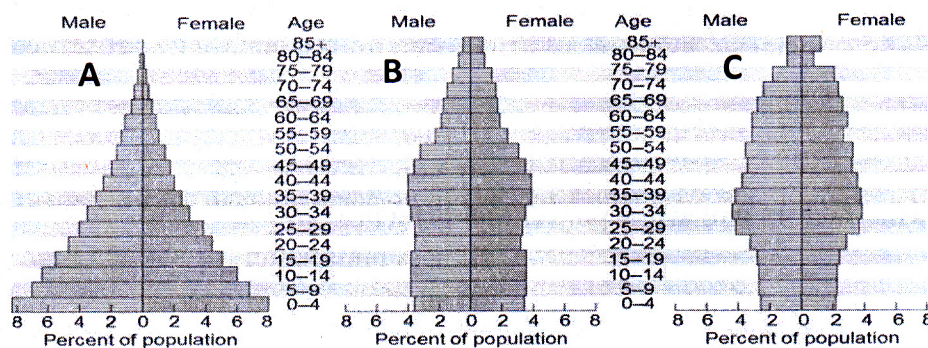
Answers table

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer															
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer															

II- Answer ONLY FIVE questions of the following:

(20 marks)

1. The following graphs show Age Structure in different Human populations. Complete the following sentences.



- a) Population is slow growth e.g.
- b) Population is rapid growth e.g.
- a) Population is decrease e.g.
- b) Generally, in aging populations the ratio of young to adult is approximately

2. 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?

.....

.....

.....

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

.....

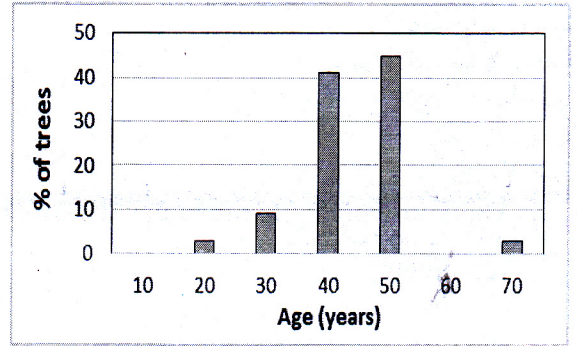
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4. This graph shows the age distribution of a population of Rio Grande cottonwoods, Explain what this figure can tell us about this population



- 5- Mention how to estimate patterns of survival within a population.

6- 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
4	Indonesia	206	1.7
5	Brazil	172	1.5
6	Pakistan	145	2.8
7	Russia	144	-0.7
8	Bangladesh	134	2.0
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

أنتهت الأسئلة مع خالص التمنيات بالتوفيق ،،،،،،،،،،
أ.د. خالد فؤاد عبد الوكيل
H. F. Wakeel