هدية مجانية

Guiding Exams

of The Ministry of Education 2025

BIOLOGY

By A Group Of Supervisors



EL-MOASSER

3rd SEC.

Exam 1

Answered

Questions signed by ✻ are answered in detail.

First Choose the correct answer 1 : 32 — 1 Mark

1 What is the type of support that protects the aerial parts of the herbaceous plant from drought ?

(a) Deposition of cellulose in the plant stem cell walls.
(b) Deposition of lignin in the cell walls of the plant leaves.
(c) Deposition of suberin in the leaf epidermis only.
(d) Deposition of cutin in the plant stem epidermis.

2 Which of the following skeleton structures are directly connected to the vertebral column ?

(a) Skull and upper limbs.
(b) Thoracic cage and skull.
(c) Upper and lower limbs.
(d) Upper limbs and pectoral girdle.

3 Which of the following is **not** from the roles of the skeleton in movement ?

(a) Supporting the moving limbs.
(b) Acting as the attachment site of muscles.
(c) Acting as the attachment sites for ligaments and tendons.
(d) Moving bones when muscles contract.

4 Which of the following proteins form(s) the dark bands of the myofibrils ?

(a) Myosin only.
(b) Actin only.
(c) Myosin and actin.
(d) Myosin, actin and Z-lines.

5 Which of the following substances is **not** secreted by mucus membrane lining the duodenum ?

(a) Digested food.
(b) Hormones.
(c) Digestive enzymes.
(d) Mucus.

6 Which of the following is **not** from the effects of LH on the human female's ovary ?

(a) Ovulation.
(b) Conversion of Graafian follicle into corpus luteum.
(c) Release of mature ovum into the fallopian tube.
(d) Ovum maturation.

7 * What is the type of hormonal disturbance illustrated in the provided figure ?



(a) Simple goiter.
(b) Exophthalmic goiter.
(c) Atrophy of thyroid gland.
(d) Hyperthyroidism.

8 Which of the following is **not** a reason for the low reproductive capacity in human ?

(a) Because of being long-aged and large-sized organism.
(b) Because of being unisexual and warm-blooded mammal.
(c) Because of being able to provide his progeny with care and protection.
(d) Because of being free living and complex organism.

9 What is the structure that is formed when a cell surrounds itself by a chitinous coat and divides within this coat many times by mitosis ?

(a) Sporangium. (b) Sori. (c) Cyst. (d) Zygospore.

10 Why is the change in water purity considered a threat to the life of *Spirogyra* ?

(a) Because it is an autotrophic.
(b) Because it is a filamentous alga.
(c) Because it is a multicellular alga.
(d) Because it is a freshwater alga.

11 Which of the following is applied to asexual reproduction of *Plasmodium* inside the human red blood cells ?

(a) It starts and ends by gametocytes.
(b) It starts and ends by merozoites.
(c) It starts by sporozoites and ends by merozoites.
(d) It starts by merozoites and ends by gametocytes.

12 Which of the following best describes the two terms "androecium and stamens" in the flower structure respectively ?

(a) They are synonymous terms.
(b) They are two floral whorls.
(c) A whorl and its leaflets.
(d) Leaflets and their whorl.

13 How many and what is the type of cells produced from each primary spermatocyte when it divides by meiosis ?

(a) Two secondary spermatocytes.
(b) Four spermatids.
(c) Four sperms.
(d) Four secondary spermatocytes.

14 Which of the following is/are responsible for tyloses formation ?

(a) Xylem vessels.
(b) Pits.
(c) Xylem parenchyma.
(d) Xylem vessels and tracheids.

15 Which of the following white blood cells are **not** classified as granulocytes ?

(a) Basophils.
(b) Mast cells.
(c) B-cells.
(d) Neutrophils.

16 Which of the following are **not** involved in the 2nd line of defense in human ?

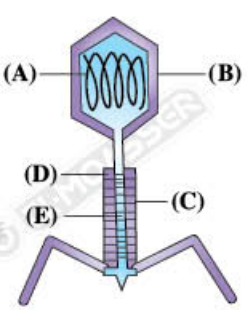
(a) T-lymphocytes and plasma cells.
(b) Interferons and mast cells.
(c) Neutrophils and natural killer cells.
(d) Monocytes and macrophages.

17 Which of the following represent(s) the immune mechanism of macrophages against pathogens ?

(a) Secreting enzymes to attack the infected cells and destroy them.
(b) Attacking the infected cells and engulfing them.
(c) Phagocytizing pathogens and forming antibodies against them.
(d) Engulfing pathogens and presenting their antigens to the specific immune cells.

18 All of the lettered parts in the provided figure represent the protein coat of the virus, **except** the lettered part .....

(a) (A).
(b) (B).
(c) (C).
(d) (D).

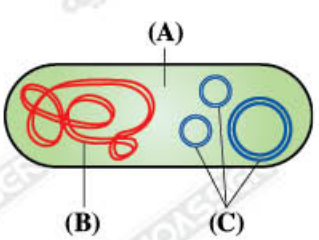


19 ✳ What is the diameter (width) of each rung in the DNA molecule ?

(a) Two nucleotides.
(b) Two or three hydrogen bonds.
(c) Three nitrogenous bases.
(d) Three carbon rings.

20 The opposite figure represents a bacterial cell and its genetic material. Which of the lettered parts (A), (B) and (C) represent(s) the genome of the cell ?

(a) (A) only.
(b) (B) only.
(c) (B) and (C).
(d) (A), (B) and (C).



21 Which of the following are regulatory proteins ?

(a) DNA replication proteins.
(b) Connective tissue proteins.
(c) Protective coverings proteins.
(d) Histone proteins.

22 What is the triplet sequence of nucleotides that follows the promoter on the DNA template strand ?

(a) ATG
(b) TAC
(c) ATC
(d) There is no specific sequence.

23 ✳ If a cell contains 4 homologous pairs of chromosomes, how many DNA molecules that constitute these chromosomes will be replicated before cell division ?

(a) 4 DNA molecules.
(b) 8 DNA molecules.
(c) Selected segments of 4 DNA molecules.
(d) Selected segments of 8 DNA molecules.

24 What is the branch of geology which has **no** role in the metro (subway) project ?

(a) Physical geology.
(b) Engineering geology.
(c) Geophysics.
(d) Stratigraphy.

25 What is the average thickness of the solid rocky part which is above the asthenosphere in the mantle zone ?

(a) 30 km
(b) 70 km
(c) 100 km
(d) 170 km

26 Study the following two figures :



Figure (1)



Figure (2)

Which of the following statements is correct ?

(a) Both are tectonic geological structures produced by the effect of environmental conditions.
(b) Both are primary geological structures produced by the effect of internal environmental factors.
(c) (1) is produced by the effect of internal factors and (2) is produced by the effect of external factors.
(d) (1) is a primary geological structure and (2) is a secondary geological structure.

27 What is the carbonate mineral which is **not** scratched by the human fingernail and it is the base of building and construction processes ?

(a) Calcite. (b) Barite. (c) Malachite. (d) Hematite.

28 Which of the following best describes the sugar crystals ?

(a) They are considered a mineral, because they have a definite crystal shape.

(b) They are considered a mineral, because they have a definite chemical composition.

(c) They are not considered a mineral, because they are manufactured.

(d) They are not considered a mineral, because they are solid.

29 (X) and (Y) are two minerals of glassy luster, the first is scratched by a copper coin and the second scratches the porcelain streak plate. What are the two minerals respectively ?

(a) (X) Quartz / (Y) Calcite. (b) (X) Calcite / (Y) Quartz.

(c) (X) Quartz / (Y) Fluorite. (d) (X) Calcite / (Y) Apatite.

30 ✳ If we have three minerals, (X) is a sulphide mineral of black streak, (Y) is a carbonate mineral and (Z) is oxide of red streak, their colours are ..... respectively.

(a) (X) gold / (Y) green / (Z) red (b) (X) yellow / (Y) red / (Z) white

(c) (X) gold / (Y) white / (Z) lemon (d) (X) black / (Y) white / (Z) red

31 To get an igneous rock from a sedimentary rock, ... must take place.

(a) weathering, then deposition (b) pressure, then temperature

(c) melting, then crystallization (d) cooling, then solidification

32 If you found a group of different igneous rocks of the same colour, which of the following is considered a similarity between them ?

(a) The size of crystals. (b) The place of crystallization.

(c) The mineral composition. (d) The type of texture.

Second Choose the correct answer 33 : 44 — 2 Marks

33 ✳ Which of the following is/are needed for the transverse links of myosin to pull actin filaments towards each other during muscle contraction ?

(a) Calcium ions only. (b) ATP only.

(c) Calcium ions and ATP (d) Calcium ions, ATP and phosphate.

34 If the normal calcium level in the blood ranges between 8.6 to 10.3 mg/dL, which of the following calcium levels leads to increasing the secretion of parathormone hormone ?

(a) 7.3 mg/dL (b) 8.9 mg/dL (c) 9.3 mg/dL (d) 11.2 mg/dL

35 How many swellings (spore mother cells) will be connected to the ovary wall at the beginning of ovule formation ?

(a) One. (b) Four. (c) One or two. (d) One or many.

36 What are the hormones that regulate the activity of uterus in the human female menstrual cycle ?

(a) Ovarian hormones.
(b) Pituitary gland hormones.
(c) Hormones of the ovary and pituitary gland.
(d) Pituitary gland and uterine hormones.

37 What is the mechanism of action of surgical sterilization as a contraceptive method for females ?

(a) It prevents ovulation. (b) It stops the menstrual cycle.
(c) It prevents fertilization. (d) It prevents the blastocyst implantation.

38 Which of the following has/have the same structure of the receptors found in the membrane of B-cells ?

(a) MHC protein of B-cells.
(b) Antibodies that are produced by plasma B-cells.
(c) B-cells antigens.
(d) Lysosomal enzymes of B-cells.

39 Which of the following is **not** a common feature between macrophages and B-lymphocytes ?

(a) Both introduce the antigen to T_H cells.
(b) Both have MHC protein in their cytoplasm.
(c) Both decompose the pathogen into antigens.
(d) Both have specific receptors for a single type of antigens.

40 Which of the following best describes the insulin gene ?

(a) A DNA molecule. (b) A DNA strand.
(c) A part or segment of a DNA molecule. (d) A part or segment of a DNA strand.

41 What is the type of mutation that made a *Penicillium* fungus produce larger amounts of penicillin ?

(a) Induced somatic mutation.
(b) Spontaneous somatic mutation.
(c) Induced gamete mutation.
(d) Spontaneous gamete mutation.

42 Which of the following is(are) **not** found at the ($\grave{3}$) end of mRNA molecule ?

(a) About 200 adenosine.
(b) The releasing factor.
(c) The stop codon.
(d) UAG or UGA or UAA codons.

43 ✳ What is the role played by the cell ribosomes in the production of new ribosomes in the cell ?

(a) Transcribing four types of rRNA
(b) Synthesizing 70 types of polypeptides.
(c) Assembling rRNAs and polypeptides into complete ribosomes.
(d) Transcribing rRNA and synthesizing ribosomal polypeptides.

44 Which of the following figures represents detritus sedimentary rock ?



(a)



(b)



(c)



(d)

Third **Answer the following questions 45 & 46** — 2 Marks

45 "Helper T-cells are more specific than B-cells".
How far is this statement correct ? With explanation.

.....

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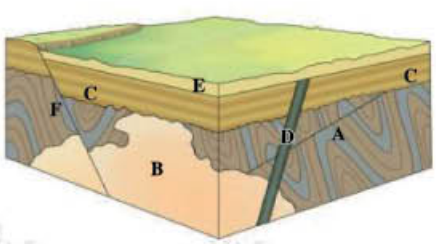
46 **Study the opposite geological model, then answer :**

(a) What is the type of fault (A) and fault (F) ?

.....

(b) Deduce the types of the unconformity surfaces (C) and (E).

.....



Exam 2

Answered

Questions signed by * are answered in detail.

First Choose the correct answer 1 : 32

1 Mark

1 What makes collenchyma tissue a supporting tissue that makes the plant organs harder and stronger ?

(a) The deposition of cellulose in its cell walls.
(b) The addition of cellulose and lignin to its cell walls.
(c) Being thickened by cellulose and its distribution in the plant.
(d) Being dead tissue and its position in the plant.

2 What is/are the region(s) at which the upper limbs are attached to the vertebral column of the human skeleton ?

(a) Cervical region.
(b) Thoracic region.
(c) Cervical and thoracic regions.
(d) Thoracic and lumbar regions.

3 Which of the following plant leaflets respond to touch ?

(a) *Mimosa* plant.
(b) Some leguminous plants.
(c) *Mimosa* and some leguminous plants.
(d) Plants that have compound pinnate leaves.

4 Which of the following two terms are synonyms ?

(a) Muscle tissues and muscle fibers.
(b) Myofibrils and muscle fibers.
(c) Muscle fibers and muscle cells.
(d) Sarcomere and myofibril.

5 Which of the following is correct about the receptor region and the curvature region in the plant phototropism ?

(a) They have opposite responses to stimuli.
(b) They communicate together through auxins.
(c) Both of them secrete auxins.
(d) They are exactly the same.

6 Which of the following parts the pituitary gland is connected physically to it ?

(a) The brain.
(b) Other endocrine glands.
(c) Adenohypophysis part of the pituitary gland.
(d) Neurohypophysis part of the pituitary gland.

7 If the normal calcium level in the blood ranges between 8.6 to 10.2 mg/dL, at which of the following calcium levels the secretion of calcitonin will increase ?

(a) 7.3 mg/dL (b) 9.3 mg/dL (c) 10 mg/dL (d) 11.2 mg/dL

8 The provided figure illustrates the stages of asexual reproduction in *Amoeba* :



(1) **(2)** **(3)** **(4)** **(5)** **(6)**

What is the number of the stage at which mitosis starts ?

(a) (2). (b) (3). (c) (4). (d) (5).

9 ✳ Which of the following organisms does **not** reproduce by conjugation ?

(a) *Paramecium*. (b) Bread mould. (c) *Spirogyra* alga. (d) Sponge.

10 ✳ If a sporangium of a fern contains 100 spore cells. How many spores will be produced by this sporangium ?

(a) 100 (b) 200 (c) 400 (d) 800

11 ✳ Which floral whorl(s) of Tulip flower attract(s) insects to pollinate the flower ?

(a) Calyx only. (b) Corolla only.
(c) Perianth. (d) Corolla and androecium.

12 What is(are) the purpose(s) of fertilization in flowering plants ?

(a) Producing zygote only. (b) Producing endosperm only.
(c) Producing zygote and its nutritive tissue. (d) Producing fruits containing stored food.

13 ✳ The human female is born with her ovary containing .....

(a) primary germ cells. (b) oogonia.
(c) primary oocytes. (d) secondary oocytes.

14 Which of the following does **not** prevent the penetration process of the pathogen to plant cell walls ?

(a) Swelling of these walls. (b) Deposition of lignin in these walls.
(c) Formation of tyloses. (d) Deposition of cutin or suberin in these walls.

15 T-lymphocytes are named after this name, because .....

(a) they are produced in thymus gland.

(b) they mature and differentiate in thymus gland.

(c) they are highly specific.

(d) they are produced and differentiated in the bone marrow.

16 What is the correct sequence of B-cells action mechanism when they act against pathogens ?

(a) Recognition ⟶ Antibodies production ⟶ Binding.

(b) Binding ⟶ Recognition ⟶ Antibodies production.

(c) Binding ⟶ Antibodies production ⟶ Recognition.

(d) Recognition ⟶ Binding ⟶ Antibodies production.

17 Which of the following attack the cells infected with viruses or cancer cells ?

(a) Natural killer cells only.

(b) Cytotoxic T-cells only.

(c) Natural killer cells and cytotoxic T-cells.

(d) Natural killer cells and antibodies.

18 What is the possible result if the genetic material of a strain of bacteria that resists antibiotics is transferred to another strain that does not have the same resistance ?

(a) The resistant strain will transform into non-resistant one.

(b) The non-resistant strain will transform into resistant one.

(c) None of the two strains will transform into the other.

(d) Both strains will die.

19 Which of the following are covalently bonded to the pentose sugar in the nucleotide structure ?

(a) A purine base and a pyrimidine base.

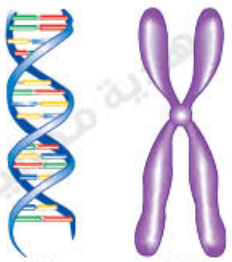
(b) A phosphate group and a hydroxyl group.

(c) A nitrogenous base and a phosphate group.

(d) A phosphate group and an adjacent nucleotide.

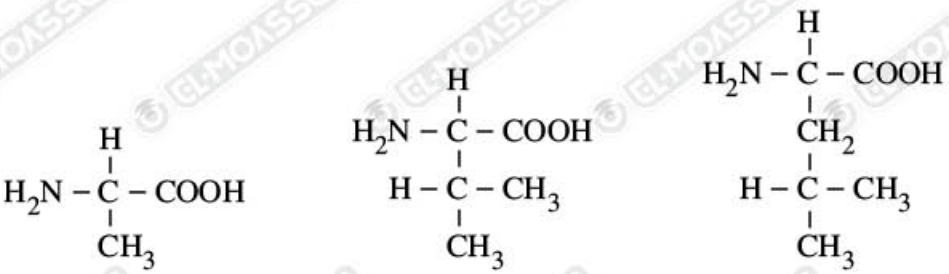
20 In the opposite figure, how many structure (A) is found in structure (B) ?

(a) One.
(b) Two.
(c) None.
(d) Indefinite number.



(A) (B)

21 In the following figures :



(A) (B) (C)

Which of the following represent (A), (B) and (C) molecules ?

(a) Protein building units.
(b) Structural proteins.
(c) Regulatory proteins.
(d) Alkyl (R) groups.

22 ✱ Human chromosome no. (1) most likely contains 2000 genes that provide instructions needed for building proteins. How many promoters are there in this chromosome ?

(a) 1 (b) 1000 (c) 2000 (d) 4000

23 Which of the following has/have a role in the binding of a large ribosomal subunit with a small ribosomal subunit to form a complete ribosome ?

(a) The nucleolus. (b) The cytoplasm. (c) mRNA molecule. (d) rRNA molecules.

24 By being compared to oceanic crust rocks, continental crust rocks have .....

(a) higher density and more basicity.
(b) higher density and more acidity.
(c) lower density and more basicity.
(d) lower density and more acidity.

25 Most of the sediments that were compacted and later formed shale are a mixture of .....

(a) clay and gravel. (b) clay and silt. (c) sand and silt. (d) gravel and sand.

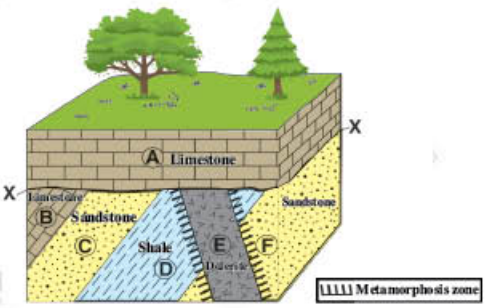
26 In which of the following Earth's zones silica is considered the most abundant component in terms of its percentage ?

(a) The Earth's crust and lithosphere.
(b) The lower mantle and outer core.
(c) The outer core and oceanic crust.
(d) The inner core and asthenosphere.

27 ✳ What are the two most important properties that distinguish between calcite and quartz ?

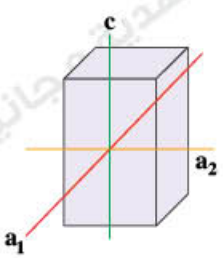
(a) Fracture and luster.
(b) Cleavage and hardness.
(c) Streak and colour.
(d) Luster and streak.

28 The opposite model shows rock units from (A) : (F), (E) represents an intruded dyke of dolerite and (XX) represents a boundary line between rock unit (A) and rock units from (B) : (F).What are the rocks formed in the metamorphosis zone which is adjacent to the intruded dyke of dolerite ?



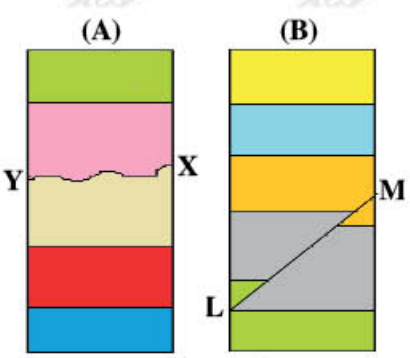
(a) Gneiss.
(b) Quartzite.
(c) Mudstone.
(d) Marble.

29 ✳ The opposite model represents one of the crystal systems. What is the crystal system that is formed as a result of changing the length of axis (c) to be equal to (a_2) ?



(a) Orthorhombic.
(b) Triclinic.
(c) Cubic.
(d) Tetragonal.

30 The two sections (A) and (B) represent sedimentary successions in distant areas. If each of (XY) and (LM) represents different geological structures, which of the following represents both of them ?



(a) (XY) Angular unconformity / (LM) Normal fault.
(b) (XY) Nonconformity / (LM) Reverse fault.
(c) (XY) Disconformity / (LM) Normal fault.
(d) (XY) Disconformity / (LM) Reverse fault.

31 Which of the following structures are associated with normal domes ?

(a) Folds whose youngest layers are at the center.
(b) Folds whose limbs become near from each other upward.
(c) Faults in which the hanging wall rocks move down.
(d) Faults in which their rocks move horizontally.

32 What is the branch of geology that specializes in making digital maps to determine the sites of mineral ores ?

(a) Mineralogy. (b) Geophysics. (c) Geochemistry. (d) Lithology.

Second Choose the correct answer 33 : 44 — 2 Marks

33 Which type of tissues determines the direction at which these bones move at the joint shown in the provided figure ?



(a) Skeletal connective tissue.

(b) Fibrous connective tissue.

(c) Muscular tissue.

(d) Vascular tissue.

34 ✳ Which of the following pairs of hormones are more similar in their effects on carbohydrates ?

(a) Insulin and glucagon. (b) Glucagon and adrenaline.

(c) Insulin and cortisone. (d) Cortisone and thyroxine.

35 Through your study for the tissue culture, which plant tissues can grow in coconut milk as a proper nutritive medium ?

(a) All plants. (b) Carrot and tobacco plants.

(c) Rare plants. (d) Disease-resistant plants.

36 What is the maximum number of individuals that could be produced by a *Spirogyra* alga that is built from 50 cells when it reproduces asexually ?

(a) 1 (b) 2 (c) 25 (d) 50

37 Which of the following is found in the ovum coat of human female ?

(a) Hyaluronic acid.

(b) Hyaluronidase enzyme.

(c) Polar body and hyaluronic acid.

(d) Hyaluronic acid and hyaluronidase enzyme.

38 What are the cells or organisms that interferons bind to ?

(a) Cells infected by viruses.

(b) Viruses and cells infected by viruses.

(c) Cells infected by viruses and their neighbouring healthy cells.

(d) Cells neighbouring to the cells infected by viruses.

39 Which of the following do **not** express the immunoglobulin structure ?

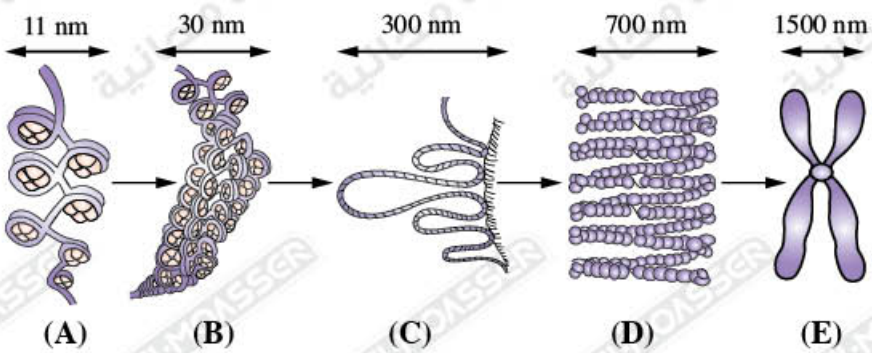
(a) Four polypeptide chains.

(b) Two pairs of polypeptide chains.

(c) Two constant regions and one variable region of polypeptides.

(d) Two long chains and two short chains of polypeptides.

40 The following figure illustrates the stages of the condensation of DNA nucleic acid in eukaryotes :



Which of the illustrated five stages in the figure represents the stage of the condensed chromatin formation ?

(a) (B). (b) (C). (c) (D). (d) (E).

41 Which of the following statements best describes the genome ?

(a) All the genes in each somatic cell. (b) All the genes in all somatic cells.

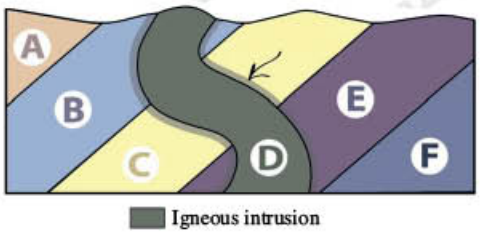
(c) All the genes in each individual. (d) All the genes in one DNA molecule.

42 If the codon (UGG) is translated into tryptophan amino acid in the genetic code. Which of the following living organisms represent an exception for this rule ?

(a) Bacteria and other prokaryotes. (b) Influenza and poliomyelitis viruses.

(c) Protista and fungi. (d) There is no exception.

43 By studying the following geological section, what are the geological events that this area was exposed to respectively ?



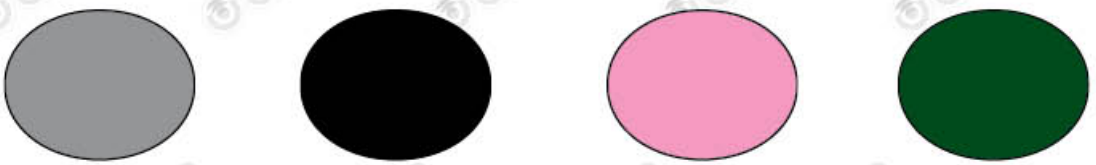
(a) Tension forces, then erosion.

(b) Tension forces, then deposition.

(c) Compressive forces, then erosion.

(d) Compressive forces, then deposition.

44 ✳ The following blocks represent different igneous rocks of the same size, thrown at the same moment into a swimming pool filled with water :



What is the correct order for the rock blocks to settle at the bottom of a swimming pool ?

(a) Rhyolite, then komatiite, then andesite, then basalt.

(b) Andesite, then rhyolite, then basalt, then komatiite.

(c) Komatiite, then basalt, then andesite, then rhyolite.

(d) Basalt, then andesite, then komatiite, then rhyolite .

Third Answer the following questions 45 & 46 — 2 Marks

45 **What** are the immune cells that are activated by interleukins ?

.....

.....

46 **Which** organism or organisms can reproduce by binary fission without dividing the nucleus mitotically ? **Explain your answer.**

.....

.....

Exam 3

Answered

Questions signed by * are answered in detail.

First Choose the correct answer 1 : 32

1 Mark

1 What causes the tendril to twine around a solid object ?

(a) Increased growth of the tendril part in contact with the solid object.
(b) Increased growth of the tendril part not in contact with the solid object.
(c) Helping the tendril to grow vertically.
(d) Twining of the remaining part of the tendril.

2 Which of the following **doesn't** express the result of tendonitis (inflammation of tendons) in the shoulder joint ?

(a) Feeling pain when contracting the humerus muscles.
(b) Difficulty in moving humerus.
(c) Changing the direction of movement of the joint.
(d) Heaviness in arm movement.

3 All of the following express the lumbar vertebrae, **except** that .....

(a) they have cartilaginous joints.
(b) they are large in size.
(c) they face the abdominal region.
(d) they are connected to the last two pairs of ribs.

4 What is the result of calcium ions deficiency in the muscle fiber ?

(a) The muscle remains in a state of relaxation.
(b) The muscle remains in a state of contraction.
(c) The actin filaments become closer to each other.
(d) The muscle consumes more energy to contract.

5 What is the mechanism of plant response to different stimuli ?

(a) The reception area works first, then the responding area.
(b) The responding area works first, then the reception area.
(c) The reception and responding areas work simultaneously.
(d) The reception area works independently of the responding area.

6 ✱ A diabetic patient loses a lot of weight before his disease is diagnosed due to .....
(a) the cell's resort to stored fats as another energy source.
(b) the presence of glucagon, which prevents glucose from entering the cell.
(c) stimulating liver cells to store a part of the glucose in the form of glycogen.
(d) the decreased metabolic rates in the body cells.

7 Vasopressin hormone is produced from ..... and stored in ..... respectively.
(a) the adenohypophysis part of the pituitary gland / the neurohypophysis part of the pituitary gland.
(b) the neurosecretory cells in the hypothalamus / the nerve endings of the cells which produced the hormone.
(c) the neurosecretory cells in the hypothalamus / the adenohypophysis part of the pituitary gland.
(d) the nerve endings of the cells which produced the hormone / the neurohypophysis part of the pituitary gland.

8 Gametocytes are formed during the life cycle of malaria *Plasmodium* parasite .....
(a) in the salivary glands of the mosquito.
(b) inside the red blood cells of humans.
(c) in the stomach of the mosquito.
(d) outside the red blood cells of humans.

9 How many whorls are there in a male flower whose corolla consists of 4 rows of petals ?
(a) 2 whorls. (b) 3 whorls. (c) 4 whorls. (d) 6 whorls.

10 The maximum growth of the corpus luteum in case of pregnancy and in case of non-pregnancy, respectively is .....
(a) at the end of the third month \ on day 22 from the start of menstruation.
(b) at the end of the first month \ on day 22 from the start of menstruation.
(c) at the end of the third month \ on day 14 from the start of menstruation.
(d) at the end of the first month \ on day 14 from the start of menstruation.

11 What is the similarity between Sertoli cells and interstitial cells in the human male testis ?
(a) They are located inside the seminiferous tubules.
(b) They have a direct role in nourishing sperms.
(c) Both are haploid cells.
(d) Both are secretory cells.

12 Which of the following distinguishes sexual reproduction in ferns from sexual reproduction in flowering plants ?

(a) Occurrence of genetic diversity.

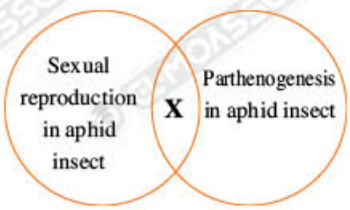
(b) The presence of reproductive organs that produce gametes.

(c) Gametes are formed by meiotic division only.

(d) Gametes are formed by mitotic division only.

13 From the opposite diagram :

Which characteristic is represented by the letter (X) ?



(a) Genetic variation.

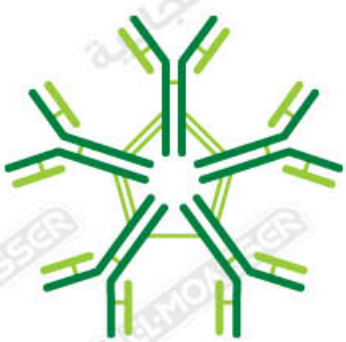
(b) Participation of one individual in producing offspring.

(c) Production of new offspring.

(d) Increased number of produced offspring.

14 The opposite figure shows one of the immunoglobulins.

The mechanism by which this immunoglobulin works is characterized by all the following, **except** .....



(a) its ability to get rid of the largest amount of microbes.

(b) stimulating the process of phagocytosis of microbes.

(c) weakening the microbe and gathering it in one area.

(d) converting antigens into precipitates.

15 The opposite picture shows a desert plant, what is the immune mean that distinguishes this plant ?



(a) Pre-existing structural immunity.

(b) Structural immunity as a response to infection.

(c) Pre-existing cellular immunity.

(d) Biochemical immunity formed as a response to infection.

16 Which lymphocytes have similar mechanisms of action to eliminate pathogens ?

(a) Natural killer cells and cytotoxic T-cells. (b) Macrophages and helper T-cells.

(c) B-cells and macrophages. (d) Natural killer cells and B-cells.

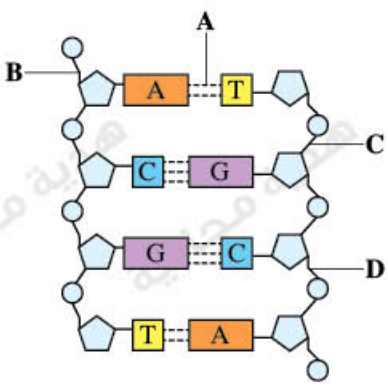
17 The following table shows three immune mechanisms :

Type of mechanism	Immune cells			
(A)	Monocytes	Macrophages	Basophils	Mast cells
(B)	Helper T-cells	B-cells	Natural killer cells	Cytotoxic T-cells
(C)	Memory T-cells	Memory B-cells	Macrophages	Cytotoxic T-cells

Which letter(s) indicate(s) the mechanism that is **not** accompanied by the appearance of the disease symptoms ?

(a) (A) and (B). (b) (A) and (C). (c) (A) only. (d) (C) only.

18 The opposite diagram represents a piece of DNA molecule. Which letter indicates the bond that can be broken by the deoxyribonuclease enzyme ?



(a) A
(b) B
(c) C
(d) D

19 Study the following figure which shows a type of mutation, then determine, what type of mutation the figure indicates ?

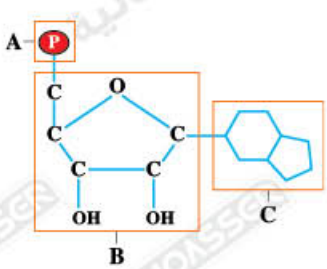


(a) Structural chromosomal. (b) Somatic gene.
(c) Change in the number of chromosomes. (d) Gamete gene.

20 ✳ Which part of the sperm contains DNA whose ends are joined ?

(a) Head. (b) Neck. (c) Midpiece. (d) Tail.

21 From the opposite figure which shows one of the nucleotides, which letter(s) indicate(s) the structure that determines the type of nucleic acid ?



(a) A and B
(b) B only.
(c) B and C
(d) A only.

22 Which technique can be used by scientists to confirm the presence of the ruby red eye color gene in the fruit fly genome ?

(a) Human genome.
(b) DNA hybridization.
(c) DNA cloning.
(d) Recombinant DNA.

23 ✳ Using the table of codons, what is the effect of the absence of the anticodon (AUG) during the translation process ?

(a) Translation stops at (UAC) codon.
(b) Translation continues and tryptophan is absent.
(c) Translation stops and methionine is absent.
(d) Translation continues and tyrosine is absent.

First base	Second base U	Second base C	Second base A	Second base G	Third base
U	Phe	Ser	Tyr	Cys	U
				STOP	C
	Leu		STOP	Trp	A
					G
C	Leu	Pro	His	Arg	U
					C
			Gln		A
					G
A	Ile	Thr	Asp	Ser	U
					C
	Met		Lys	Arg	A
					G
G	Val	Ala	Asp	Gly	U
					C
			Glu		A
					G

24 The branch of geology that specializes in studing the conditions under which coal deposits in Sinai is formed is .....

(a) geochemistry.
(b) paleontology.
(c) geophysics.
(d) structural geology.

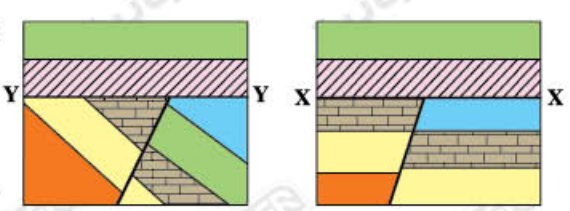
25 ✳ If the mass of the Earth's core is (X), the mass of the Earth's crust and mantle together is approximately .....

(a) 2 X
(b) $\frac{2}{3}$ X
(c) $\frac{1}{3}$ X
(d) $\frac{1}{2}$ X

26 When the axial plane intersects with the surfaces of the layers forming the fold, 4 imaginary lines are resulted. This indicates that the ratio between the axes and limbs is .....

(a) 1 : 2
(b) 1 : 4
(c) 1 : 1
(d) 2 : 2

27 In the opposite sedimentary succession, which of the following is true about unconformity surfaces (X – X) and (Y – Y) respectively ?



(a) (X – X) Angular / (Y – Y) Nonconformity.
(b) (X – X) Disconformity / (Y – Y) Disconformity.
(c) (X – X) Disconformity / (Y – Y) Nonconformity.
(d) (X – X) Disconformity / (Y – Y) Angular unconformity.

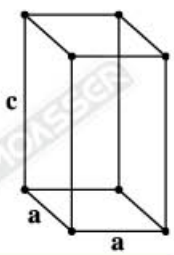
28 The minerals that ancient human used to engrave on the walls of caves belong to ..... group.

(a) carbonates (b) silicates (c) oxides (d) sulphates

29 The mineral of non-metallic luster that **doesn't** belong to silicates is .....

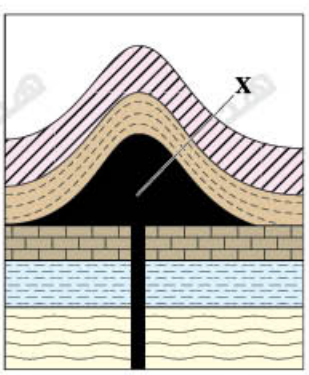
(a) quartz. (b) calcite. (c) feldspar. (d) galena.

30 ✳ To which crystal system does the opposite figure belong ?



(a) Trigonal.
(b) Tetragonal.
(c) Orthorhombic.
(d) Monoclinic.

31 Which of the following **doesn't** apply to the geological structure (X) ?



(a) High viscosity.
(b) Its crystals are of different sizes.
(c) It is rich in fossils.
(d) It results in an anticline fold.

32 What is the rock that is formed from several minerals ?

(a) Flint. (b) Gypsum. (c) Peridotite. (d) Limestone.

Second Choose the correct answer 33 : 44 — 2 Marks

33 What causes the construction worker to feel pain in the arm muscles ?

(a) The conversion of glycogen molecules into glucose.
(b) Increasing the rate of anaerobic respiration in the muscles.
(c) The abundance of ATP molecules resulting from aerobic respiration.
(d) The lack of ATP molecules resulting from aerobic respiration.

34 One of the symptoms of diabetes is feeling thirsty, due to .....

(a) losing a part of salt content of the cell.
(b) excreting glucose in urine at close intervals.
(c) gaining water by the cell as a result of its high sugar concentration.
(d) glucose entering through the cell membrane in large quantities.

35 The aquatic turtle produces large numbers of individuals despite being long aged, because it is .....

(a) more vulnerable to dangers.
(b) primitive in structure.
(c) small in size.
(d) free-living.

36 What is the contraceptive method that affects the activity of the anterior lobe of the pituitary gland ?

(a) Coil.
(b) Fallopian tubes ligation.
(c) Pills.
(d) Condom.

37 Which of the following distinguishes asexual reproduction from sexual reproduction ?

(a) It maintains the stability of the genetic makeup.
(b) It produces individuals more suitable for environmental changes.
(c) It is more common in animals than plants.
(d) It occurs after a certain age and suitable conditions.

38 What is the reason for the failure of a liver lobe transplantation ?

(a) Natural killer cells attack the transplanted cells.
(b) Antibodies attack the transplanted cells.
(c) Macrophages engulf the transplanted cells.
(d) Basophils destroy the transplanted cells.

39 What are the types of immune cells that secrete interleukins and lymphokines respectively ?

(a) B and T_H (b) T_H and T_C (c) T_H and T_S (d) T_S and T_H

40 Which of the following is **not** determined by Griffith's experiment ?

(a) The material that is transferred between the two bacterial strains is DNA
(b) Strain (S) of bacteria killed by heating does not kill the mouse when injected with it.
(c) The genetic material can be transferred from the cells of strain (S) killed by heating to the cells of strain (R).
(d) The cells of strain (R) of bacteria can be transformed and become virulent.

41 DNA wraps around proteins, and assembles into loops to form chromatin. At which stage does chromatin condense to form chromosomes ?

(a) Immediately after chromatin is formed.
(b) Shortly after cell division is completed.
(c) When cells become fertilized.
(d) When the cell is ready for cell division.

42 What is the similarity between the process of cloning pieces of DNA using PCR and using a plasmid ?

(a) The time of producing DNA pieces.

(b) The use of a single enzyme in the cloning process.

(c) The temperature at which the cloning process is carried out.

(d) The purpose of the cloning process.

43 When constructing the iconic tower in the New Administrative Capital, which of the following branches of geology contributed to this project ?

(a) Paleontology. (b) Crystallography.

(c) Petroleum geology. (d) Engineering geology.

44 We have three rock samples, rock (X) is metamorphosed from a clastic sedimentary rock with grains size of about 70 microns, rock (Y) is metamorphosed from acidic plutonic igneous rock, and rock (Z) is metamorphosed from calcareous sedimentary rock composed of a single mineral, what are the three rocks (X), (Y) and (Z) respectively ?

(a) (X) Sandstone / (Y) Gneiss / (Z) Marble. (b) (X) Quartzite / (Y) Gneiss / (Z) Marble.

(c) (X) Sandstone / (Y) Marble / (Z) Gneiss. (d) (X) Quartzite / (Y) Marble / (Z) Gneiss.

Third Answer the following questions 45 & 46 — 2 Marks

45 **Study the following figures that represent the types of white blood cells. Then conclude :**



(A) **(B)** **(C)** **(D)**

(a) Which letter refers to the cell that secretes histamine and engulf microbes ?

.....

(b) What distinguishes the cell indicated by letter (A) structurally from the rest of the cells ?

.....

46 **Mention** two ways in which you get new individuals from a starfish, if you have one female starfish, then **determine** the sex of the individuals resulting from each way.

.....

.....

Exam 4

Answered

Questions signed by ✻ are answered in detail.

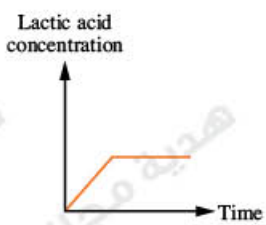
First Choose the correct answer 1 : 32

1 Mark

1 What is the similarity between the pulling movement in peas and corms ?

(a) Providing protection and support for the plant.
(b) Direction of movement of the plant stem in both.
(c) Formation of supportive tissues.
(d) The mechanism by which the pulling process takes place.

2 ✻ The opposite graph shows the concentration of lactic acid in the gastrocnemius muscle. What can be concluded from the graph ?



(a) The person suffers from a painful muscle spasm.
(b) The amount of ATP is sufficient to separate the transverse links.
(c) The amount of oxygen is not sufficient for aerobic respiration.
(d) The muscle stops contracting and relaxing.

3 What is the main factor whose absence affects the occurrence of muscle contraction ?

(a) The arrival of nerve impulses from the brain and spinal cord.
(b) The return of the muscle fiber membrane to the state of polarization.
(c) The outflow of potassium ions from the muscle fiber.
(d) The disappearance of the potential difference on both sides of the muscle fiber membrane.

4 Vertebra no. (15) is connected to vertebra no. (16) in the human vertebral column through .....

(a) cartilaginous joint and two superior articulating processes.
(b) cartilaginous joint and two inferior articulating processes.
(c) two superior articulating processes and two inferior articulating processes.
(d) cartilaginous joint, two superior and two inferior articulating processes.

5 Scientists were able to know many functions of hormones and glands by .....

(a) studying the anatomy of the endocrine glands.
(b) studying the location of the glands in the body.
(c) studying the effect of glands extract on the body.
(d) studying the size of the endocrine glands.

6 Which hormone activates an exocrine gland to pour its secretion outside the body ?

(a) Gastrin. (b) Secretin. (c) Prolactin. (d) Cholecystokinin.

7 The antidiuretic hormone causes symptoms similar to diabetes in case of its deficiency, **except** .....

(a) increasing the urine amount.

(b) increasing the sugar level in urine.

(c) decreasing the osmotic pressure of urine.

(d) increasing the thirst sensation.

8 ✱ If the sporangium of bread mould contains 100 spore mother cells, how many spores does this sporangium produce ?

(a) 100 (b) 200 (c) 400 (d) 800

9 Where does reproduction by spores occur in the life cycle of malaria *Plasmodium* ?

(a) In the salivary glands of mosquito.

(b) Inside human red blood cells.

(c) In the stomach wall of mosquito.

(d) Inside human liver cells.

10 Which of the following is a characteristic for endospermic seeds ?

(a) All of them are monocotyledonous.

(b) All of them are dicotyledonous.

(c) They are monocotyledonous or dicotyledonous.

(d) All of them form grains.

11 The second meiotic division of secondary oocytes occurs .....

(a) immediately after fertilization.

(b) immediately before fertilization.

(c) after the formation of the polar body.

(d) after their exit from the ovary.

12 Study the following figure and conclude :

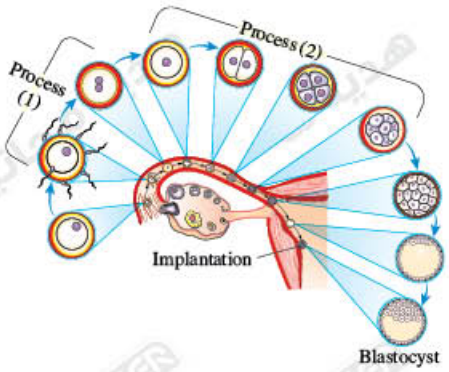
How many times does mitosis occur in process (2) ?

(a) Once.

(b) Twice.

(c) 3 times.

(d) 4 times.



13 When is progesterone at its highest levels and why ?

(a) Between ovulation and menstruation - to maintain the endometrium.

(b) Between ovum maturation and ovulation - to rebuild the endometrium.

(c) Between ovulation and menstruation - to stimulate ovum maturation.

(d) Between menstruation and ovum maturation - to stimulate ovum maturation.

14 All of the following are considered from the results of the absence of cutin from the epidermis of clover stems, **except** .....

(a) the invasion of the pathogen into the epidermal cells.

(b) the growth of fungi on the plant stem.

(c) the formation of cork tissue to cover the stem.

(d) the loss of a large amount of water.

15 What is the role of macrophages in immunity ?

(a) They attack and engulf the infected cells.

(b) They pick up microbes and present the antigens to the specialized cells.

(c) They secrete enzymes that attack and destroy the infected cells.

(d) They play an important role in the formation of antibodies.

16 ✱ What are the types of cells affected by histamine directly ?

(a) Basophils.

(b) Macrophages.

(c) Mast cells.

(d) Cells of blood vessel wall.

17 What is the role of complements in the immune system ?

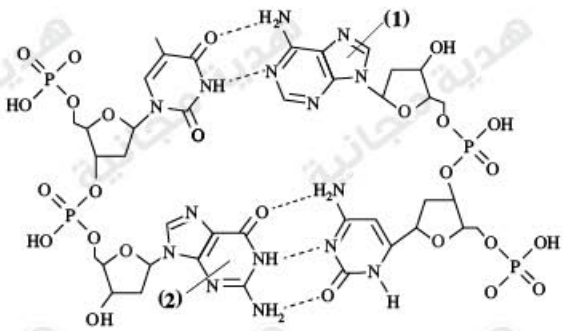
(a) Stimulating the production of antibodies.

(b) Lysing the membranes of microbes.

(c) Lysing the membranes of the infected cells.

(d) Attracting phagocytes to the site of infection.

18 ✳ The opposite figure shows the structure of a piece of DNA molecule, if the percentage of the structure indicated by no. (2) represents 22% of the structure of the double helix. What is the percentage of thymine in this piece ?



(a) 28%
(b) 22%
(c) 44%
(d) 56%

19 What is the result of non-separation of the centromere during cell division in the grape plant stem ?

(a) Gamete gene mutation.
(b) Gamete chromosomal mutation.
(c) Somatic chromosomal mutation.
(d) Somatic gene mutation.

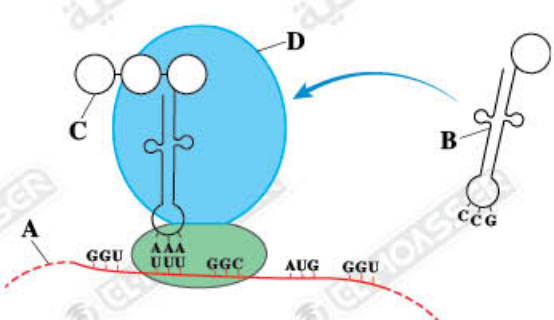
20 What is the evidence that protein is **not** the genetic material ?

(a) It enters into the composition of chromosomes.
(b) It consists of 20 types of amino acids.
(c) Its quantity varies in the somatic cells of the same species.
(d) Its quantity is equal in the somatic cells of different species.

21 What is the result of having more than one codon for most amino acids in the genetic code ?

(a) Reducing the negative effects of gene mutations.
(b) Increasing the diversity of proteins.
(c) Reducing the negative effects of chromosomal mutations.
(d) Translating the same codon into more than one amino acid.

22 In the opposite figure, where are the two structures indicated by the letters (A) and (D) built respectively ?



(a) Nucleus / Nucleolus.
(b) Nucleus / Cytoplasm.
(c) Cytoplasm / Nucleolus.
(d) Nucleolus / Nucleus.

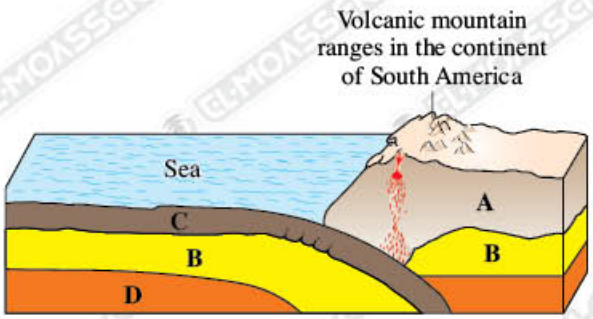
23 ✳ What is the sequence on DNA from which mRNA is transcribed but **not** translated into amino acids ?

(**Note that :** the arrow ⟶ indicates the direction of the transcription process).

(a) ⟶ TCT ATA TTT CCT (b) ⟶ ACT ATC ATT ACT

(c) ⟶ AGT CTC ACG GCT (d) ⟶ ACC GCC AAA ACA

24 In the following model, zones (A), (B), (C) and (D) represent parts of the Earth's crust and the mantle :



Which of the following statements correctly expresses zones (A), (B), (C) and (D) ?

(a) Zone (B) is made up of basaltic sima rocks, and zone (C) represents solid lithospheric rocks.

(b) Zones (A) and (B) represent the Earth's crust, and zones (C) and (D) represent the upper part of the mantle.

(c) Zone (A) is made up of granitic sial rocks, and zone (D) represents a fluid part of iron and magnesium silicates.

(d) Zones (A) and (B) are made up of solid rocks that have higher density than the rocks of the ductile fluid (B) and (D) zones.

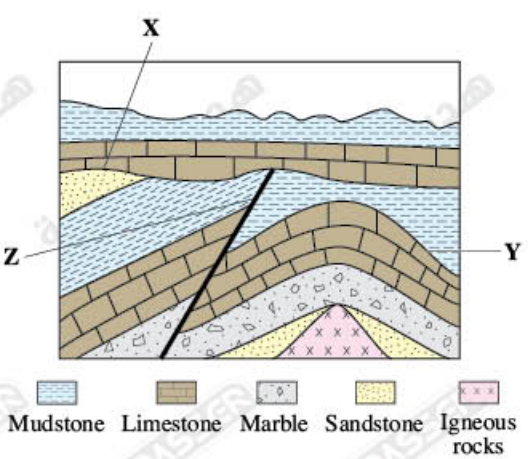
25 In the opposite vertical section, structures (X), (Y) and (Z) represent ..... respectively.

(a) (X) nonconformity surface / (Y) anticline fold / (Z) normal fault

(b) (X) angular unconformity surface / (Y) anticline fold / (Z) reverse fault

(c) (X) disconformity surface / (Y) syncline fold / (Z) reverse fault

(d) (X) angular unconformity surface / (Y) syncline fold / (Z) normal fault



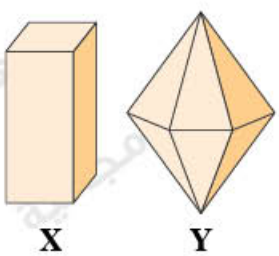
26 When the transportation factor loses its speed, the process that directly results from this is .....

(a) deposition. (b) metamorphism.
(c) crystallization. (d) lithification.

27 Two zones of the main zones of the Earth behave like fluids and share the presence of iron in both of them, but the first has convection currents and the second has very high pressure, what are they respectively ?
(**Knowing that :** fluids are liquids and gases).

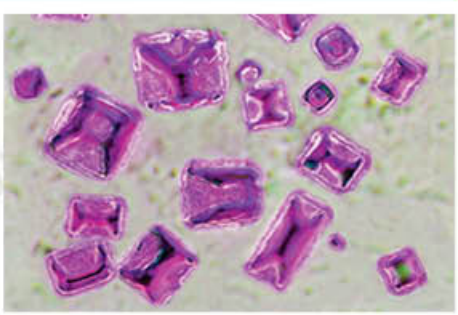
(a) Continental crust / Inner core. (b) Asthenosphere / Outer core.
(c) Oceanic crust / Outer core. (d) Asthenosphere / Inner core.

28 Which of the following is correct about the two crystal systems (X) and (Y) in the opposite figure ?



(a) (X) Tetragonal system / (Y) Hexagonal system.
(b) (X) Orthorhombic system / (Y) Trigonal system.
(c) (X) Cubic system / (Y) Hexagonal system.
(d) (X) Tetragonal system / (Y) Trigonal system.

29 ✳ The opposite figure represents kidney stones made of calcium oxalate crystals, are these stones considered a mineral ?

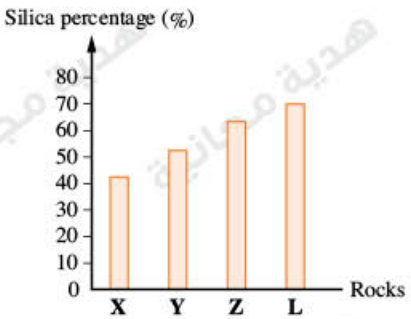


(a) They are considered a mineral, because they have a distinct crystalline shape.
(b) They are considered a mineral, because they have a definite chemical composition.
(c) They are not considered a mineral, because they are manufactured.
(d) They are not considered a mineral, because they are organic.

30 All of the following describe the luster of minerals, **except** that it is .....

(a) metallic.
(b) glassy.
(c) transparent.
(d) dull.

31 The opposite graph expresses the approximate percentage of silica in igneous rocks, therefore rocks (X), (Y), (Z) and (L) are ..... respectively.



(a) granite / andesite / basalt / komatiite
(b) peridotite / gabbro / diorite / rhyolite
(c) microgranite / microdiorite / basalt / dolerite
(d) granite / basalt / andesite / komatiite

32 What is the type of rocks do foraminifera contribute to their formation ?

(a) Organic sedimentary rocks. (b) Chemical sedimentary rocks.
(c) Extruded igneous rocks. (d) Foliated metamorphic rocks.

Second Choose the correct answer 33 : 44 — 2 Marks

33 What is the main role of cutin and suberin in plants ?

(a) Maintaining the shape of cell walls.
(b) Providing support for vascular tissues.
(c) Acting as impermeable and water-resistant barriers.
(d) Identifying the substances that enter or exit from plant cells.

34 Which of the following hormones whose secretion is related to the needs of the body cells for energy ?

(a) Adrenaline. (b) Thyroxine. (c) Insulin. (d) Gastrin.

35 The characteristic that distinguishes the apple fruit is that .....

(a) it is formed from one of the parts of the flower except the ovary.
(b) it is produced by pollination without fertilization.
(c) it is produced by the fusion of the ovule integuments with the ovary wall.
(d) it is formed from an ovary that has increased in size and stored food.

36 What happens during the cloning process ?

(a) Inserting the nucleus (n) of an egg cell instead of the nucleus of a somatic cell (2n).
(b) Inserting the nucleus (n) of a somatic cell instead of the nucleus of an egg cell (n).
(c) Inserting the nucleus (2n) of a somatic cell instead of the nucleus of a sperm (n).
(d) Inserting the nucleus (2n) of a somatic cell instead of the nucleus of an egg cell (n).

37 After the birth of the fetus, what happens to the placenta ?

(a) It gradually degenerates and decreases in size.

(b) It separates from the uterine wall and is expelled.

(c) It disintegrates and tears with the uterine wall.

(d) It adheres to the uterine wall and fuses with it.

38 What is the difference between innate immunity and acquired immunity ?

(a) Innate immunity represents an internal immune response, while acquired immunity works according to two separate mechanisms.

(b) Innate immunity is present since birth, while acquired immunity develops after the exposure to pathogen.

(c) Innate immunity works against all pathogens, while acquired immunity works against viruses only.

(d) Innate immunity takes longer time to respond than acquired immunity.

39 What are the cells that bind to T_S cells after eliminating the microbe ?

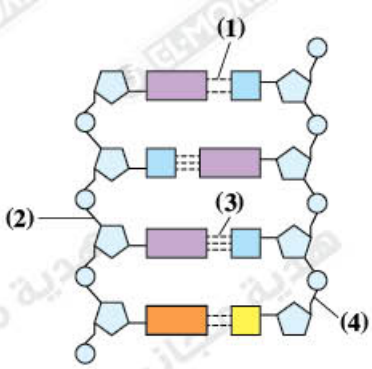
(a) Plasma B-cells and cancer cells.

(b) Helper T-cells, B-cells and natural killer cells.

(c) Macrophages and cytotoxic T-cells.

(d) Helper T-cells, plasma B-cells and cytotoxic T-cells.

40 ✳ Study the opposite figure, then determine :
Which number indicates the bond that connects the building blocks of the backbone to each other ?



(a) (1).

(b) (2).

(c) (3).

(d) (4).

41 Which of the following represents the *Amoeba* genome ?

(a) The nucleotides sequence that build proteins.

(b) The nucleotides sequence that contribute to building ribosomes.

(c) Nucleotides sequence found on chromosomes.

(d) Nucleotides sequence that build mRNA

42 What is the similarity between DNA hybridization and recombinant DNA ?

(a) Breaking down hydrogen and covalent bonds occurs in both of them.
(b) Both of them occur when the temperature is raised to 100°C
(c) Both of them require ligase enzymes.
(d) Both of them produce double strands of DNA

43 All of the following are true about rock crystal and amethyst, **except** that they both have the same .....

(a) colour. (b) streak colour. (c) hardness. (d) mineral composition.

44 By studying the following rock samples, it is found that :



(X) Limestone



(Y) Sandstone



(Z) Gneiss

The metamorphic rock from (X), the mineral that forms (Y) and the rock equivalent to the original rock of (Z) are ..... respectively.

(a) granite / quartzite / marble
(b) quartzite / rhyolite / marble
(c) calcite / quartz / rhyolite
(d) marble / quartz / rhyolite

Third Answer the following questions 45 & 46 — 2 Marks

45 **Calculate** the number of times the second meiotic division occurred in a woman who gave birth 3 times, had 4 miscarriages, and used birth control pills for 150 days.

.....

.....

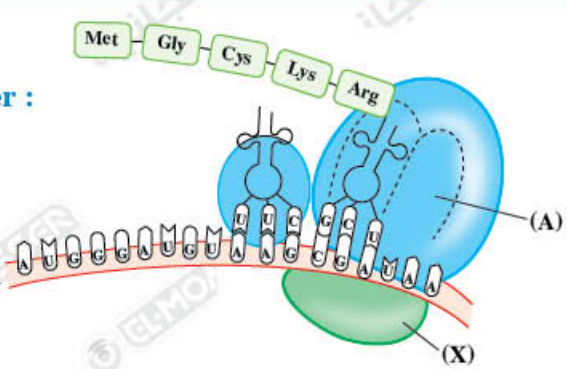
46 **Study the opposite figure that shows one of the steps of protein synthesis, then answer :**

(a) What is the name of the structure indicated by letter (X) ?

.....

(b) Why tRNA does not bind to the site indicated by letter (A) ?

.....



Exam 5

Answered

Questions signed by ✻ are answered in detail.

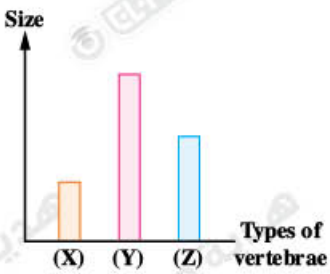
First Choose the correct answer 1 : 32

1 Mark

1 Which plant supports the rest of its parts as a result of the contraction of its roots ?

(a) *Narcissus*. (b) *Mimosa*. (c) Pea. (d) Bean.

2 Study the following graph that illustrates three types of articulating vertebrae in humans, then conclude, how many vertebrae belong to type (Y) ?



(a) 12

(b) 5

(c) 7

(d) 4

3 What is the reason for the occurrence of the muscle spasm ?

(a) When the amount of oxygen in the muscle increases.

(b) When the transverse links separate from actin.

(c) When the amount of ATP decreases in the muscle.

(d) When lactic acid accumulates.

4 Where do calcium ions work inside the myofibril during muscle contraction ?

(a) At the myosin filaments in the dark band.

(b) At the actin filaments in the light band.

(c) At the actin filaments in the dark band.

(d) At the myosin filaments in the semi-light band.

5 The pancreas is under the ..... for the secretion of its digestive juice.

(a) neural effect only

(b) hormonal and neural effects

(c) change in blood sugar level effect

(d) hormonal and the change in blood sugar level effects

6 The substance(s) secreted by the growing tip and regulate the growth of different areas of the plant is(are) .....

(a) phenols. (b) glycosides. (c) indole acetic acid. (d) tyloses.

7 The homeostasis of minerals is naturally regulated in the human body by .....

(a) the neurohypophysis part of the pituitary gland only.
(b) the neurohypophysis part of the pituitary gland and the adrenal gland cortex.
(c) the cells of the adrenal gland cortex only.
(d) the adenohypophysis part of the pituitary gland and the adrenal gland cortex.

8 In artificial parthenogenesis, starfish eggs are artificially activated to give .....

(a) males and females.
(b) males only.
(c) females only.
(d) males or females.

9 The swollen tip of the flower stalk that carries all parts of the flower is called .....

(a) bract.
(b) receptacle.
(c) calyx.
(d) corolla.

10 The first system that begins to be formed in the fetus during the first month of pregnancy is the ..... system.

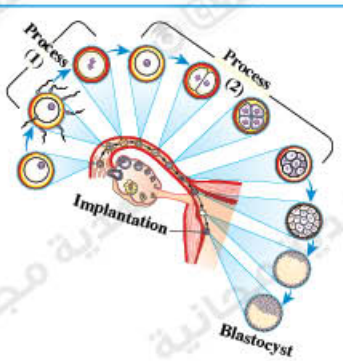
(a) nervous
(b) skeletal
(c) digestive
(d) urinary

11 ✱ Which type of seeds contains the required food for the growth of the embryo during germination ?

(a) Endospermic seeds.
(b) Monocotyledonous seeds.
(c) Exendospermic seeds and grains.
(d) Endospermic and exendospermic seeds.

12 ✱ Study the provided figure, then conclude :
How many times does meiosis occur in process (2) ?

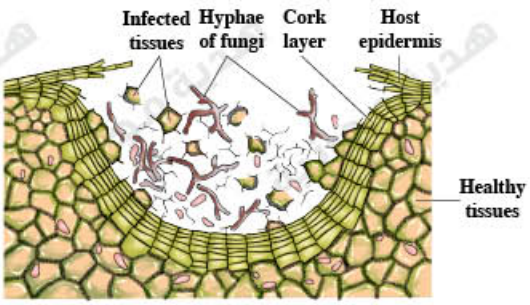
(a) Once.
(b) Twice.
(c) 3 times.
(d) Zero.



13 A woman underwent surgery to tie one of her fallopian tubes.
What is the effect of this surgery on both ovulation and menstruation in this woman ?

(a) Ovulation and menstruation stop.
(b) Ovulation occurs every 56 days and menstruation occurs every two months.
(c) Ovulation occurs every 28 days and menstruation stops.
(d) Ovulation and menstruation occur every 28 days.

14 Which of the following is considered a scientific reason for the failure of fungal hyphae to invade plant tissues in the opposite figure ?



(a) Adding more suberin to the cork cells.

(b) Re-forming the cork in the infected area.

(c) Swelling the cell walls of the cork cells.

(d) Weakness of the fungal hyphae.

15 The following table shows three immune mechanisms :

Mechanism	Used immune cells			
(A)	Monocytes	Macrophages	Basophils	Mast cells
(B)	Helper T-cells	B-cells	Natural killer cells	Cytotoxic T-cells
(C)	Memory T-cells	Memory B-cells	Macrophages	Cytotoxic T-cells

When is mechanism (C) activated ?

(a) When the body re-infected with the same antigen.

(b) When mechanism (A) fails to eliminate the pathogen.

(c) After mechanism (B) fails to eliminate the pathogen.

(d) When the body infected with a new microbe.

16 What is the similarity between the spleen and the lymph nodes ?

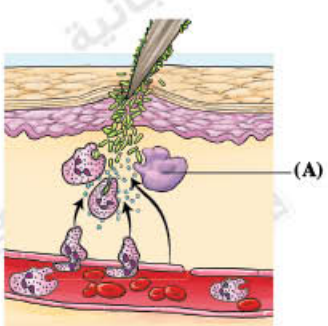
(a) They contribute to the formation of lymphocytes.

(b) They contribute to the maturation of lymphocytes.

(c) They contribute to the storage of lymphocytes.

(d) They contribute to the production of different types of blood cells.

17 From the opposite figure, what is the process that cell (A) illustrates ?



(a) Histamine release.

(b) Phagocytosis.

(c) Tissue swelling.

(d) Interferon penetration

18 A scientist transferred the DNA of a penicillin-resistant bacterial strain to another bacterial strain that was not penicillin-resistant.
Who is/are the scientist(s) carried out an experiment similar to the previous one ?
(a) Watson and Crick. (b) Avery. (c) Griffith. (d) Franklin.

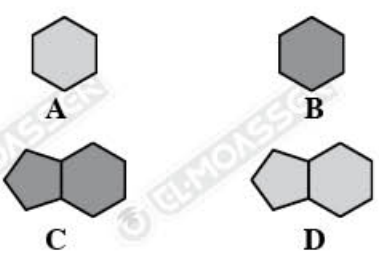
19 Which of the following parts of the wheat plant have the largest amount of DNA in their nuclei ?
(a) Stem. (b) Root. (c) Grain. (d) Leaf.

20 Which types of proteins play a role in the condensation of DNA to form chromatin ?
(a) Histone proteins.
(b) Histone and structural non-histone proteins.
(c) Structural non-histone proteins.
(d) Structural and regulatory non-histone proteins.

21 Which of the following describes the promoter ?
(a) Start codon on mRNA
(b) Anticodon on tRNA
(c) Sequence of nucleotides on DNA
(d) Sequence of nucleotides on mRNA

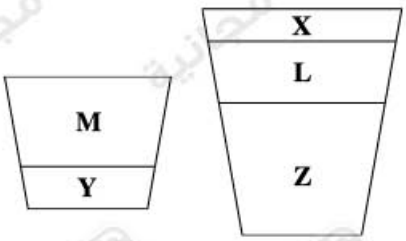
22 Which of the following describes the recombinant DNA technology ?
(a) Annealing of two DNA strands from different sources as a result of the complementarity of nitrogenous bases.
(b) Inserting the haemoglobin production gene into plasmids extracted from a type of bacteria.
(c) Using the PCR device to multiply pieces of DNA thousand times within minutes.
(d) Producing an artificial gene from DNA molecules.

23 ✳ Study the provided figures, which show four types of nitrogenous bases that enter into the structure of nucleic acids.
Which letters indicate the nitrogenous base that distinguishes the structure of RNA ?
(a) A or D
(b) A or B
(c) B or C
(d) A or C

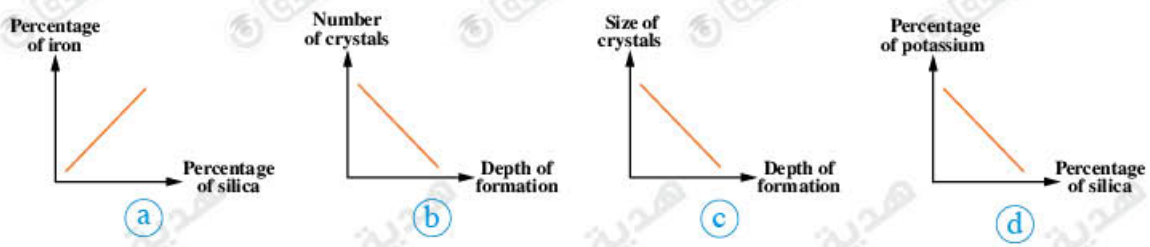


24 ✳ The following two figures represent parts of the Earth's zones. (L) is responsible for the movements of continents, (M) is responsible for originating the magnetic field.
Which of these sentences is correct ?

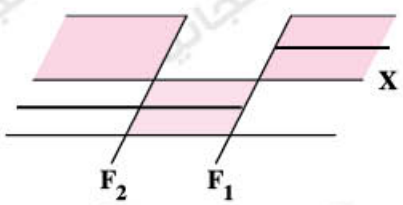
(a) (X) and (Y) are of the same physical state.
(b) (X) and (Y) are of the same density.
(c) Nickel is present in the composition of both (Z) and (Y).
(d) (Z) and (Y) are of the same temperature.



25 Which of the following graphs indicates the correct relation about igneous rocks ?



26 Study the opposite vertical section,
if the age of sills (X) is about 2 million years,
which of the following statements is correct ?



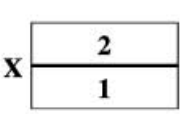
(a) The normal fault is 3 million years old and the reverse fault is 3 million years old.
(b) The normal fault is more recent than the reverse fault.
(c) The normal fault is one million years old and the reverse fault is one million years old.
(d) The reverse fault is younger than sills.

27 The crystal system which contains inclined symmetrical planes from the following is ..... system.

(a) cubic (b) monoclinic (c) triclinic (d) trigonal

28 ✳ In the following figure, the igneous body (X) is classified as a volcanic flow, if .....

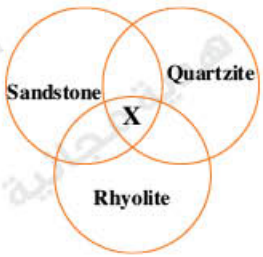
(a) (1) is marble and (2) is sandstone.
(b) (1) is marble and (2) is quartzite.
(c) (1) is limestone and (2) is sandstone.
(d) (1) is quartzite and (2) is marble.



29 The igneous rock resulted from the cooling of lava, and contains pyroxene and quartz is .....

(a) diorite. (b) andesite. (c) dolerite. (d) basalt.

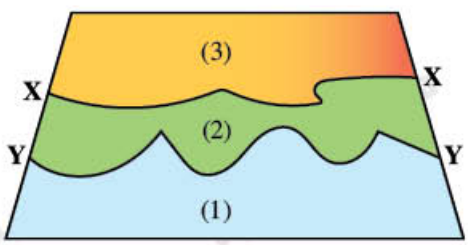
30 Letter (X) in the opposite figure represents a similarity between the shown rocks in the figure, as all of them .....



(a) are igneous rocks.
(b) are sedimentary rocks.
(c) contain quartz mineral.
(d) are metamorphic rocks.

31 The difference between the monoclinic and triclinic crystals is .....
(a) the relation between the lengths of axes.
(b) the relation between the angles α and β
(c) the relation between the angles β and γ
(d) the presence of a symmetrical plane.

32 * If (X-X) is a disconformity and (Y-Y) is a nonconformity, rocks (1), (2) and (3) are ..... respectively.

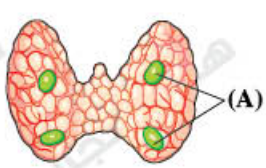


(a) (1) gneiss / (2) sandstone / (3) limestone
(b) (1) granite / (2) gneiss / (3) sandstone
(c) (1) sandstone / (2) quartzite / (3) limestone
(d) (1) basalt / (2) marble / (3) sandstone

Second Choose the correct answer 33 : 44 — 2 Marks

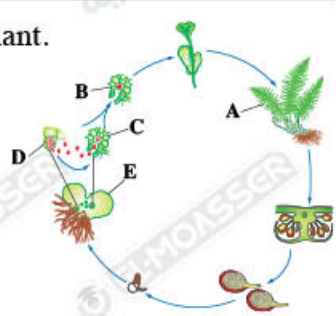
33 What is the structure that has the smallest diameter in the cardiac muscle ?
(a) Myofibril. (b) Muscle fiber. (c) Myosin filament. (d) Actin filament.

34 Study the following figure, then conclude :
What is the factor that stimulates the secretion of the structure indicated by letter (A) ?



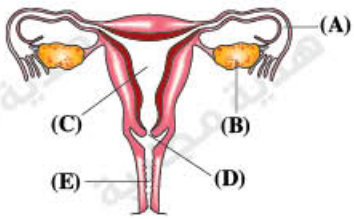
(a) Iodine concentration in the blood.
(b) Hormonal stimulation from the pituitary gland.
(c) Calcium concentration in the blood.
(d) Stimulation from the nervous system.

35 Study the provided figure, which shows the life cycle of a fern plant.
What is the ratio of the chromosomal number of structure (A) to structure (E) ?



(a) 1 : 2
(b) 2 : 1
(c) 1 : 1
(d) 2 : 3

36 Study the provided figure, then conclude :
Which letter refers to the structure that contains ciliated epithelial cells ?



(a) (A). (b) (C).
(c) (D). (d) (E).

37 Where does the first meiotic division occur in human females and males respectively ?
(a) Graafian follicle / Seminiferous tubules.
(b) Fallopian tube / Lining of seminiferous tubules.
(c) Ovarian lining / Seminiferous tubules.
(d) Uterine cavity / Epididymides.

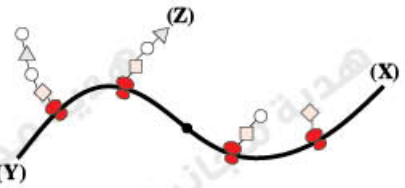
38 ✳ How many types of receptors are present in the membranes of B-cells and helper T-cells that attack the measles virus when it attacks the human body ?
(a) One type.
(b) Two different types.
(c) One type and a histocompatibility protein.
(d) Two types and two histocompatibility proteins.

39 What is the role of antibodies in the immune response ?
(a) They bind to specific antigens on pathogens.
(b) Small proteins that act as chemical signals between immune cells.
(c) They regulate the immune response through severe inflammation.
(d) They attach to the infected cells with viruses through the histocompatibility complex.

40 Which of the following organisms **cannot** repair the damage of its genetic material despite the availability of ligase enzymes ?
(a) Pneumonia bacteria. (b) Phage virus.
(c) Poliomyelitis virus. (d) Yeast fungus.

41 Which of the following correctly describes the genetic material in prokaryotes and eukaryotes ?
(a) A DNA molecule carries genetic information and consists of two strands that form a double helix.
(b) A molecule of DNA and proteins, and contains the genetic information of the organism.
(c) A small circular molecule of nucleic acid (DNA) that is not complexed with protein.
(d) A linear molecule of DNA that is coiled around itself and carries the genetic information.

42 Study the provided figure about the stages of building a polypeptide inside a living cell, then conclude :
What do each of (X), (Y) and (Z) indicate in order ?



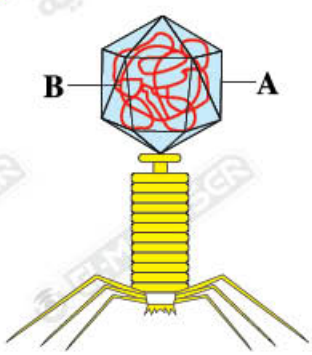
(a) Ribosomal-binding site / Polyadenine tail / Polypeptide.
(b) Small ribosomal subunit / Polyadenine tail / Small ribosomal subunit.
(c) Polyadenine tail / Ribosomal-binding site / Polypeptide.
(d) Ribosomal-binding site / Polypeptide / Polyadenine tail.

43 Which of the following acts on breaking covalent bonds in DNA ?
(a) DNA helicase. (b) Restriction endonuclease.
(c) Reverse transcriptase. (d) Modification enzymes.

44 ✳ The igneous rock which contains a mineral of flaky cleavage, a mineral of pearly luster and a mineral of glassy luster may be .....
(a) gabbro. (b) diorite. (c) peridotite. (d) basalt.

Third Answer the following questions 45 & 46 — 2 Marks

45 **Study the provided figure, then conclude :**



(a) Which letter refers to the compound that the scientists Hershey and Chase labeled with radioactive phosphorus ?

.....

(b) What is the result of treating the phage with the deoxyribonuclease enzyme before it infects a bacterial cell ?

.....

.....

46 **Magma containing 60% silica :**

(a) What is the chemical and mineral classification of the rock resulting from the crystallization of that magma ?

.....

(b) What is the formed rock, if it crystallizes :

1. At the bottom of the ocean.

.....

2. At a great depth.

.....

3. Interspersed near the surface of the Earth.

.....

Exam 6

Answered

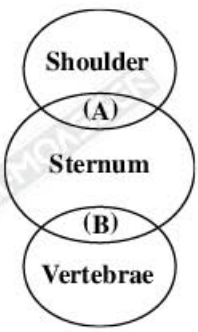
Questions signed by * are answered in detail.

First Choose the correct answer 1 : 32

1 Mark

1 The opposite diagram shows the connection of the bones of the appendicular skeleton to the bones of the axial skeleton.

What is the number of the vertebra that letter (B) refers to ?

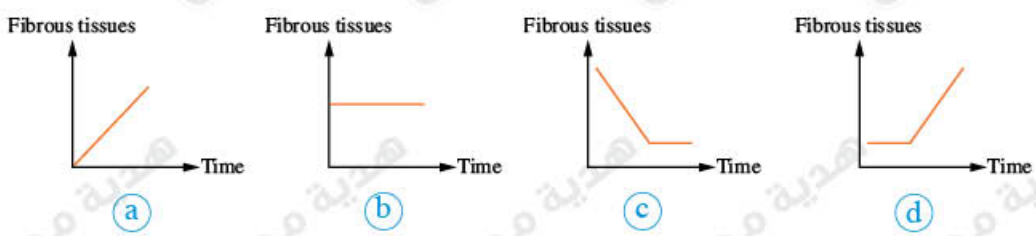


(a) 6
(b) 9
(c) 18
(d) 21

2 What is the main function of support materials in plants ?

(a) Increasing the rate of materials transport throughout the plant.
(b) Increasing flexibility and allowing movement of the plant.
(c) Maintaining the shape of the plant and plant cells.
(d) Controlling the entry and exit of materials into and from the plant cells.

3 Which of the following graphs shows the relationship between the percentage of fibrous tissues in the joints of the cerebral part of the skull and aging ?



(a) (b) (c) (d)

4 A person suffers from an inability to move the forearm in a semi-circular way.

What is the cause of this case ?

(a) Arm muscle fatigue.
(b) Hand cartilage degeneration.
(c) Fracture of the ulna bone.
(d) Depletion of the synovial fluid.

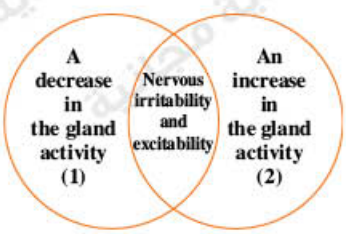
5 Why does a person suffer from an increase in the level of sodium ions in the urine above the normal level ?

(a) Aldosterone hormone deficiency.
(b) Increased secretion of aldosterone.
(c) Vasopressin hormone deficiency.
(d) Increased secretion of vasopressin hormone.

6 ✳ What is the factor that determines the speed of transporting hormones from the endocrine glands to their target organs ?

(a) The amount of hormone secretion.
(b) The type of the hormone-secreting cells.
(c) The contraction of cardiac and smooth muscles.
(d) The type of medium transporting the hormone.

7 Study the opposite diagram, then conclude :
What are the two glands (1) and (2) respectively ?



(a) Thyroid gland / Parathyroid glands.
(b) Adrenal gland medulla / Thyroid gland.
(c) Parathyroid glands / Adrenal gland cortex.
(d) Parathyroid glands / Thyroid gland.

8 What is the difference between scalariform conjugation in *Spirogyra* and reproduction in bony fish ?

(a) Formation of the zygote.
(b) Surrounding conditions.
(c) Method of reproduction.
(d) Number of individuals participating in it.

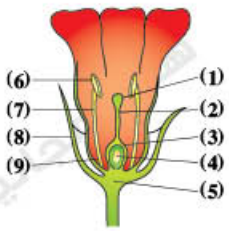
9 Which of the following statements is applied to reproduction in living organisms ?

(a) Living organisms cannot survive without reproductive organs.
(b) The failure of a single individual to reproduce leads to the extinction of the entire species.
(c) Reproduction is essential for the continuity and survival of the species.
(d) Terrestrial organisms usually produce more offspring than aquatic organisms.

10 Which of the following organisms' reproduction leads to an increase in the number of individuals and diversity of genetic traits ?

(a) Yeast.
(b) *Polypodium*.
(c) Bread mould.
(d) *Planaria*.

11 The opposite figure shows the structure of the flower in angiosperms. What are the numbers of the parts in which meiosis occurs ?



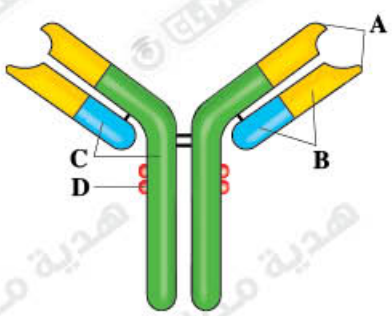
(a) (1) and (4).
(b) (6) and (7).
(c) (3) and (7).
(d) (4) and (6).

12 Which of the following is **not** a function of the placenta ?
(a) Transferring digested food and oxygen to the fetus blood.
(b) Getting rid of fetal waste.
(c) Protecting the child from shock and dryness.
(d) Secreting estrogen and progesterone hormones.

13 In which of the following periods does ovulation occur in an adult woman ?
(a) Pregnancy and fertility.
(b) Taking birth control pills.
(c) Using coil.
(d) Cutting the fallopian tubes and pregnancy.

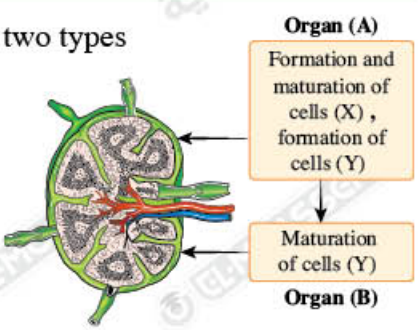
14 What are the symptoms that stimulate the plant to deposit gums ?
(a) Exposing the vascular system to cut.
(b) Providing a suitable environment for fungal growth.
(c) Tearing of the parenchyma cells adjacent to the vessels.
(d) Tearing of the cork layer in the woody stems.

15 Study the opposite figure, then conclude :
Which letter indicates the part that determines the specificity of each antibody ?



(a) (A).
(b) (B).
(c) (C).
(d) (D).

16 From the opposite diagrammatic figure, if (X) and (Y) are two types of lymphocytes. What is the characteristic feature that distinguishes organ (A) from organ (B) ?



(a) Maturation of lymphocytes.
(b) Formation and maturation of all lymphocytes.
(c) Tissue found inside bones.
(d) Capturing any microbe or foreign body.

17 Which of the following is secreted by the cells infected with a virus to prevent its replication in the neighboring cells ?

(a) Histamine. (b) Antibodies. (c) Interferons. (d) Complements.

18 * The DNA of phage (A) was inserted into the protein coat of phage (B) which was used to attack the bacteria. What are the components of the viruses produced after the bacteria bursting ?

(a) DNA and protein of phage (A).
(b) DNA and protein of phage (B).
(c) DNA of phage (A) and protein of phage (B).
(d) DNA of phage (B) and protein of phage (A).

19 Which of the following pairs is separated using the helicase enzyme ?

(a) Thymine and deoxyribose sugar.
(b) Cytosine and guanine.
(c) Phosphate and deoxyribose sugar.
(d) Adenine and guanine.

20 What is the organism whose genetic material is similar to the genetic material of plastids ?

(a) Pneumonia bacteria.
(b) Bacteriophage.
(c) *Amoeba*.
(d) Bean plant.

21 Which of the following statements best describes the bacterial restriction enzymes ?

(a) They are secreted by viruses that infect bacteria.
(b) They affect all types of nucleic acids.
(c) They play a role in DNA hybridization.
(d) They cut DNA into small pieces.

22 All of the following are from the uses of recombinant DNA, **except** .....

(a) producing insulin using bacterial cells to treat diabetes.
(b) determining the evolutionary relationships between different species of living organisms.
(c) modifying the bacterial genome to produce antigens of pathogens to produce safer vaccines.
(d) modifying the plant genome to produce crops resistant to certain diseases.

23 ✳ Study the provided mRNA strand, then determine :

5` ··· AAAA AUG AAAAAAAAA UAA AAAAAA ··· 3`

The number of amino acids produced from the translation of this strand is .....

(a) 1

(b) 2

(c) 3

(d) 4

First base	Second base U	Second base C	Second base A	Second base G	Third base
U	Phe	Ser	Tyr	Cys	U
	Leu		STOP	STOP	C
				Trp	A
					G
C	Leu	Pro	His	Arg	U
			Gln		C
					A
					G
A	Ile	Thr	Asp	Ser	U
	Met		Lys	Arg	C
					A
					G
G	Val	Ala	Asp	Gly	U
			Glu		C
					A
					G

24 An Egyptian-Australian study of the Nuba Mountains in the Eastern Desert proved that the rocks of this region contain economic quantities of gold. What is the branch of geology that is responsible for this study ?



(a) Mineralogy.

(b) Structural geology.

(c) Geochemistry.

(d) Stratigraphy.

25 Magnesium silicates are involved in the main composition of the .....

(a) continental crust. (b) mantle. (c) outer core. (d) inner core.

26 The following two geological structures are formed as a result of .....



Structure (1)



Structure (2)

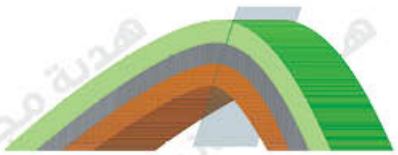
(a) (1) wind and (2) water.

(b) (1) water and (2) wind.

(c) (1) water and (2) Earth movements.

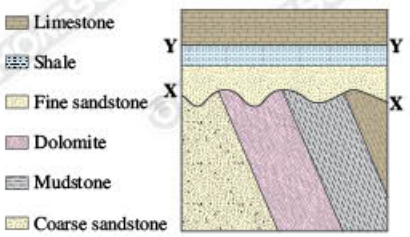
(d) (1) Earth movements and (2) wind.

27 In the fold shown in the opposite figure, how many axial planes, limbs and axes are there respectively ?



(a) 4 / 2 / 4
(b) 1 / 2 / 3
(c) 2 / 4 / 5
(d) 1 / 2 / 5

28 From the opposite figure, what are the two types of unconformity surfaces (X - X) and (Y - Y) ?



(a) (X - X) Angular / (Y - Y) Nonconformity.
(b) (X - X) Nonconformity / (Y - Y) Disconformity.
(c) (X - X) Disconformity / (Y - Y) Nonconformity.
(d) (X - X) Angular / (Y - Y) Disconformity.

29 One of the minerals of granite rock and is used in the manufacture of ceramics is .....

(a) feldspar. (b) clay. (c) quartz. (d) pyroxene.

30 The similarity between galena and calcite is .....

(a) the values of the angles between the cleavage planes.
(b) the degree of reflection of the light falling on them.
(c) the mineral group to which they belong.
(d) the number of the directions of cleavage planes.

31 The magma that forms granite differs from that forms rhyolite in .....

(a) the rate of heat loss. (b) the mineral composition.
(c) silica content. (d) the crystallization temperature.

32 * Which of the following is **not** expected to occur when exposing the oil reservoir rocks to metamorphism process ?

(a) The formation of quartzite.
(b) The formation of marble.
(c) Losing the porosity of rocks.
(d) Foliation of the rock texture.

Second Choose the correct answer 33 : 44 — 2 Marks

33 The outer layers of the tree trunk are thickened by the deposition of .....

(a) lignin. (b) suberin. (c) cellulose. (d) cutin.

34 What is the reason for high blood glucose in a diabetic patient ?

(a) The conversion of glycogen in the liver to glucose in the blood.
(b) The glucose does not pass into the body's cells.
(c) Increased absorption of glucose in the digestive tract.
(d) The glucose does not pass into the nephrons of the kidney.

35 ✳ What is the maximum number of *Spirogyra* filaments that are produced from the reproduction by conjugation for all the cells of two opposite *Spirogyra* filaments, one with 27 cells and the other with 37 cells ?

(a) 27 (b) 30 (c) 32 (d) 37

36 What is the importance of formation of polar bodies during oogenesis ?

(a) Reducing chromosomal number and storing food.
(b) Formation of a round-shaped ovum.
(c) Storing food and increasing the chances of fertilization.
(d) Postponing the second meiotic division.

37 The following table shows the average number of offspring resulting from each successful fertilization process :

Organism	Number of offspring
Lice	4500 eggs
Lion	2 - 4 cubs
Blue whale	1 whale
Bolti fish	200 - 1000 fish

Which organism will probably spend the longest period of parental care ?

(a) Lice.
(b) Lion.
(c) Blue whale.
(d) Bolti fish.

38 Which white blood cell does **not** engulf microbes ?

(a) Natural killer. (b) Basophil. (c) Neutrophil. (d) Monocyte.

39 ✱ A person was infected with microbe (A) at the age of (5 years) and recovered from it. Then he was infected with microbe (B) at the age of (7 years) and recovered from it. Then he was infected with microbe (A) at the age of (30 years) and did not show symptoms of the disease. How many times did this person's immune system have primary and secondary immune responses, respectively ?

(a) 2 / 1 (b) 1 / 1 (c) 1 / 2 (d) 2 / 2

40 How many DNA molecules are there in a secondary spermatocyte of human ?

(a) 22 molecules. (b) 23 molecules. (c) 46 molecules. (d) 92 molecules.

41 What is the result of non-separation of chromatids after centromere division ?

(a) DNA duplication. (b) Polyploidy. (c) Genetic mutation. (d) True mutation.

42 Which of the following contain(s) hydrogen bonds ?

(a) mRNA (b) tRNA (c) Ribosomes (d) rRNA

43 What is the main role of the ribosomal RNA (rRNA) ?

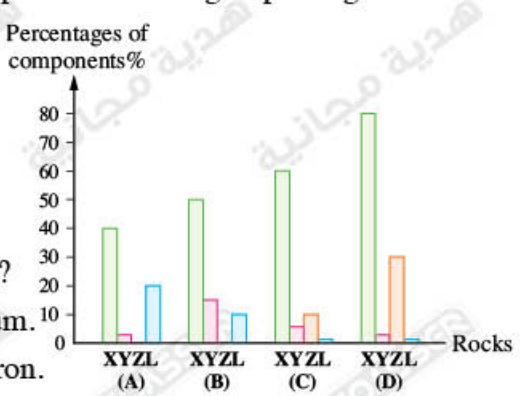
(a) It transfers genetic information from the nucleus to the cytoplasm.
(b) It binds to the genetic codon of amino acids.
(c) It builds polypeptide chains that make up proteins.
(d) It modifies the structure of other ribonucleic acids.

44 The following graph shows the percentages of components of four groups of igneous rocks (A), (B), (C) and (D) which are :

(A) : Ultrabasic.
(B) : Basic.
(C) : Intermediate.
(D) : Acidic.

What do (X), (Y), (Z) and (L) represent respectively ?

(a) (X) Silica / (Y) Iron / (Z) Potassium / (L) Sodium.
(b) (X) Silica / (Y) Calcium / (Z) Potassium / (L) Iron.
(c) (X) Iron /(Y) Silica /(Z) Potassium / (L) Calcium.
(d) (X) Iron /(Y) Sodium / (Z) Calcium / (L) Potassium.



Third **Answer the following questions 45 & 46** — 2 Marks

45 **The nucleus of an early embryonic cells of a male frog was removed and transplanted in a frog egg cell whose nucleus is removed :**

(a) What is the name of this process ? **And what** is the gender of the resulting individual ?

.....

(b) What is the artificial form of reproduction that can be conducted on a frog to obtain females only ?

.....

46 **From the following diagram :**



(a) What are the geological processes that are represented by the letters (X), (Y) and (Z) ?

.....

(b) What is the rock that is represented by letter (W) ?

.....

Exam 7

Answered

Questions signed by ✻ are answered in detail.

First Choose the correct answer 1 : 32

1 Mark

1 The tissues that support plants are .....

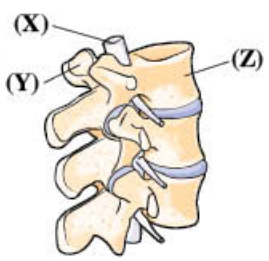
(a) phloem and sclerenchyma tissues.

(b) parenchyma and sclerenchyma tissues.

(c) collenchyma and sclerenchyma tissues.

(d) parenchyma and collenchyma tissues.

2 If the opposite figure represents a part of the human skeleton, which of the following statements is correct ?



(a) Part (Z) is connected posterioly to the neural ring.

(b) The part shown in the figure belongs to the pectoral girdle.

(c) Part (X) passes through the vertebrae shown in the figure only.

(d) Part (Y) is inclined downwards and carries two inferior articulating processes.

3 What distinguishes the pulling movement in pea plants from the pulling movement in bulbs ?

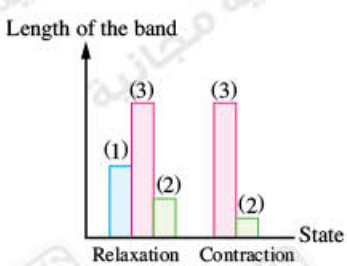
(a) Dependence on auxins.

(b) Support against winds.

(c) Increased food consumption rate.

(d) Increased food storage rate.

4 Through studying the opposite graph that shows the state of a sarcomere that is working normally. What do numbers (1), (2) and (3) represent respectively ?



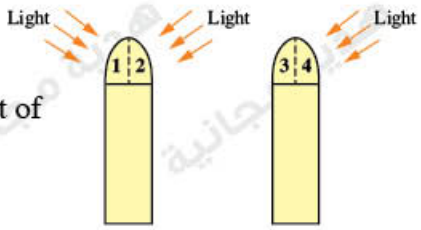
(a) Dark band / Semi-light band / Light band.

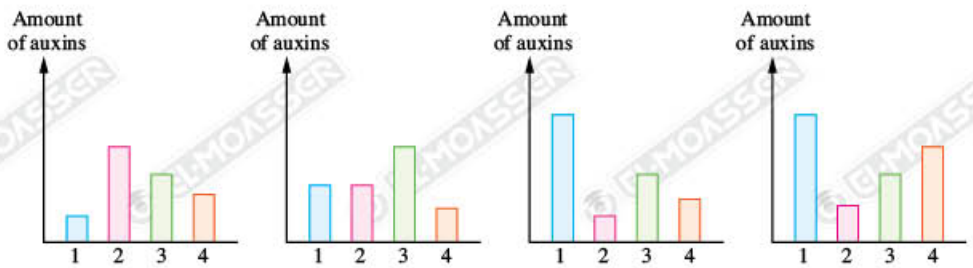
(b) Dark band / Light band / Semi-light band.

(c) Semi-light band / Light band / Dark band.

(d) Semi-light band / Dark band / Light band.

5 ✻ The opposite figure shows an experiment used to verify the effect of light on the plant seedlings. Which of the following graphs shows the probable amount of auxins on the two sides of seedlings after several days ?





6 Which of the following hormones has the highest concentration in the mother's body during embryonic development ?

(a) Estrogen. (b) Progesterone. (c) Prolactin. (d) Relaxin.

7 Which of the following can cause an increased secretion of cortisol ?

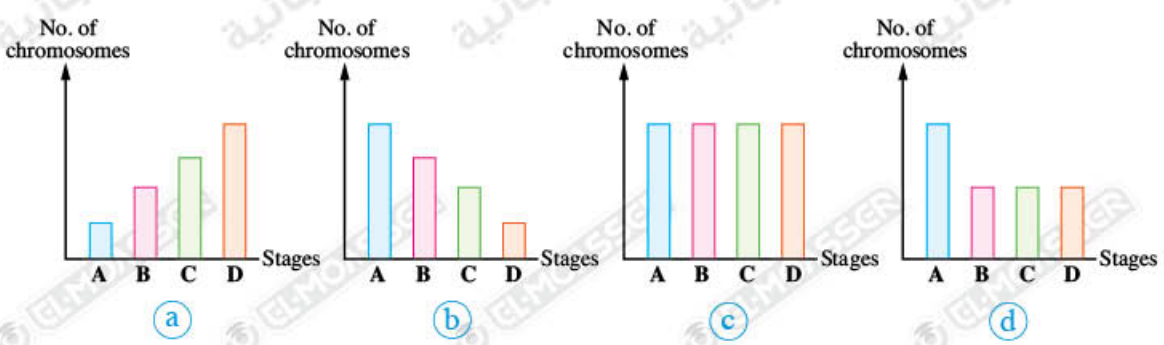
(a) Decreasing the protein and fat synthesis.

(b) Increasing the ACTH level in blood.

(c) Increasing the blood glucose level.

(d) Decreasing the muscle glycogen level.

8 ✻ Based on studying tissue culture in tobacco plant, which of the following graphs represents the number of chromosomes during different stages of the experiment from the beginning of the tissue development till obtaining a complete plant ?



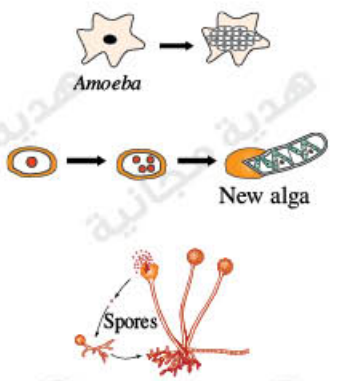
9 Which of the following distinguishes asexual reproduction from sexual reproduction ?

(a) It depends on meiosis to increase the number of individuals.
(b) It causes a diversity in the genes of the resulting individuals.
(c) It increases the number of species with a change in genetic traits.
(d) It conserves the species with the stability of genetic traits mostly.

10 ✱ If the number of nuclei in zygospore resulting from meiosis on germination in *Spirogyra* alga is four, then the number of algal filaments resulting from this zygospore is .....

(a) (1). (b) (2). (c) (4). (d) (8).

11 Based on your study for the reproduction in living organisms, what is the similarity between the living organisms shown in the opposite figure ?



(a) Resulted individuals are similar in the chromosomal numbers.
(b) Protection from harsh conditions by forming a thick coat.
(c) Depending on the two types of cell division when reproducing.
(d) Using the sexual reproduction in suitable conditions.

12 When examining a blood sample of a person infected with malaria using a microscope, which of the following phases will appear upon examination ?

(a) Sporozoites and gametes. (b) Merozites and ookinete.
(c) Gametocytes and sporozoites. (d) Gametocytes and merozoites.

13 Which of the following statements is correct ?

(a) The number of pollen grains is always less than the number of fertilized eggs.
(b) Two male nuclei are required to form the embryo during double fertilization.
(c) Three mitotic divisions are required to form the embryonic sac.
(d) The embryonic sac results from meiotic division of a spore cell in the flower's ovary.

14 Which of the plant immune means **doesn't** require exposing the plant to danger ?

(a) Receptors and detoxifying enzymes. (b) Hairs and thorns.
(c) Waxy layer and tyloses. (d) Deposition of gums and phenols.

15 Interferons are protein substances secreted by some cells. Which of the following cells can form them ?

(a) Rectal cells infected with *Bilharzia*.
(b) Liver cells infected with malaria *Plasmodium*.
(c) Lung cells infected with Coronavirus.
(d) Stomach cells infected with *Salmonella* bacteria.

16 A mosquito bites a person's skin. What is likely to happen at the site of the bite ?

(a) Mast cells secrete anti-inflammatory substances.
(b) Histamine is secreted by plasma B-cells.
(c) Complements are produced by macrophages.
(d) Basophils secrete inflammation-generating substances.

17 From the following diagram of the antibody, what is the correct statement ?



(a) From the parts of the heavy chain are (A, C & E), and from the parts of the variable chain are (H & F).
(b) From the parts of the heavy chain are (A, H & E), and from the parts of the constant region are (G & E).
(c) From the parts of the heavy chain are (A, G & E), and from the parts of the short chain are (F & H).
(d) From the parts of the heavy chain are (A, G & B), and from the parts of the variable chain are (H & F).

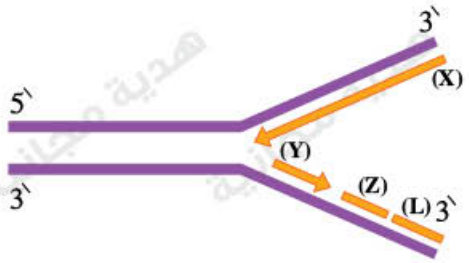
18 Scientists Hershey and Chase concluded, through their experiment that the substance(s) present in the outer surface of the phage is/are .....

(a) radioactive sulphur only.
(b) radioactive phosphorus only.
(c) both non-radioactive phosphorus and sulphur.
(d) both radioactive phosphorus and sulphur.

19 Which of the following statements about plasmids is **incorrect** ?

(a) They are circular pieces of DNA
(b) They can be transferred from one cell to another.
(c) They do not replicate when cell division occurs.
(d) They are present in some bacterial strains.

20 From the process shown in the opposite figure, which of the following pieces are formed first ?



(a) (X) and (L).
(b) (L) and (Y).
(c) (Z) and (X).
(d) (Y) and (X).

21 All of the following proteins are regulatory ones, **except** .....
(a) immune proteins that fight pathogens.
(b) transverse links proteins in myofibril.
(c) proteins that activate the digestion of starch into glucose.
(d) proteins that deposit calcium in bones.

22 By completing the following table and by using the codons table, which amino acid is translated ?

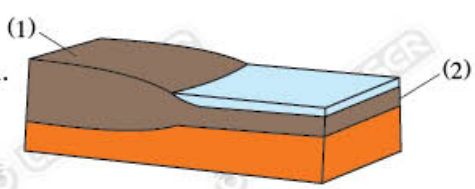
DNA	A		
mRNA		G	G
Amino acid			

(a) Tryptophan.
(b) Valine.
(c) Glycine.
(d) Alanine.

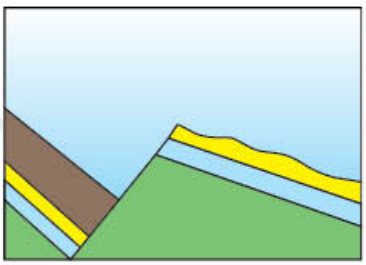
First base	Second base U	Second base C	Second base A	Second base G	Third base
U	Phe	Ser	Tyr	Cys	U
					C
	Leu		STOP	STOP	A
				Trp	G
C	Leu	Pro	His	Arg	U
					C
			Gln		A
					G
A	Ile	Thr	Asp	Ser	U
					C
	Met		Lys	Arg	A
					G
G	Val	Ala	Asp	Gly	U
					C
			Glu		A
					G

23 What is the importance of identifying defective genes in the fetus before delivery ?
(a) Studying the development of living organisms.
(b) Facilitating the delivery process.
(c) Preparing medicines without side effects.
(d) Improving the human offspring.

24 What is the difference and the similarity between components (1) and (2) respectively ?
(a) The physical state / Density and thickness.
(b) The density / Thickness and chemical composition.
(c) The density and thickness / The physical state.
(d) The physical state and thickness / The density.

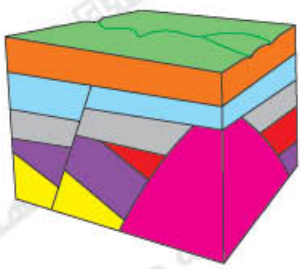


25 Which of the following characterizes the fault shown in the opposite figure ?



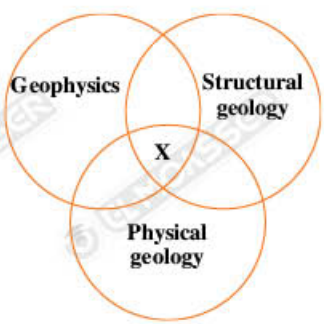
(a) The displacement of rocks occurs against the direction of gravity.
(b) The rocks exposed to a higher level are the hanging wall rocks.
(c) The rocks exposed to a higher level are the foot wall rocks.
(d) It leads to shrinking the area of rocks in that region.

26 Which of the following statements is true about the opposite model ?



(a) The reverse fault is younger than the angular unconformity and older than the disconformity.
(b) The reverse fault is younger than the angular unconformity and younger than the disconformity.
(c) The normal fault is younger than the angular unconformity and older than the disconformity.
(d) The normal fault is older than the angular unconformity and younger than the disconformity.

27 From the opposite diagram, which of the following geological structures is/are represented by letter (X) in which the three branches overlap in studying it and studying its importance ?



(a) Folds.
(b) Mud cracks.
(c) Cross-bedding.
(d) Unconformity surface.

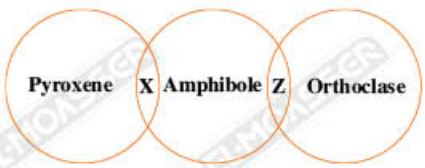
28 The crystal of the hexagonal crystal system contains .....
(a) one horizontal hexametrical axis.
(b) 6 perpendicular crystal axes.
(c) one vertical hexametrical axis.
(d) right horizontal crystal angles.

29 Which of the following minerals **can't** be scratched by topaz ?
(a) The mineral used in glass industry.
(b) The mineral that scratches apatite, but doesn't scratch quartz.
(c) The mineral used in cement industry.
(d) The transparent carbon mineral used in ornamentation.

30 When the ions of the magma elements react and the calcium plagioclase mineral is transformed into sodium plagioclase, it is accompanied by .....

(a) a decrease in temperature.
(b) an increase in temperature.
(c) an increase, then decrease in temperature.
(d) stability in temperature.

31 ✳ From the following diagram, what are the rocks represented by letters (X) and (Z) respectively ?



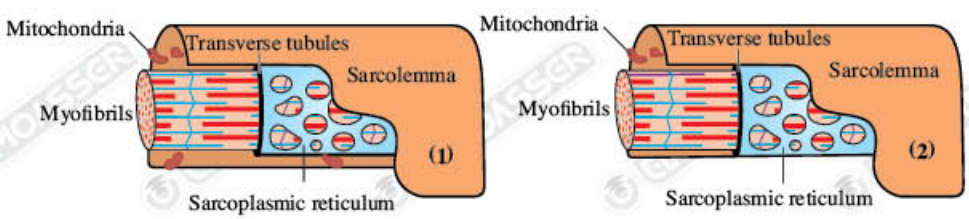
(a) (X) Peridotite / (Z) Obsidian.
(b) (X) Dolerite / (Z) Diorite.
(c) (X) Andesite / (Z) Komatiite.
(d) (X) Pumice / (Z) Andesite.

32 From the shapes of the volcanic igneous rocks are .....

(a) volcanic bombs and lopolith.
(b) laccolith and volcanic breccia.
(c) laccolith and batholith.
(d) ropes and volcanic bombs.

Second Choose the correct answer 33 : 44 — 2 Marks

33 Which of the following statements is true about the following two figures during muscle contraction if the two muscles have an abundance of oxygen ?

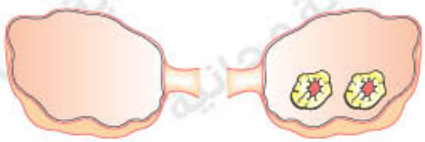


(a) Muscle (2) has a higher percentage of glycogen than muscle (1).
(b) Muscle (1) has a lower percentage of ATP than muscle (2).
(c) Muscle (1) is less susceptible to muscle spasm than muscle (2).
(d) Muscle (2) has a greater number of myofibrils than muscle (1).

34 The pituitary gland is connected to a network of blood vessels.
Which of the following glandular tissues **isn't** affected when the blood vessels coming out from the gland are blocked ?

(a) The glandular tissue cells that are found in the medulla of the adrenal gland.
(b) The gonad cells in both males and females, which are necessary for completing the sexual maturity.
(c) The cortex cells of the gland which secretes the mineralocorticoids and glucocorticoids.
(d) The follicular cells that form the gland located around the trachea.

35 From the following figure, which of the following predictions may occur in case of the occurrence of pregnancy ?



(a) Birth of fraternal twins.
(b) Birth of identical twins.
(c) Formation of a single embryonic sac.
(d) Birth of siamese twins.

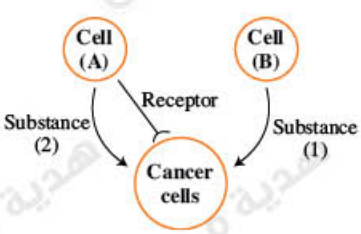
36 ✳ Through studying the opposite table. Deduce what are the organisms that this table shows their reproduction characteristics, respectively ?

Reproduction characteristics	Quick propagation	Genetic variation	Tolerance to harsh conditions
Organism (X)	–	✓	–
Organims (Y)	✓	–	✓
Organism (Z)	✓	✓	✓

(a) *Plasmodium* / *Spirogyra* / Frog.
(b) *Amoeba* / *Plasmodium* / *Spirogyra*.
(c) Frog / Bread mould / *Polypodium*.
(d) *Plasmodium* / *Polypodium* / *Spirogyra*.

37 Which stage of spermatogenesis produces chromosomally different cells ?
(a) The stage of increasing the number of cells by mitosis.
(b) The stage of reducing the chromosomes to half.
(c) The stage of increasing in size by storing food.
(d) The stage of metamorphosis.

38 ✳ By studying the opposite diagram that illustrates a part of the human immune mechanisms, deduce the similarity between the two cells (A) and (B) .....



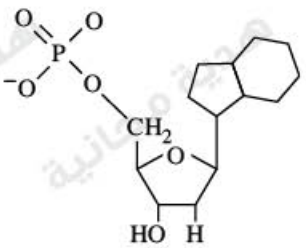
(a) the site of maturation and differentiation.
(b) both are granulocytes.
(c) the type of the lines of defence to which they belong.
(d) the type of the substance that kills cancer cells.

39 By studying the following blood cells, deduce the similarity between them .....



(a) the site of maturation and differentiation.
(b) type of receptors.
(c) the site of formation.
(d) the nature of cytoplasm.

40 If the chemical formula of the sugar molecule in the opposite figure is $C_5H_{10}O_4$, which of the following statements is a correct description about the opposite figure ?



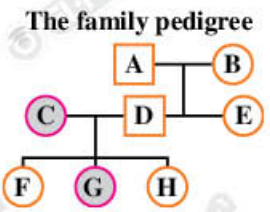
(a) A building unit of a ribonucleic acid.

(b) A nitrogenous base that distinguishes RNA.

(c) A purine base that distinguishes DNA from RNA.

(d) A building unit of deoxyribonucleic acid.

41 ✱ The opposite diagram represents the pedigree of a family. The individuals shaded in the figure have undergone a mutation, what is the possible type of this mutation ?



(a) True gene mutation.

(b) False chromosomal mutation.

(c) True somatic mutation.

(d) False gene mutation.

42 Pairing of nucleotides (ACG) with (UGC) can occur in the case of .....

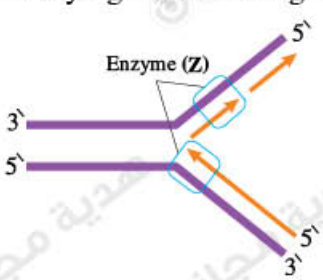
(a) binding of rRNA to mRNA codon.

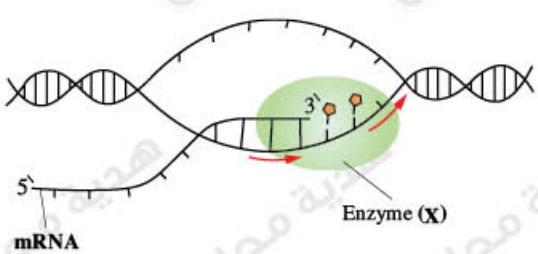
(b) DNA hybridization technique.

(c) DNA molecule.

(d) mRNA molecule.

43 From studying the shown figures, conclude :





What can distinguish enzyme (X) from enzyme (Z) ?

(a) The building blocks used to build the growing strand.

(b) The type of a single-ring base that added to the nucleotides of the new strand.

(c) The type of a double-ring base that added to the nucleotides of the new strand.

(d) The direction of adding nucleotides in the new growing strand.

44 The mud rock that exhibits the foliation property, as a result of the compaction of its components is represented by.....

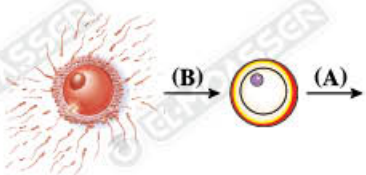
(a) shale. (b) mudstone.

(c) kerogen. (d) sandstone.

Third Answer the following questions 45 & 46

2 Marks

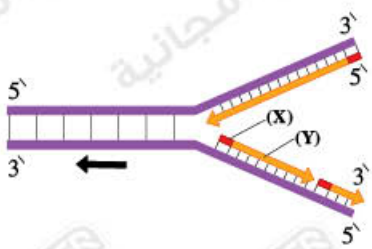
45 Through the opposite diagram, **mention** the two cell divisions represented by the letters (A) and (B), and **what** is their importance ?



.....

.....

46 **What** is the chemical difference between structures (X) and (Y), that shown in the opposite figure ?



.....

.....

.....

.....

Exam 8

Answered

Questions signed by * are answered in detail.

First Choose the correct answer 1 : 32

1 Mark

1 The largest articulating vertebra in the human vertebral column is vertebra no. .....

(a) 7 (b) 19 (c) 24 (d) 25

2 The number of bones in the human hand is .....

(a) 27 (b) 24 (c) 29 (d) 13

3 The occurrence of muscle fatigue when getting tired is due to the accumulation of .....

(a) carbon dioxide. (b) alcohol.
(c) lactic acid. (d) amino acids.

4 The tendril wilts and dies if .....

(a) it attaches to the support.
(b) the remaining part of it gets coiled after twining.
(c) the support is a solid object.
(d) it doesn't find a support to twine around it.

5 Which of the following hormones does/do **not** work on the internal balance of the body ?

(a) Calcitonin and parathormone. (b) Aldosterone.
(c) Glucagon and insulin. (d) Thyroxine.

6 When you drink a quantity of water, this leads to .....

(a) increased secretion of TSH hormone.
(b) increased secretion of antidiuretic hormone.
(c) decreased secretion of TSH hormone.
(d) decreased secretion of vasopressin hormone.

7 Which of the following is responsible for the secretion of oxytocin ?

(a) The anterior lobe of the pituitary gland.
(b) The parathyroid glands.
(c) The nerve endings in the posterior lobe of the pituitary gland.
(d) The ovaries.

8 What is the distinguishing character of asexual reproduction ?

(a) The ability to produce new offspring quickly.
(b) The presence of diversity in generations.
(c) It takes time and energy.
(d) It needs more than one individual.

9 Which of the following reproduces by budding under suitable conditions ?

(a) Yeast.
(b) Bacteria.
(c) *Amoeba*.
(d) *Paramecium*.

10 The organism that consumes the least time and energy in parental care is .....

(a) lion.
(b) shark.
(c) blue whale.
(d) head louse in humans.

11 Which of the four floral whorls consist(s) of modified leaves or leaflets ?

(a) The calyx only.
(b) The calyx and corolla.
(c) The androecium and gynoecium.
(d) The four whorls.

12 When does the generative nucleus inside the pollen grain divide into two male nuclei ?

(a) When the pollen grain touches the stigma of the carpel.
(b) When the tip of the pollen tube reaches the micropyle.
(c) After the germination of the pollen grain.
(d) Before the germination of the pollen grain.

13 What type of cell is found inside an immature Graafian follicle ?

(a) Primary oocyte.
(b) Oogonium.
(c) Secondary oocyte.
(d) Primary germ cell.

14 Antibodies have the same chemical composition as ..... cells receptors.

(a) plasma
(b) B
(c) helper T
(d) T and B

15 One of the plant defences that arises only during infection with a pathogen is .....

(a) tyloses.
(b) cuticle layer.
(c) thorns.
(d) cellulose wall.

16 Which of the following is **not** a granulocyte ?

(a) Basophil.
(b) Macrophage.
(c) Eosinophil.
(d) Mast cell.

17 What is the type of lymphocytes that produce antibodies ?

(a) T-cells.
(b) B and T-cells.
(c) Memory B-cells.
(d) Plasma B-cells.

18 Which of the following **doesn't** contain DNA ?

(a) Nucleolus.
(b) Histone.
(c) Chromatin.
(d) Plasmid.

19 Which of the following applies to chromosomal proteins ?

(a) All of them are histone proteins.
(b) They are histone and structural non-histone proteins.
(c) All of them are non-histone proteins.
(d) They are histone and regulatory non-histone proteins.

20 It is known that if the DNA in one of the cells of the human body is unwound, it will reach a length of approximately two meters. How is this DNA found inside the nucleus despite of its length ?

(a) It is condensed into a structure called chromatid.
(b) It is wrapped around amino acids to fit the size of the nucleus.
(c) It is wrapped around the nucleolus tightly to fit the size of the nucleus.
(d) It is wrapped around the centromere to fit the size of the nucleus.

21 Which of the main parts in the structure of mRNA molecules is **not** transcribed from the DNA strand ?

(a) Start codon.
(b) Stop codon.
(c) Polyadenine tail.
(d) Ribosomal binding site.

22 Which of the following cells are preferable to be used to obtain the the insulin gene in an easier way ?

(a) Beta cells in the pancreas.
(b) All cells of the islets of Langerhans.
(c) All cells of the pancreas.
(d) All cells of the body.

23 ✳ Which of the following enzymes is formed inside the host cell when infected with AIDS virus ?

(a) DNA polymerase enzyme.
(b) RNA polymerase enzyme.
(c) DNA replication enzyme.
(d) Reverse transcriptase enzyme.

24 Which of the following distinguishes basalt from andesite ?

(a) The speed of rock crystallization.
(b) The texture of the igneous rock.
(c) The existance in the form of a volcanic eruption.
(d) Olivine enters into its composition.

25 All of the following are native minerals, **except** .....

(a) gold. (b) graphite. (c) diamond. (d) coal.

26 From the bases on which faults are classified is .....

(a) the fault components.
(b) the direction of displacement of fault walls.
(c) the economic importance of faults.
(d) the type of rocks that affected by faults.

27 The lava that contains large amounts of silica and the elements of sodium and potassium may cool to form ..... rock.

(a) peridotite (b) basalt (c) diorite (d) rhyolite

28 Which mineral cleaves in more than one direction and has salty taste ?

(a) Calcite. (b) Galena. (c) Halite. (d) Graphite.

29 If all the angles among the crystal axes in a monoclinic crystal become right-angled, it changes into .....

(a) cubic system. (b) tetragonal system.
(c) orthorhombic system. (d) triclinic system.

30 ✱ A mineral found in all rocks, **except** the ultrabasic ones is .....

(a) olivine. (b) amphibole.

(c) pyroxene. (d) plagioclase feldspar.

31 The chemical sedimentary rocks that contain water as a part of its chemical composition is ..... rocks.

(a) limestone (b) gypsum (c) table salt (d) anhydrite

32 The metamorphic rock that is formed from a mineral which is used in cement industry and is scratched by the copper coin is .....

(a) quartzite. (b) gneiss. (c) marble. (d) granite.

Second Choose the correct answer 33 : 44 — 2 Marks

33 What are the stages of the pulling movement in climbing plants ?

(a) Tendril twines in the air ⟶ It twines around the solid body ⟶ The parts of the tendril coil ⟶ The tendril thickens.

(b) The tendril thickens ⟶ It twines around the solid body ⟶ Tendril twines in the air ⟶ The parts of the tendril coil.

(c) The parts of the tendril coil ⟶ The tendril thickens ⟶ It twines around the solid body ⟶ Tendril twines in the air.

(d) Tendril twines in the air ⟶ The parts of the tendril coil ⟶ It twines around the solid body ⟶ The tendril thickens.

34 What is the main function of growth hormone ?

(a) Stimulating the secretion of steroid hormones.

(b) Inhibiting cell division and multiplication.

(c) Stimulating the secretion of milk from the mammary glands after birth.

(d) Regulating the growth of muscles and bones.

35 What is the effect of surgical sterilization on the human male ?

(a) Inability to mate.

(b) Failure to ejaculate the seminal fluid during mating.

(c) Non-exit of sperms within the seminal fluid.

(d) Inflammations in the epididymis.

36 Which of the following is considered asexual reproduction resulting from meiotic division ?

(a) Budding in *Hydra*.

(b) Parthenogenesis in male aphid insect.

(c) Spores formation in ferns.

(d) Sporogony in *Plasmodium*.

37 Which of the following characteristics distinguish siamese twins attached at the head ?

(a) One embryonic sac and two placentas.

(b) Two embryonic sacs and one placenta.

(c) One embryonic sac and one umbilical cord.

(d) One placenta and one embryonic sac.

38 Which of the following lymphoid organs are anatomically present in the digestive system ?

(a) Tonsils only.

(b) Peyer's patches only.

(c) Peyer's patches and appendix.

(d) Spleen and Peyer's patches.

39 What are the immune cells that are activated by interleukins ?

(a) B-cells only.

(b) B-cells and helper T-cells.

(c) T-cells and B-cells.

(d) Helper and cytotoxic T-cells.

40 The protein synthesis reaction is considered a/an ..... reaction.

(a) oxidation (b) reduction (c) hydrolysis (d) dehydration

41 How many nitrogenous bases make up the mRNA strand that is used to build a polypeptide chain consisting of 500 amino acids ?

(a) 500 (b) 503 (c) 1500 (d) 1503

42 ✳ How many purine bases are present in one turn of a DNA molecule ?

(a) 3 (b) 7 (c) 10 (d) 14

43 Which of the following led to a mutation in the *Penicillium* fungus that caused an increase in its production for the antibiotic ?

(a) Cosmic rays.

(b) The aqueous medium of the cell.

(c) Indole acetic acid.

(d) Gamma rays.

44 The hardest mineral is characterized by being ..... mineral.

(a) silicate (b) carbonate (c) native (d) clay

Third Answer the following questions 45 & 46 — 2 Marks

45 **(a) What** is the main purpose of sexual reproduction in monocotyledonous plants ?

.....

(b) Mention three factors that are considered stimuli for hormones secretion.

.....

.....

46 **(a) What happens** if magma is cooled in two stages ?

.....

(b) What does the dark colour of the igneous rock and its high density indicate ?

.....

.....

Exam 9

Answered

Questions signed by ✱ are answered in detail.

First Choose the correct answer (1 : 32) — 1 Mark

1 All of the following are correct about the vertebra at which the fifth pair of ribs articulates, **except** that .....

(a) it is larger than the seventh vertebra of the vertebral column.
(b) it is smaller than the first lumbar vertebra.
(c) no ligaments are attached to it.
(d) it has a transverse process.

2 What is the number of ligaments that attach the lower part of femur bone to the inner bone of shank ?

(a) 1 (b) 2 (c) 3 (d) 4

3 How far are these statements "the upper part of the sternum heals quickly because it gets food and oxygen directly "," the lower part of the sternum is difficult to heal because it gets food and oxygen indirectly" correct ?

(a) Both statements are correct.
(b) Both statements are incorrect.
(c) The first statement is correct and the second statement is incorrect.
(d) The first statement is incorrect and the second statement is correct.

4 ✱ The ratio between the number of vertebral column bones in a newborn baby and their number in an adult man is .....

(a) less than one. (b) equal to one.
(c) greater than one. (d) there is no relation.

5 How far are these statements "all hormones of the adenohypophysis part of the pituitary gland are related to the appearance of secondary sex characters" , "both FSH and LH control the appearance of secondary sex characters in males and females" correct ?

(a) Both statements are correct.
(b) Both statements are incorrect.
(c) The first statement is correct and the second statement is incorrect.
(d) The first statement is incorrect and the second statement is correct.

6 The mammary glands are affected by many hormones. The correct order for the effect of these hormones on them is as follows .....

(a) progesterone ⟶ estrogen ⟶ oxytocin ⟶ prolactin.

(b) estrogen ⟶ progesterone ⟶ prolactin ⟶ oxytocin.

(c) progesterone ⟶ estrogen ⟶ prolactin ⟶ oxytocin.

(d) estrogen ⟶ progesterone ⟶ oxytocin ⟶ prolactin.

7 ✻ During long hours of fasting, hormonal changes occur to maintain the body's internal balance. Which of the following expresses the correct change in hormones within this period ?

(a) Increase in glucagon and ADH

(b) Increase in insulin and ADH

(c) Decrease in glucagon and increase in ADH

(d) Increase in glucagon and decrease in ADH

8 Which of the following flowers produces the least genetic variation through sexual reproduction ?



(a) (b) (c) (d)

9 After double fertilization of the marrow flower, all the floral whorls and leaves will wilt and fall, **except** .....

(a) corolla. (b) androecium.

(c) corolla and stamens. (d) corolla and ovary.

10 Female gametes are produced in flowering plants by .....

(a) meiotic nuclear division followed by mitotic cellular division.

(b) mitotic nuclear division followed by meiotic cellular division.

(c) meiotic cellular division followed by mitotic nuclear division.

(d) mitotic cellular division followed by meiotic nuclear division.

11 Which of the following stages in human embryonic development includes the lowest rate of mitotic divisions ?


(a)


(b)

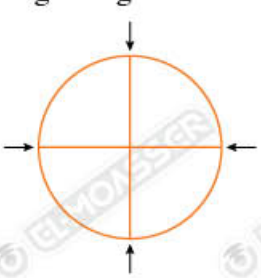

(c)


(d)

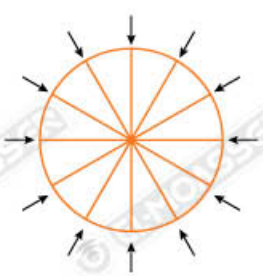
12 ✳ An egg of a female mouse (A) underwent the process of transplantation (cloning) by using an embryonic cell nucleus of a mouse (B). The resulting blastocyst was implanted in the uterus of a female (C). Therefore, the mitochondria in the resulting mouse cells will belong to the female lettered .....

(a) (A). (b) (B). (c) (C). (d) (A) and (B).

13 In the following figures, the circle represents a full year and the arrow represents the beginning of the breeding cycle :


(1)


(2)


(3)


(4)

Which of the following choices represents the breeding cycle in the lion and the mouse, respectively ?

(a) (1) and (3). (b) (2) and (4). (c) (3) and (2). (d) (2) and (3).

14 If the number of lymphocytes in a sample of a person's blood = 20 X, then the possible number of T-cells in this sample is .....

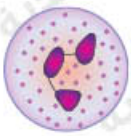
(a) 2 X (b) 4 X (c) 8 X (d) 16 X

15 Which mechanism of action of antibodies **cannot** work without complements ?

(a) Neutralization. (b) Precipitation. (c) Agglutination. (d) Antitoxins.

16 Which of the following cells **doesn't** have an immune function ?


(a)


(b)


(c)


(d)

17 Which of the following is performed by the bean plant to prevent the spread of a pathogenic fungus after its failure to destroy it ?

(a) Deposition of gums.

(b) Formation of tyloses.

(c) Getting rid of the infected cells.

(d) Increasing the thickness of the external epidermal layer.

18 A DNA molecule consists of 3 turns and contains 16 purine bases that pair with its complementary pyrimidines with three hydrogen bonds. How many thymine bases are in this molecule ?

(a) 16 (b) 30 (c) 28 (d) 14

19 Which of the following types of mutations play a role in the occurrence of evolution ?

(a) Induced / Chromosomal / Somatic.

(b) Induced / Genetic / Somatic.

(c) Spontaneous / Chromosomal / Somatic.

(d) Spontaneous / Genetic / Gamete.

20 If the opposite graph shows the ratio between the amount of DNA and the amount of protein in the cells of organism (X).

What can be concluded ?



(a) The organism is a prokaryote.

(b) More than half of the DNA is non-coding.

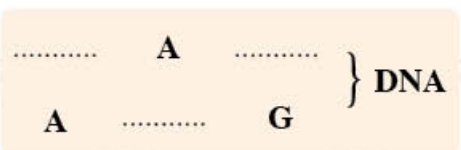
(c) The amount of protein depends on the amount of DNA

(d) The coding DNA represents about 70%

21 All of the following represent hybrid DNA of different species. Which of them represents the least evolutionary relationship ?



22 ✳ The following figure represents the beginning of a gene. Which of the following represents the correct anticodon in the figure ?



(a) AUG (b) UAC (c) UUG (d) AUC

23 ✳ Which of the following causes the greatest change in the resulting protein if inserted directly after the start codon ?

(a) A (b) AAA (c) ACG (d) UCC

24 When reclaiming land for agriculture, which branch of geology is **not** directly relied upon ?

(a) Engineering geology. (b) Paleontology.
(c) Hydrogeology. (d) Geophysics.

25 From the following, the hardest silicate mineral is .....

(a) quartz. (b) malachite. (c) diamond. (d) orthoclase.

26 ✳ Which of the following is true about the crystal system in which the value of the two angles (α) and (γ) are different ?

(a) It has no symmetrical planes.
(b) It has one symmetrical plane.
(c) It has horizontal and vertical symmetrical planes.
(d) It has inclined symmetrical planes.

27 When taking rock samples of equal size from the following igneous structures, which one contains the least number of crystals ?

(a) Sills of dolerite. (b) Ropes of rhyolite.
(c) Dykes of dolerite. (d) Batholith of diorite.

28 When studying the feldspar that forms basalt rock, which of the following elements is the most abundunt in it ?

(a) Iron. (b) Sodium. (c) Calcium. (d) Potassium.

29 Which of the following minerals is composed of two elements and its luster differs from that of metals ?

(a) Galena. (b) Quartz. (c) Calcite. (d) Malachite.

30 The temperature at which the crystallization of the rock containing the following minerals (orthoclase, quartz, amphibole and muscovite) occurred is .....

(a) 1000°C (b) 750°C (c) 900°C (d) 1100°C

31 Which of the following describes the materials used by the paleolithic man in drawing on walls ?

(a) They are considered minerals, because they are manufactured.
(b) They are not considered minerals, because they are liquid.
(c) They are considered minerals, because they are crystallized.
(d) They are considered minerals, because man relies on them.

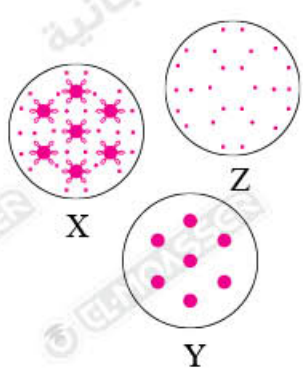
32 If you have three pieces of gold, diamond and magnetite, a magnet is approached to them, the magnet attracts to .....

(a) diamond. (b) magnetite.
(c) gold. (d) the three minerals.

Second Choose the correct answer 33 : 44 — 2 Marks

33 The opposite figure shows three cross-sections in a myofibril. Which of these sections passes through the dark region ?

(a) X
(b) Y
(c) Z
(d) Y and Z



34 ✳ Which of the following affects the ability of bone cells to divide and also to bear heavy weights ?

(a) The posterior lobe of the pituitary gland and parathyroid glands.
(b) The anterior lobe of the pituitary gland and adrenal cortex.
(c) The anterior lobe of the pituitary gland and thyroid gland.
(d) The posterior lobe of the pituitary gland and thyroid gland.

35 ✳ After double fertilization, the fertilized egg turns into a seed. Which of the following seeds will have only diploid cells after maturation ?

(a) Beans. (b) Wheat. (c) Castor. (d) Corn.

36 Which of the following organisms will possibly have the highest biological cost during its reproduction ?

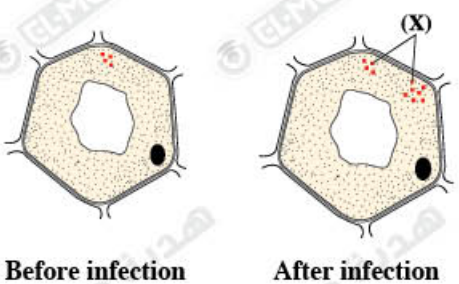
(a) Bony fish. (b) Cartilaginous fish. (c) Amphibians. (d) Mammals.

37 A woman gave birth to 4 twins (Mona, Hoda, Majed and Ali). What is the minimum number of ova required to give birth to these twins ?

(a) 4 (b) 3 (c) 2 (d) 1

38 The opposite figures represent plant cells before and after infection. Which of the following does **not** represent (X) ?

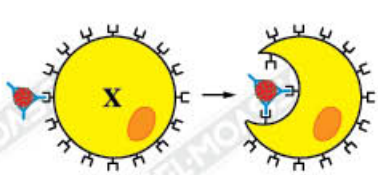
(a) Canavanine.
(b) Cephalosporin.
(c) Glycosides.
(d) Detoxifying enzymes.



Before infection **After infection**

39 The following figure illustrates one of the mechanisms of action of antibodies. Cell (X) represents .....

(a) helper T-cell.
(b) cytotoxic T-cell.
(c) plasma B-cell.
(d) macrophage.



40 In one of the experiments (X), (Y), (Z), and (L) are four different organisms, the ribosome was isolated from (X), tRNA was isolated from (Y), mRNA was isolated from (Z) and amino acids were isolated from (L), so the resulting protein is specific to organism .....

(a) (X). (b) (Y). (c) (Z). (d) (L).

41 Which of the following organisms **doesn't** have nucleosomes in its cells ?

(a) Bacteria. (b) *Plasmodium*. (c) *Amoeba*. (d) *Paramecium*.

42 If the mRNA for building insulin is introduced into the pancreatic alpha cells, these cells will be able to produce .....

(a) insulin only.
(b) glucagon only.
(c) insulin and glucagon.
(d) the cell stops producing protein.

43 If the following figure represents a sequence of nucleotides on a DNA strand. This part represents .....



(a) a complete gene.
(b) the beginning of a gene.
(c) the middle of a gene.
(d) the end of a gene.

44 How far are these statements "all rocks are made up of several minerals" , "all minerals are considered rocks" correct ?

(a) The first statement is correct and the second statement is wrong.
(b) Both statements are correct.
(c) Both statements are wrong.
(d) The first statement is wrong and the second statement is correct.

Third Answer the following questions 45 & 46 — 2 Marks

45 **Identify an example of each of the following:**

(a) Male gamete that is produced by mitosis.

.....

(b) Organisms that produce gametes by meiosis followed by mitosis.

.....

46 **From the following, identify the type of rock and determine one of its uses :**

(a) A metamorphic rock composed of one of the carbonate minerals.

.....

(b) A metamorphic rock formed under pressure and temperature less than 200°C.

.....

Exam 10

Answered

Questions signed by ✱ are answered in detail.

First Choose the correct answer 1 : 32

1 Mark

1 Which of the following consists of fewer bones ?

(a) The ankle. (b) The forearm. (c) The pectoral girdle. (d) The skull.

2 Which of the following structures is **not** present in most of the joints of the vertebral column between the vertebral centra ?

(a) Cartilages. (b) Ligaments. (c) Tendons. (d) Synovial fluid.

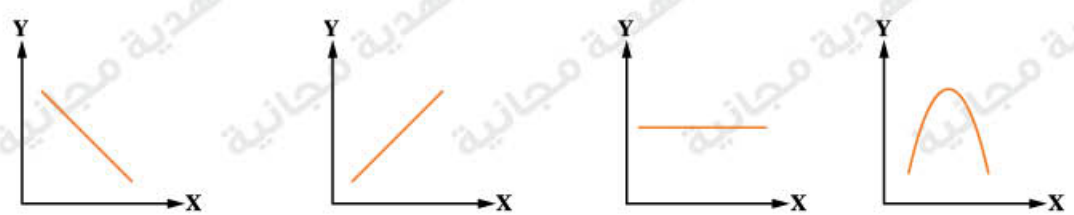
3 Which of the following movements its occurrence depends on the movement of water among cells ?

(a) Sleeping and awakening movement.
(b) Pulling movement.
(c) Tropism.
(d) Cytoplasmic streaming.

4 What is the range of the number of myofibrils found in five muscle fibers ?

(a) One thousand : Two thousands. (b) Two thousands : Four thousands.
(c) Five thousands : Ten thousands. (d) Three thousands : Six thousands.

5 Which of the following graphs expresses the relationship between the concentration of ADH hormone in blood (X) and the osmolarity of urine (Y) to maintain the blood osmolarity ?



(a) (b) (c) (d)

6 The hormones that stimulate the involuntary muscle contraction are .....

(a) relaxin and ADH (b) oxytocin and relaxin.
(c) adrenaline and progesterone. (d) oxytocin and ADH

7 Which of the following pairs of hormones are antagonistic in their action ?

(a) FSH and LH
(b) Vasopressin hormone and TSH
(c) Calcitonin and parathormone.
(d) Oxytocin and prolactin.

8 Which of the following forms of reproduction consumes the least energy ?

(a) Sexual reproduction in humans.
(b) Scalariform conjugation in *Spirogyra*.
(c) Binary fission in bacteria.
(d) *Plasmodium* reproduction in the mosquito stomach.

9 ✳ The hormones with the highest concentration in the vein of the testis of an adult man are .....

(a) FSH and testosterone.
(b) LH and androsterone.
(c) FSH and LH
(d) testosterone and androsterone.

10 The bean seed embryo feeds during its development on .....

(a) endosperm only.
(b) nucellus and endosperm.
(c) nucellus, receptacle and endosperm.
(d) endosperm and the food stored in the cotyledons.

11 The spores of the *Polypodium* plant are characterized by being .....

(a) equipped with cilia.
(b) large in size.
(c) thin-walled.
(d) thick-walled.

12 ✳ The chemical contraceptive method is the .....

(a) coil. (b) pills. (c) condom. (d) surgical sterilization.

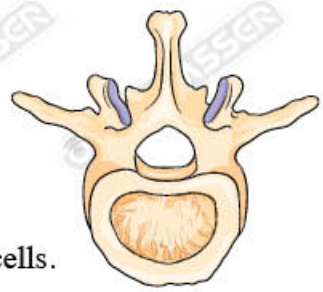
13 ✳ Which of the following sentences expresses sexual reproduction ?

(a) It always requires the presence of a male gamete and a female gamete.
(b) It occurs in diploid organisms only.
(c) There is no genetic diversity in it.
(d) It can take place by one parental individual.

14 ✳ Which of the following immune cells contribute to kill microbes during the inflammatory response ?

(a) Macrophages only.
(b) Natural killer cells (NK) and cytotoxic T-cells (T_C).
(c) Basophils and B-cells.
(d) All types of non-specific white blood cells.

15 The figure in front of you represents one of the components of the .....



(a) axial skeleton, which produces only lymphocytes.
(b) axial skeleton, which produces all types of white blood cells.
(c) appendicular skeleton, which produces only lymphocytes.
(d) axial skeleton, which produces all white blood cells except T-cells.

16 Which of the following lymphoid organs belong anatomically to the digestive system ?

(a) Thymus gland. (b) Tonsils. (c) Lymph nodes. (d) Appendix.

17 Which of the following immune means in plant are specific ?

(a) Tyloses. (b) Receptors. (c) Glycosides. (d) Phenols.

18 What did Griffith conclude through his experiments on pneumonia bacteria ?

(a) The genetic material of viruses is DNA
(b) The structure of DNA is a double helix.
(c) The amount of thymine equals the amount of adenine in DNA structure.
(d) The characteristics of bacteria change after introducing new genes into them.

19 In the following table, which of the following choices applies to the guanine base ?

	Complementary base	Binds with	Number of hydrogen bonds	Number of carbon rings
(a)	C	1st carbon of ribose	3	1
(b)	A	3rd carbon of ribose	2	1
(c)	C	1st carbon of deoxyribose	3	2
(d)	G	5th carbon of deoxyribose	2	2

20 During the process of DNA replication, which of the following are separated ?

(a) Phosphate groups and deoxyribose sugar.

(b) Cytosine and guanine.

(c) Uracil and thymine.

(d) Adenine and uracil.

21 Which of the following is **not** a characteristic of DNA found inside the nuclei of eukaryotic cells ?

(a) It is organized in a circular form.

(b) It is associated with histones.

(c) It is organized in the form of chromatin.

(d) It may undergo a mutation.

22 ✳ If a mutation occurs in the DNA found in the mitochondria in the gametes of both the father and mother, from which of the following the mutations will be transmitted ?

(a) Fathers to their sons only.

(b) Fathers to their sons and daughters.

(c) Mothers to their daughters only.

(d) Mothers to their sons and daughters.

23 ✳ What is the regulatory protein that plays a role in restoring the sarcomere to its fundamental length ?

(a) Actin. (b) Myosin. (c) Acetylcholine. (d) Cholinesterase.

24 What is the reason for the gradual increase in density inside the outer core with increasing the depth in the interior of the Earth ?

(a) The gradual increase in temperature.

(b) The increase in pressure affecting its components.

(c) The change in chemical composition.

(d) The presence of the Earth's magnetic field.

25 The presence of old rocks surrounding younger rocks as a result of tectonic tension forces is considered an evidence for the presence of .....

(a) graben fault. (b) anticline fold. (c) horst fault. (d) syncline fold.

26 All of the following is from the economic importance of folds, **except** .....
(a) they are sites where oil and natural gas are formed.
(b) they are sites where economic minerals are deposited.
(c) they have a role in engineering projects.
(d) they are reservoirs for groundwater.

27 The opposite table shows the axes lengths of a crystal that belongs to the tetragonal system, when this crystal is bisected by a horizontal symmetrical plane, a crystal is produced that is characterized by .....

Axis	a	b	c
The length of axis	4 cm	4 cm	8 cm

(a) having axes which are equal in length, but not perpendicular.
(b) being the most symmetrical crystal system.
(c) having a biometric vertical axis.
(d) having unequal ratios among the lengths of its axes.

28 A compound mineral that has cleavage in one plane is .....
(a) calcite. (b) graphite. (c) biotite. (d) galena.

29 ✳ What is the correct ascending order of the following rocks according to the melting point ?
(a) Pumice, then komatiite, then microdiorite.
(b) Komatiite, then pumice, then microdiorite.
(c) Pumice, then microdiorite, then komatiite.
(d) Komatiite, then microdiorite, then pumice.

30 When deposits with a diameter of less than 50 microns are exposed to a temperature less than 200°C and high pressure, ... is produced.
(a) a primary non-porous crystalline rock
(b) a porous crystalline rock with deformed fossils
(c) a foliated rock with clear fossils
(d) a foliated rock used in construction works

31 When an igneous dyke and a laccolith are formed from the same magma, they differ in .....
(a) the type of rock and the tectonic structures associated with them .
(b) the shape of the structure and the effect of each of them on layers.
(c) the shape of the structure and the texture of their rocks .
(d) the chemical composition and the crystallization temperature.

32 When foliated metamorphic rocks in an inclined position is found beneath younger foliated clastic rocks, that is considered an evidence for the presence of .....

(a) an angular unconformity surface.
(b) a nonconformity surface.
(c) a disconformity surface.
(d) a fold whose oldest layers are at the center.

Second Choose the correct answer 33 : 44 — 2 Marks

33 The opposite figure shows the structure of the myosin protein in the myofibil. Which of the parts labeled with the letters (A), (B) and (C) is the site at which the structure shown in the figure binds to actin filaments during muscle contraction ?



(a) A (b) B (c) C (d) None of them.

34 Which of the following hormones affect all the body cells, including the cells secreting them ?

(a) Thyroxine and insulin.
(b) Parathormone and calcitonin.
(c) Aldosterone and ADH
(d) Gastrin and adrenaline.

35 The calyx differs from the corolla in .....

(a) the presence of pigments in its leaves.
(b) the number of its leaves sometimes.
(c) its function in protecting the parts of the flower.
(d) there is no difference between them.

36 The cell that contains a thick coat and has the ability to germinate into a new individual directly is .....

(a) the egg. (b) the spore. (c) the pollen grain. (d) the bud.

37 Which hormone stimulates the beginning of the uterine activity in an adult female ?

(a) FSH (b) LH (c) Estrogen. (d) Progesterone.

38 * The blood vessels in the umbilical cord of the fetus belong to .....

(a) the fetus only.
(b) the mother only.
(c) the mother and the fetus.
(d) the mother and the placenta.

39 Tyloses are considered a ..... immune mean.

(a) structural pre-existing

(b) structural induced as a response to infection

(c) structural specific

(d) structural, pre-existing and as a response to infection

40 Which of the following chemical substances works on communicating immune cells with somatic cells ?

(a) Interleukins. (b) Cytokines. (c) Interferons. (d) Histamine.

41 A researcher inserted an mRNA molecule into the nucleus of an animal cell, after removing the polyadenine tail. Which of the following is expected to happen ?

(a) mRNA cannot exit from the nucleus for translation.

(b) The cell recognizes the absence of a polyadenine tail in mRNA and digests it in the nucleus.

(c) The mRNA molecule is digested when it leaves the nucleus.

(d) The mRNA molecule binds to the ribosome and is translated, but more slowly.

42 How many types of nucleotides are similar in DNA and RNA ?

(a) Zero. (b) 1 (c) 3 (d) 4

43 Which of the following distinguishes tRNA from mRNA ?

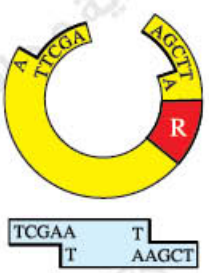
(a) The presence of the ribosomal binding site.

(b) The presence of hydrogen bonds between some bases.

(c) The site of transcription.

(d) The site of action.

44 From the opposite figure, what is the reason that prevents the direct binding of the plasmid to the gene ?



(a) Not using suitable ligase enzymes.

(b) Treating both the gene and the plasmid with different restriction enzymes.

(c) Both the DNA and the plasmid belong to genetically different organisms.

(d) The difference in the length of the sticky ends.

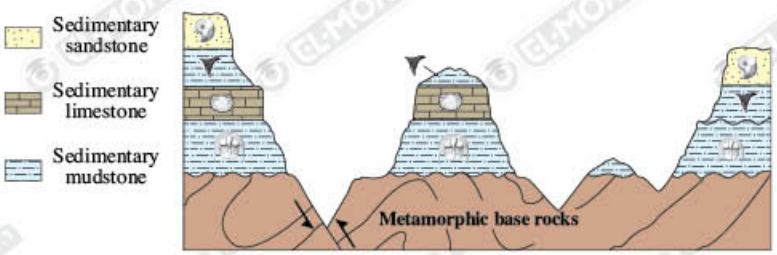
Third **Answer that following questions 45 & 46** — 2 Marks

45 A person has difficulty in moving his humerus bone despite being intact. **Identify two possible reasons for this.**

.....

.....

46 **Study the following vertical section, then answer :**



(a) What is the type of the fault shown in the section ?

.....

(b) What is the number of unconformity surfaces in the section ? **And what** are their types in order from the oldest to the youngest ?

.....

.....

Answers of Guiding Exams

Exam 1

Answers of Multiple Choice Questions

Question no.	1	2	3	4	5	6	7	8	9	10
Answer	d	b	d	c	a	d	a	b	c	a

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	b	c	b	c	c	a	d	a	d	c

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	a	b	b	a	b	c	a	c	b	a

Question no.	31	32	33	34	35	36	37	38	39
Answer	c	c	b	a	d	a	c	b	d

Question no.	40	41	42	43	44
Answer	c	a	b	b	d

Detailed Answers for the Questions Signed by ❋

7 ⓐ / As the figure shows a slight swelling in the anterior part of the neck, but there is no eye protrusion. Therefore, this disturbance does not represent hyperthyroidism, but rather it represents a simple goiter as a result of hypothyroidism.

19 ⓓ / As the width of the ladder rungs along the DNA molecule is equal, and the two strands are at the same distance from each other, because each rung consists of a base with one ring (pyrimidine) and another with two rings (purine), i.e. each rung in the DNA molecule consists of three carbon rings.

23 ⓑ / As the structure of the chromosome includes one DNA molecule that extends from one end to the other, therefore 4 homologous pairs of chromosomes contain 8 DNA molecules (all of them are replicated).

30 ⓐ / As the sulphide mineral of black streak (X) is pyrite which is characterized by gold colour, while the mineral that belongs to oxides group of red streak (Z) is hematite of red colour and the carbonate mineral (Y) may be calcite (white) or dolomite (white) or malachite (green), therefore the correct choice is ⓐ.

33 ⓑ / As the transverse links extend from myosin filaments and attach to actin filaments with the help of calcium ions and ATP molecules, while the transverse links pull the actin filaments towards each other with the help of ATP molecules only.

43 ⓑ / As approximately 70 types of polypeptides (which are involved with the four types of rRNA) are built by ribosomes, therefore ribosomes play a role in the production of new ribosomes in the cell.

Answers of Miscellaneous Questions

45 **The statement is wrong** / As B-cells are more specific than helper T-cells. Each B-cell is specific, i.e. it has one type of immune receptors that can recognize and bind to one type of antigens, and the receptor of the B-cell has the same shape and structure of the antibody that will be produced by that cell when it differentiates into a plasma cell.

46 **(a) (A) :** Thrust fault / **(F) :** Normal fault.

(b) • **Unconformity surface (C) :** Angular unconformity.

• **Unconformity surface (E) :** Disconformity.

Exam 2

Answers of Multiple Choice Questions

Question no.	1	2	3	4	5	6	7	8	9	10
Answer	c	b	a	c	b	a	d	a	d	c

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	c	c	c	c	b	d	c	b	c	b

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	a	c	c	d	b	a	b	b	c	d

Question no.	31	32	33	34	35	36	37	38	39
Answer	b	b	b	b	b	d	a	d	c

Question no.	40	41	42	43	44
Answer	c	a	d	c	c

Detailed Answers for the Questions Signed by ✱

9 ⓓ / As most primitive organisms reproduce by conjugation, such as some protozoa (like *Paramecium*), some algae (like *Spirogyra*), and some fungi (like bread mould), while sponge belongs to the kingdom "Animalia" and reproduce sexually by gametes and asexually by budding and regeneration.

10 ⓒ / As ferns produce spores by meiosis, where each spore cell (2n) divides meiotically to give 4 spores, each one of them is (n). Therefore, the number of spores that are produced by a sporangium containing 100 spore cells is $100 \times 4 = 400$ spores.

11 ⓒ / As in the tulip flower, it is difficult to distinguish between the calyx and corolla leaves, therefore the whorl that attracts insects for the pollination of this flower, is the perianth.

13 ⓒ / As during the embryonic development of the female, the multiplication stage of ovum formation takes place, in which mitotic division of the primary germ cells (2n) occurs, and this division results in the formation of oogonia. The growth stage also takes place, in which the oogonia (2n) store a quantity of food, then they grow in size, and turn into primary oocytes. Thus, the human female is born with her ovary containing primary oocytes, while the maturation stage occurs, during which the secondary oocyte is formed during puberty.

22 ⓒ / As a promoter is a sequence of nucleotides that represent signals where mRNA synthesis should begin, and it is found at the beginning of each gene, therefore there are 2000 promoters on 2000 genes.

27 ⓑ / As calcite has rhombohedra cleavage and its hardness is 3, while quartz doesn't cleave and its hardness is 7

29 ⓒ / As the model shows a crystal of tetragonal system, where the relation among the lengths of its crystal axes is ($a_1 = a_2 \neq c$), therefore when the length of axis (c) equals the length of axis (a_2), the relation among the lengths of the crystal axes becomes ($a_1 = a_2 = a_3$), and this relation is what characterizes the crystal of the cubic system.

34 ⓑ / As both glucagon and adrenaline hormones convert glycogen into glucose, thus increasing the concentration of glucose in the blood, i.e. they have a similar effect on carbohydrates. Insulin, on the other hand, works to lower the concentration of glucose in the blood by inducing the oxidation of glucose in the various cells and tissues of the body, because it allows monosaccharides (except fructose) to pass through the cell membrane into the cell.

44 ⓒ / As the density of igneous rocks differs according to their chemical composition, so it is found that the rocks of the highest density is the ultrabasic rocks (komatiite) followed by basic rocks (basalt), then intermediate rocks (andesite) and the rocks of the lowest density is acidic rocks (rhyolite).

Answers of Miscellaneous Questions

45 Helper T-cells (T_H) and B-cells.

46 Bacteria / As bacteria are from prokaryotes, i.e. they don't contain a defined nucleus but the genetic material is found in the cytoplasm not surrounded by the nuclear membrane. So, they reproduce by binary fission through the duplication of the genetic material at first, then the cell divides into two genetically identical cells.

Exam 3

Answers of Multiple Choice Questions

Question no.	1	2	3	4	5	6	7	8	9	10
Answer	b	c	d	a	a	a	b	b	b	a

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	d	d	c	d	a	a	d	c	a	c

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	b	b	a	b	a	a	d	c	b	b

Question no.	31	32	33	34	35	36	37	38	39
Answer	c	c	b	b	a	c	a	a	c

Question no.	40	41	42	43	44
Answer	a	d	d	d	b

Detailed Answers for the Questions Signed by ✱

6 ⓐ / As diabetes mellitus takes place as a result of the deficiency in insulin secretion. Consequently, glucose does not enter the cell, so that the cells cannot obtain energy from glucose, due to the lack of insulin. Therefore, the cells resort to another energy source, which is the fat stored in body tissues. This leads to significant weight loss in the diabetic patients.

20 ⓒ / As the midpiece of the sperm contains the mitochondrion, which contains a DNA molecule in the form of a double helix whose ends are joined together, as in prokaryotes. While the head contains the nucleus, which contains DNA in the form of a double helix whose ends are not joined together.

23 ⓐ / As the absence of the anticodon (AUG) during translation process means the absence of the tRNA for tyrosine, which has a codon (UAC) on the mRNA. Consequently, translation process stops, and tyrosine is absent.

25 ⓐ / As the mass of the Earth's core (X) represents the third of the Earth's mass, therefore the mass of both the Earth's crust and mantle represents about two-thirds of the Earth's mass (2X).

30 ⓑ / As the figure shows a crystal in which the lengths of the two horizontal axes are equal and the length of the vertical axis (c) is different and this characterizes the crystal of the tetragonal system ($a_1 = a_2 \neq c$).

Answers of Miscellaneous Questions

45 **(a) (B) :** Basophil.

(b) The cell indicated by letter (A), "lymphocyte," is characterized by being agranular cell.

46
- New individuals can be obtained from a single female starfish by :
  - Regeneration.
  - Artificial parthenogenesis.
- The sex of the individuals produced by each way is only female.

Exam 4

Answers of Multiple Choice Questions

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

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	b	c	a	c	b	d	b	a	c	c

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	a	a	b	c	b	a	b	a	d	c

Question no.	31	32	33	34	35	36	37	38	39
Answer	b	a	c	b	a	d	b	b	d

Question no.	40	41	42	43	44
Answer	b	c	d	a	d

Detailed Answers for the Questions Signed by ✱

2 ⓒ / As shown in the graph, the concentration of lactic acid rises, then it becomes constant. This indicates muscle fatigue occurrence due to the lack of oxygen, which causes the muscle resorting to convert glycogen into glucose that is oxidized through fermentation (anaerobic respiration) to produce energy. This process results in the accumulation of lactic acid. Therefore, the lack of sufficient oxygen for aerobic respiration causes the concentration of lactic acid to be constant in the muscle after its increase.

8 ⓑ / As the spores are formed in the sporangium of bread mould by mitosis, i.e. each spore mother cell produces two spores through mitosis. Therefore, 100 spore mother cells produce 200 spores when they divide.

16 ⓓ / As histamine affects the cells that make up the walls of blood vessels, causing them to dilate and increase their permeability to blood plasma. This leads to the swelling of the tissues at the site of inflammation, which then allows the passage of neutrophils, monocytes and natural killer cells, as well as macrophages to fight and kill pathogens.

18 ⓐ / ∵ Structure (2) represents a two-ring nitrogenous base linked to its complementary base by three hydrogen bonds.

∴ Structure (2) is guanine (G) base, which represents 22%

∵ The percentage of cytosine (C) bases = The percentage of guanine (G) bases = 22%

∴ The total percentages of adenine (A) and thymine (T) in the piece of DNA molecule = 100% – (22% + 22%) = 56%

∴ The percentage of thymine (T) = $\frac{56\%}{2}$ = 28%

23 ⓑ / As the sequences in choice ⓑ represent sequences on DNA from which stop codons (UGA) (UAG) (UAA) are transcribed on the mRNA molecules, but they are not translated into amino acids, as each stop codon gives a signal at the point where the protein synthesis stops and the polypeptide chain is completely formed.

29 ⓓ / As oxalates that form kidney stones are organic ions and one of the conditions for defining a mineral is that it is inorganic.

40 ⓑ / As the phosphate group attached to carbon atom no. (5) in the sugar of one nucleotide is covalently bonded to carbon atom no. (3) in the sugar of the following nucleotide, and this bond is represented by no. (2) in the figure. While no. (1) and no. (3) represent hydrogen bonds that bind the complementary nitrogenous bases together, while no. (4) represents a covalent bond that binds the phosphate group to the pentose sugar of the same nucleotide.

Answers of Miscellaneous Questions

45 Number of times of meiosis (II) = 7 times (3 births + 4 miscarriages).

46 **(a)** The structure indicated by letter (X) is the small ribosomal subunit.

(b) Because this site represents a stop codon (UAA) and does not have tRNA, because it does not represent an amino acid code.

Exam 5

Answers of Multiple Choice Questions

Question no.	1	2	3	4	5	6	7	8	9	10
Answer	a	b	c	c	b	c	d	c	b	a

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	d	d	d	b	a	c	b	c	c	b

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	c	b	b	a	b	b	a	a	b	c

Question no.	31	32	33	34	35	36	37	38	39
Answer	d	a	d	c	b	a	a	a	a

Question no.	40	41	42	43	44
Answer	c	a	a	b	b

Detailed Answers for the Questions Signed by ✱

11 ⓓ / As the nucleus of the endosperm (resulting from the triple fusion process) divides to give the endosperm tissue to nourish the embryo in its early stages of development in endospermic seeds (where the embryo does not feed on all the endosperm during its formation) and in exendospermic seeds (where the embryo feeds on all the endosperm during its formation). In this case, the plant is forced to store other food for the embryo in the cotyledons, i.e. in both cases, the embryo depends on the endosperm tissue to begin the germination process.

12 ⓓ / As process (2) shown in the figure represents the splitting of the fertilized ovum, which occurs by mitosis not meiosis.

23 ⓑ / As the nitrogenous base that distinguishes the nucleic acid RNA from the nucleic acid DNA is only the uracil (U) base, which is a single-ring base, i.e. it can be A or B

24 ⓐ / As zone (L) that is responsible for the movement of continents is asthenosphere, so part (X) above it is the solid upper mantle, while zone (M) that is responsible for the origin of magnetic field is the outer core, so part (Y) below it is the solid inner core, therefore (X) and (Y) have the same solid physical state.

28 ⓐ / As volcanic flows lead to the metamorphism of the rocks below it and sedimentary rocks are deposited above it.

32 ⓐ / As (X-X) is disconformity, so rocks (2) and (3) above and below it are sedimentary rock, while (Y -Y) is nonconformity, so rock (1) below it is metamorphic or igneous and rock (2) above it is sedimentary.

38 ⓐ / As B-cells are specific, where each B-cell has one type of immune receptors that can recognize and bind to one type of antigens, such as the measles virus antigen. Also, each T-cell produces a type of receptors specific to its membrane during maturation, and thus each type of these receptors can bind to one type of antigens, such as the measles virus antigen.

44 ⓑ / As the mineral that is characterized by flaky cleavage is mica and the mineral that is characterized by pearly luster is feldspar and the mineral that is characterized by glassy luster is quartz, so the rocks that are composed of quartz, feldspar and mica are intermediate and acidic igneous rocks, therefore the correct choice is ⓑ.

Answers of Miscellaneous Questions

45 **(a) Compound (B) :** DNA molecule.

(b) DNA molecule is completely hydrolyzed into nucleotides, therefore the phage can't infect the bacterial cell.

46 **(a)** Intermediate rock.

(b) **1.** Andesite.
2. Diorite.
3. Microdiorite.

Exam 6

Answers of Multiple Choice Questions

Question no.	1	2	3	4	5	6	7	8	9	10
Answer	b	c	c	c	a	c	d	b	c	b

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	d	c	c	d	a	c	c	a	b	a

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	d	b	d	c	b	c	b	d	a	d

Question no.	31	32	33	34	35	36	37	38	39	40
Answer	a	d	b	b	c	a	c	a	a	c

Question no.	41	42	43	44
Answer	b	b	c	b

Detailed Answers for the Questions Signed by ❋

6 ⓒ / As the hormone transfers through the blood (the transferring medium) to another organ or gland (the responding organ), the speed of hormone transportation in the blood is determined by the continuous movement of blood within the blood vessels through the contraction of the cardiac muscles and the smooth muscles found in the vessel walls. While the amount of hormone or the type of hormone-secreting cells does not determine its speed of transport.

18 ⓐ / As when phage (A) attacks a bacterial cell, the phage's genetic material penetrates the bacterial cell (leaving the protein coat outside), and its numbers multiply. The mRNA is then transcribed from the DNA and translated into the protein that forms the protein coat of the newly formed phages. Therefore, the components of the new viruses are from DNA and the phage (A) protein.

23 ⓓ / As the translation process begins with the start codon (AUG) to give the methionine amino acid. As well as the sequence AAA AAA AAA gives three lysine amino acids, which carry the code (AAA), while the codon (UAA) represents a stop codon (it does not represent an amino acid code) and gives a signal at the point where the translation process stops. Therefore, the polypeptide chain ends and separates, and the number of amino acids produced from the translation of this strand is four amino acids, which are :

AUG	AAA	AAA	AAA
Methionine	Lysine	Lysine	Lysine

The sequence AAAAAA that follows the stop codon represents the polyadenine tail, which is not translated.

32 ⓓ / As oil is stored in porous rocks such as sandstone and limestone, which lose their porosity when being metamorphosed into other rocks with granular texture, where sandstone is metamorphosed into quartzite rock and limestone is metamorphosed into marble rock.

35 ⓒ / As the scalariform conjugation occurs between the cells of the algal filament containing 27 cells and the 27 cells of the opposite algal filament containing 37 cells, so 27 new algal filaments are formed. Then a lateral conjugation occurs between each two cells of the remaining 10 cells, resulting in 5 algal filaments. The total number of *Spirogyra* filaments resulting from reproduction by conjugation is 27 (resulting from scalariform conjugation) + 5 filaments (resulting from lateral conjugation) = 32 algal filaments.

39 ⓐ / As the body responds to the infection with microbe (A) with a primary immune response, because it is a new microbe that entered the body. When the body is exposed to a new and different microbe (B), a primary immune response is also formed. However, when the body is exposed to microbe (A) again, a secondary immune response is formed through the memory cells that were formed for this microbe during the primary immune response. Thus, the number of times of the primary immune response is twice, and the number of times of the secondary immune response is once.

Answers of Miscellaneous Questions

45 **(a)** Cloning process / male.

(b) • Artificial parthenogenesis.
• Cloning using a nucleus from a female embryonic cell.

"One method is enough"

46 **(a)** • **(X)** : Lithification or solidification.
• **(Y)** : Compaction.
• **(Z)** : Metamorphism.

(b) Shale.

Exam 7

Answers of Multiple Choice Questions

Question no.	1	2	3	4	5	6	7	8	9	10
Answer	c	a	a	c	b	b	b	c	d	a

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	b	d	d	b	c	d	a	a	c	a

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	b	a	d	a	c	c	a	c	d	a

Question no.	31	32	33	34	35	36	37	38	39	40
Answer	b	d	c	a	a	c	b	d	c	d

Question no.	41	42	43	44
Answer	a	b	b	a

Detailed Answers for the Questions Signed by ❋

5 ⓑ / As the auxins amount will be equal in both sides (1) and (2), due to the exposure of the seedling sides to equal amount of light. While sides (3) and (4), the auxins amount in side (3) is greater than that of side (4), because the light is in side (4) of the seedling, so that auxins are transferred from the side facing light (4) to the side far away from light (3).

8 ⓒ / As tissue culture is a form of asexual reproduction that depends on the mitotic division of the living organism's somatic cells, where the number of chromosomes in the cells of the new individuals at all stages of development is the same as the number of chromosomes of the original plant cells.

10 ⓐ / As the nucleus of the zygospore divides meiotically (when conditions improved) to form four haploid nuclei (n) within the zygospore. Then, three of these nuclei degenerate, leaving the fourth nucleus, which divides mitotically to form a single new algal filament (n).

31 ⓑ / As pyroxene and amphibole minerals are involved in the mineral composition of rock (X), so dolerite rock is formed. While orthoclase and amphibole minerals are involved in the mineral composition of rock (Y), so diorite rock is formed.

36 ⓒ / As the reproduction of organism (X) is characterized only by causing genetic variation, i.e. it reproduces sexually and thus represents the frog. The reproduction of organism (Y) is characterized only by quick propagation and tolerance to harsh conditions, without genetic variation, and thus it represents bread mould, which reproduces asexually by spores. Besides, organism (Z) is characterized by each of the following :

- Quick propagation and tolerance to harsh conditions through asexual reproduction by producing spores.
- Genetic variation through asexual reproduction by spores formed by meiosis, in what is known as the alternation of generations through the life cycle of organism (Z).

38 ⓓ / As the two cells (A) and (B) are agranulocytes, which act on killing the cancer cells by secreting perforin protein. So, cell (A) is cytotoxic T-cell, due to the presence of a receptor on its surface, as it is a cell that is formed in the bone marrow, and matured and differentiated in thymus gland, where it works in the third line of defence. While cell (B) is a natural killer cell, due to the absence of receptors on its surface, as it is a cell which is formed and matured in bone marrow and works in the second and third lines of defence.

41 ⓐ / As the pedigree chart shows the inheritance of the mutation across generations, therefore it is a true mutation resulting from a chemical change in the gene's structure. This change in the gene's chemical structure is often accompanied by its transformation from a dominant gene to a recessive gene, i.e. it is a gene mutation. Besides, it is not a somatic mutation because it is inherited across generations, as the somatic mutation is not inherited.

Answers of Miscellaneous Questions

45
- **(A)** : It represents mitosis / Due to the occurrence of splitting and the formation and development of the embryo
- **(B)** : It represents meiosis (II) / Due to the formation of mature ovum to complete the fertilization process and zygote formation.

46
- **(X)** : It represents RNA nucleotides, which are called primers and are synthesized by the primase enzyme, which are characterized by containing ribose sugar.
- **(Y)** : It represents DNA nucleotides and are synthesized by the DNA polymerase enzyme, which are characterized by containing deoxyribose sugar.

Exam 8

Answers of Multiple Choice Questions

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

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	d	c	a	b	a	b	d	b	b	a

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	c	a	d	d	d	b	d	c	c	b

Question no.	31	32	33	34	35	36	37	38	39	40
Answer	b	c	a	d	c	c	d	c	b	d

Question no.	41	42	43	44
Answer	d	c	d	c

Detailed Answers for the Questions Signed by ✱

23 ⓓ / As the genetic material of AIDS virus is RNA, so the reverse transcriptase enzyme that exists in this virus transforms its genetic material from RNA to DNA to bind with the DNA of the host cell to ensure its replication.

30 ⓑ / As olivine, pyroxene and plagioclase feldspar minerals are entering in the main composition of the ultramafic rocks, while amphibole mineral enters in the main composition of mafic, intermediate and acidic igneous rocks.

42 ⓒ / As in any DNA turn the number of purines is equal to the number of pyrimidines.

∵ The turn in DNA molecule consists of 20 bases.

∴ The number of purine bases in one turn $= \frac{20}{2} = 10$ bases.

Answers of Miscellaneous Questions

45 **(a)** The main purpose for the occurrence of sexual reproduction in plants (monocotyledonous and dicotyledonous) is the production of seeds.

(b)
- Changing the level of some substances in blood such as (sodium – potassium – calcium – glucose – water).
- The presence of a neural stimulus (nerve signal or impulse).
- The effect of other hormones such as (TSH – ACTH – LH – FSH).
- The presence of a physical stimulus (the arrival of food to the duodenum).

"Three are enough"

---

46 **(a)** Intruded igneous rocks are formed, which are characterized by porphyritic texture.

(b) It is an ultramafic or mafic igneous rock that is rich in iron mineral.

Exam 9

Answers of Multiple Choice Questions

Question no.	1	2	3	4	5	6	7	8	9	10
Answer	c	c	a	c	b	b	a	a	d	c

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	d	a	d	d	d	c	c	d	d	b

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	c	b	a	b	a	a	d	c	b	b

Question no.	31	32	33	34	35	36	37	38	39	40
Answer	c	b	a	c	a	d	c	d	d	c

Question no.	41	42	43	44
Answer	a	c	c	c

Detailed Answers for the Questions Signed by ✱

4 ⓒ / As in a newborn baby, he was born having some bones that fuse with aging, such as the unfused sacral vertebrae, so that the number of bones is 5 bones. In addition, the coccygeal vertebrae are also unfused, so that their number is 4 bones, whereas in an adult person, the sacral vertebrae are fused forming one bone and the coccygeal vertebrae are fused into one bone. Therefore, the number of vertebrae in a newborn baby is greater than in an adult. So, the ratio between them is greater than one.

---

7 ⓐ / As during long hours of fasting :
- The glucose level decreases in blood, which leads to an increase in the secretion of glucagon hormone, which works on increasing the blood glucose level to the normal level.
- The water level decreases in blood, so its osmolarity increases, which leads to an increase in the secretion of the ADH hormone to work on the reabsorption of water from the tubules of the kidney nephrons to the blood to regulate the blood osmolarity.

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12 ⓐ / As the nucleus of female egg (A) is removed, therefore its cytoplasm contains the rest of the egg's components such as mitochondria. When the nucleus of a cell from the mouse embryo (B) is implanted into the female egg (A), the embryo grows carrying the female's mitochondria (A).

---

22 ⓑ / As the beginning of a gene indicates the location of the promoter, which is followed by the TAC triplet from which the start codon AUG is transcribed. Therefore, the anticodon of the start codon is UAC.

23 ⓐ / As inserting a single nitrogenous base may cause a change in most of the codons, and consequently a change in the amino acids forming the protein, while inserting any codon leads to the addition of an amino acid to the polypeptide chain.

---

26 ⓐ / As the crystal system in which the values of angles α and γ are different is the triclinic system and it is a system that has no symmetrical planes.

---

34 ⓒ / As :

- The anterior lobe of the pituitary gland secretes growth hormone, which controls the metabolic processes, the body growth and bone growth, as it helps in the division of bone cells.
- The thyroid gland secretes the calcitonin hormone, which reduces the level of calcium in blood and its deposition in bones, therefore this increases the bone strength and its ability to withstand heavy weights.

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35 ⓐ / As bean seeds are exendospermic seeds, the embryo feeds on all the endosperm during its embryo formation, and therefore the triploid endosperm tissue disappears, resulting in all the cells of the bean seed being diploid, while endospermic seeds such as wheat, corn, and castor contain triploid cells, which is the endosperm tissue.

Answers of Miscellaneous Questions

45 **(a)** • Sperms of a honey bee drone.
• Ciliated sperms in *Polypodium*.
"One example is enough"
(b) Flowering plants.

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46 **(a)** Marble / • **Its type :** Massive metamorphic rock.
• **Its uses :** It is used as an ornamental stone.
(b) Slate / • **Its type :** Foliated metamorphic rock.
• **Its uses :** It is used in construction purposes.

Exam 10

Answers of Multiple Choice Questions

Question no.	1	2	3	4	5	6	7	8	9	10
Answer	b	d	a	c	b	d	c	c	d	a

Question no.	11	12	13	14	15	16	17	18	19	20
Answer	d	b	d	d	b	d	b	d	c	b

Question no.	21	22	23	24	25	26	27	28	29	30
Answer	a	d	d	b	a	a	b	c	c	d

Question no.	31	32	33	34	35	36	37	38	39	40
Answer	b	b	d	a	b	b	c	a	b	d

Question no.	41	42	43	44
Answer	c	a	b	b

Detailed Answers for the Questions Signed by ❋

9 ⓓ / As the venous blood of the testes is the blood leaving them and carries the hormones secreted by the testes, which are testosterone and androsterone, while arterial blood is the blood supplying to the testes and carries the pituitary gland hormones that stimulate gonads (FSH & LH).

---

12 ⓑ / As pills contain synthetic hormones similar to estrogen and progesterone, which are chemical substances.

---

13 ⓓ / As sexual reproduction can occur with one parental individual, as in hermaphroditic flowering plants that contain both male and female reproductive organs together, and the gametophyte stage of ferns like the *Polypodium*, which carries both male and female gonads together. It can also occur without male and female gametes in some haploid organisms, such as the *Spirogyra* alga which reproduces sexually by conjugation.

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14 ⓓ / As the non-specific white blood cells work on killing microbes during the inflammatory response, and this happens in an indirect way through mast cells and basophils and directly through macrophages, neutrophils, monocytes and natural killer cells.

22 ⓓ / Because the mitochondria in the zygote are inherited only from the mother, since during fertilization the head and neck of the sperm enter the ovum, leaving the midpiece (containing the mitochondria) and the tail outside, therefore, if a mutation occurs in the mitochondrial DNA of the mother's gametes, this mutation is passed from mothers to their sons and daughters.

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23 ⓓ / As the cholinesterase enzyme works to break down acetylcholine and convert it into choline and acetic acid, thus the effect of the stimulus disappears, and the permeability of the muscle fiber membrane returns to its normal resting state, i.e., it returns to a state of polarization (i.e., the sarcomere returns to its normal length). while actin and myosin are structural proteins, not regulatory proteins and acetylcholine is a chemical substance, and not a protein.

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29 ⓒ / As pumice is an acidic rock that crystallizes and melts at relatively low temperatures (less than 800°C) and microdiorite is an intermediate rock that crystallizes and melts at intermediate temperatures, while komatiite is from the first formed rocks when cooling the magma at high temperatures.

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38 ⓐ / As the umbilical cord is composed of the amniotic membrane, which is an embryonic membrane. Therefore, the blood vessels in the umbilical cord belong only to the fetus.

Answers of Miscellaneous Questions

45 **1.** Tearing in ligaments of shoulder joint.
2. Tearing in tendons of the shoulder joint attached to the humerus bone.
3. Tearing in muscles that cause moving the humerus bone. ***"Two reasons are enough"***

---

46 **(a)** Reverse fault.
(b) • 2
• Nonconformity, then disconformity.