

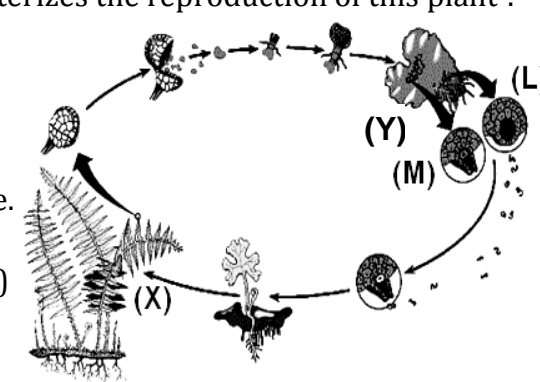
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رُوجع ومطابق للأصل البيوى ويُطبع على مسئولية اللجنة الفنية ،

ح14 ARAB REPUBLIC OF EGYPT {268} ت.ع.ج / أول {268} ت.ع.ج / أ.أ.  
Ministry of Education  
General Secondary Education Certificate Examination, 2014  
{ First Session – New System }  
BIOLOGY Time: 3 Hours  
{ الأسئلة فى أربع صفحات } { بالأحياء } { باللغة الإنجليزية }  
تنبيه مهم : ١ - يسلم الطالب ورقة امتحانيه باللغة العربية مع الورقة المترجمة .  
٢ - الإجابات المتكررة عن أسئلة الاختيار من متعدد لن تقدر ويتم تقدير الإجابة الأولى فقط .

**Answer FOUR QUESTIONS ONLY of the following:**  
**QUESTION ONE: (15 MARKS)**  
**(A) Choose the correct answer for each of the following, then write it only in your answer sheet:**  
1. After fertilization, the leaflets of the corolla may remain in ..... fruit.  
a. eggplant    b. dates    c. pomegranate    d. marrow  
2. Upper end of the wrist skeleton is attached to the .....  
a. upper end of the radius    b. lower end of the radius  
c. lower end of the ulna    d. bones of the palm  
3. The development of the nervous system of human embryo begins at the..... of pregnancy.  
a. first week    b. first month    c. sixth week    d. twelfth week  
4. A woman with blood group (A) married a man with blood group (A). Which one of the following genotypes can not be found in their offspring? .....  
a. AO    b. OO    c. AA    d. AB  
5. The ..... enzyme adds new nucleotides to the 3' end of the new DNA strand.  
a. ligase    b. helicase    c. polymerase    d. deoxyribonuclease

**(B) Examine the following figure which illustrates the life cycle of *Polypodium* plant, then answer the following questions:**  
1. What is the phenomenon that characterizes the reproduction of this plant ?  
What is its importance for this plant?  
2. What is the chromosome number of the two structures (X and Y)?  
3. Mention the letter that indicates the structure which starts a new life cycle.  
What is its name?  
4. What do the two structures (L and M) represent?  
5. How does the structure (Y) feed?



بقية الأسئلة فى الصفحة الثانية

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**(C) 1. In a strain of the butterflies, the yellow colour is dominant over the brown colour. When mating occurred between a yellow coloured male and a brown coloured female, they produced 25% brown males, 25% yellow females, 25% yellow males and 25% brown females. Explain this result on genetic bases.**  
**2. Write a brief note about the structural support in the plant.**

**QUESTION TWO: (15 MARKS)**  
**(A) Write the scientific term that indicates each of the following statements:**  
1. Genes carried on different chromosomes and are distributed independently on gametes during meiosis.  
2. A method of asexual reproduction applied in propagating rare plants with desirable strains.  
3. The circular DNA molecules exist in the prokaryotes.  
4. A thin bone attached to the scapula bone.  
5. The points of turning between the internal chromatids of a pair of the homologous chromosomes during the first prophase.

**(B) 1. On genetic bases, show how each of the following can be obtained:**  
a. All plants carry a dominant trait and are produced from crossing of two plants have the recessive genes of the same trait.  
b. A white-eyed female *Drosophila*.  
**2. What is the importance of each of the following .....?**  
a. Graafian follicle.  
b. Nonhistone regulatory proteins.  
c. The corpus luteum.  
d. Cilia of the fallopian tube.

**(C) Mention the results of Franklin which helped to know the structure of DNA molecule.**

بقية الأسئلة فى الصفحة الثالثة

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رُوجع ومطابق للأصل البيوى ويُطبع على مسئولية اللجنة الفنية ،

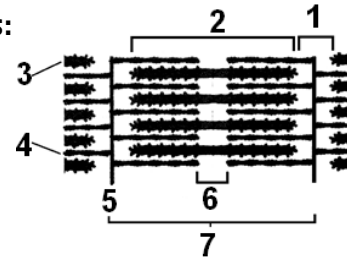
**QUESTION THREE: (15 MARKS)**

**(A) Explain each of the following:**

1. Inheritance of some offspring for several traits exist together in a parent.
2. The coil is used to prevent pregnancy.
3. Deoxyribonuclease has an advantage in knowing that DNA is the genetic material.
4. Twining of the tendril around the support.
5. Gametes can be stored in special banks for several years.

**(B) 1. Examine the following figure which illustrates the structure of a myofibril, then answer the following questions:**

- a. What does the part no. (7) represent?
- b. What is the kind of protein that forms the parts no. (1, 2 and 6)?
- c. What is the relationship between the part no. (3) and muscle contraction?



**2. If the sequence of the nitrogenous bases in a piece of one strand of DNA molecule is:**

3'..... GGG CCC GTG ..... 5'

- a. Write down the sequence of the nitrogenous bases in the complementary piece of DNA for the above mentioned piece.
- b. If a mutation occurred and resulted in a change in one of bases of the above mentioned piece of DNA, what is the kind of this mutation? What is its effect?

**(C) 1. Mention the site and function of each of the following:**

- a. Human ovary.
- b. The amnion.

**2. Define each of the following:**

- a. Gynander insects.
- b. Crossing over.

**3. Mention the law of independent assortment.**

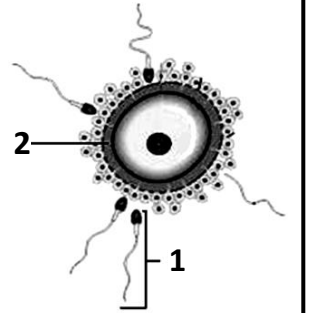
**QUESTION FOUR: (15 MARKS)**

**(A) What would happen in each case of the following... ?**

1. The triple fusion does not occur inside the embryo sac of a flower.
2. Falling down of spores of the bread mould fungus on a piece of wet bread.
3. Occurrence of a mutation in the somatic cells.
4. Enlargement of the receptacle of a flower instead of its ovary.
5. Putting of some dry fruits in water.

**(B) 1. Examine the following figure that illustrates a vital process of the human, then answer of the following questions:**

- a. What is the process illustrated in the figure?
- b. What are the parts which form the structure no. (1)?
- c. Why does the structure no. (2) surround itself with a coat after occurrence of this process?
- d. Why is a large number of structure no. (1) necessary for occurrence of this process?



**2. What are the genotypes and phenotypes of the individuals resulted from mating of a heterozygous black mouse with a pure brown mouse?**

**(C) 1. Mention the type of the genetic case for each of the following:**

- a. Inheritance of blood groups.
  - b. Inheritance of sickle-cell anaemia in humans.
  - c. Inheritance of colour in Andalusian fowl.
- 2. "The appearance of the character on the plant depends firstly on the presence of its specific gene, and secondly on the environmental conditions that are suitable for its expression". Explain this statement.**

**QUESTION FIVE: (15 MARKS)**

**(A) Give reasons for each of the following:**

1. The regeneration in *Hydra* differs from regeneration in crustaceans.
2. Down's syndrome appears on both human males and females.
3. The genome of the Salamander equals 30 times the human genome.
4. The premature baldness spreads widely among men than women.
5. In some viruses, a high rate of genetic change appears.

**(B) What is the difference between each pair of the following ...?**

1. The nucleosome and the nucleotide (in terms of the structure).
2. The seed and the grain.
3. The multiplication phase and maturation phase of spermatogenesis.

**(C) 1. Illustrate by a labeled drawing only the structure of a human vertebra.**

2. On examining two embryonic cells, it is found that one of them is a male cell and contains a Barr body, and the second is a female cell and devoid of a Barr body. What can you conclude from this? What is the reason for each of these two cases?

الدرجة العظمى (٦٠)  
الدرجة الصغرى (٣٠)  
عدد الصفحات (٥)

جمهورية مصر العربية  
وزارة التربية والتعليم  
امتحان شهادة إتمام الدراسة الثانوية العامة  
لعام ٢٠١٤ م  
نموذج إجابة [ الأحياء بالإنجليزية ]

[ ٢٦٨ ]  
الدور الأول  
( نظام حديث )

**ANSWER OF QUESTION ONE: (15 MARKS)**

**(A) (5X1=5 marks)**

- 1- (d) marrow. 236
- 2- (b) lower end of the radius. 195
- 3- (b) first month. 340
- 4- (d) AB. 296
- 5- (c) polymerase. 341

**(B) (5 marks) 225**

- 1- Alternation of generations ( $\frac{1}{2}$  mark) - **Its importance:** achieving rapid reproduction and genetic diversity. This enables the plant to disperse widely and to conform to the environmental fluctuations. (mark)
- 2- The chromosomal number of structure (X) = 2n ( $\frac{1}{2}$  mark) and structure (Y) = n ( $\frac{1}{2}$  mark)
- 3- (X) ( $\frac{1}{2}$  mark) – sporophyte. ( $\frac{1}{2}$  mark)
- 4- Structure (L) is antheridia. ( $\frac{1}{2}$  mark) Structure (M) is archegonia. ( $\frac{1}{2}$  mark)
- 5- It feeds by rhizoids which penetrate into the soil to absorb water and salts. ( $\frac{1}{2}$  mark)

**(C) (3+2 = 5Marks)**

**1- 3 marks**

Suppose that the gene of yellow colour is **A** and the gene of brown colour is **a**  
**(Any other symbols are correct)**

Yellow coloured male

Brown coloured female

( $\frac{1}{2}$  mark) p:  $X^A X^a$  x  $X^a Y$  ( $\frac{1}{2}$  mark)

G:  $X^A$   $X^a$   $X^a$   $Y$

(Mark) F:  $X^A X^a$  -  $X^A Y$  -  $X^a X^a$  -  $X^a Y$

25% Yellow male  
25% Yellow female  
25% Brown male  
25% Brown female

(mark)

**2- 2 marks**

**The structural support:**

The plant has many methods for the structural support such as the deposition of substances on or in the cell walls. The external plant cells can't prevent loss of water from the inner cells and so the epidermal cell walls become thick and impermeable due to cutin being deposited. ( $\frac{1}{2}$  mark) The plant may be surrounded with an impermeable cork layer containing suberin, cellulose or lignin may be deposited in the cell walls or in some of its parts. (mark) So these cells become stronger, such as collenchyma cells and sclerenchyma cells (fibres and stone cells). ( $\frac{1}{2}$  mark) 191

**ANSWER OF QUESTION TWO : (15 MARKS )****(A) (5X1=5 marks)**

- 1- Free (or independent) genes. 302
- 2- Tissue culture. 220
- 3- Plasmids. 334
- 4- Clavicle. 194
- 5- Chiasma. 303

**(B) (4+4= 8 marks)****1-(2+2= 4 marks)****a- 2 marks** 290

White flowered pea plant

**P:** AA $bb$  x**G:**  $\textcircled{Ab}$ **F:** AaBb

White flowered pea plant

aaBB **(mark)** $\textcircled{aB}$  **(½ mark)**Pink flowered pea plants **(½ mark)****b- 2 marks** 319Hybrid red eyed  
female *Drosophila***P:**  $X^R X^r$  x**G:**  $\textcircled{X^R}$   $\textcircled{X^r}$ **F:**  $X^r X^r$ White eyed  
male *Drosophila* $X^r Y$  **(mark)** $\textcircled{X^r}$   $\textcircled{Y}$  **(½ mark)**White eyed female *Drosophila* **(½ mark)****2- 4 marks (4x1=4)**

<b>a-</b> Graafian follicle. 249	Secretes estrogen and contains the ovum. <b>(mark)</b>
<b>b-</b> Nonhistone regulatory proteins. 344	Determine whether or not the DNA code is used to make RNA, proteins and enzymes. <b>(mark)</b>
<b>c-</b> Corpus luteum. 249	Secretes progesterone and estrogen. <b>(mark)</b>
<b>d-</b> Cilia of fallopian tube. 245	Act to direct the ovum towards the uterus. <b>(mark)</b>

**(C) 2 marks** 337

- 1- DNA is twisted into a spiral or helix.
- 2- The bases are perpendicular to the length of the fibre.
- 3- The sugar-phosphate backbone is on the outside of the helix with the bases on the inside.
- 4- The diameter of the helix showed that DNA must be composed of more than one strand.

**ANSWER OF QUESTION THREE : (15 MARKS)****(A) (5X1=5 marks)**

- 1- Genes of these traits are completely linked together, carried on the same chromosome and transfer together as one unit from a parent to offspring. 302
- 2- It prevents the fertilized ovum to be implanted in the uterus. 255
- 3- This enzyme hydrolyses DNA completely but it does not affect the proteins or RNA. 333
- 4- Due to the slow growth of the side in contact with the support, and accelerated growth of the side of the tendril away from the support. This leads to elongation of the far side and so the tendril twines around the support. 199
- 5- To keep them available for reproduction till the time of need. They can be used in artificial fertilization, even after the death of the producer individuals or if some rare animal species are liable to extinction. 258

**(B) (3+2=5 marks)****1- 3 marks**

- a- Sarcomere. ( $\frac{1}{2}$  mark) 202-
- b- (1) Actin - (2) Actin and myosin - (6) Myosin. ( $1\frac{1}{2}$  mark) 202
- c- The presence of transverse links extended from the myosin filaments and attach to the actin filaments. In the presence of calcium ions and energy, the transverse links act as hooks that pull the actin filaments from both sides towards each other leading to muscle contraction. (mark) 206

**2- 2 marks**

- a- 5'.....CCC GGG CAC .....3' (mark) 339
- b- Gene mutation – **Its effect:** The production of a different enzyme that would in turn develop a new trait. (mark) 349

**(C) (2+2+1= 5 marks)****1- 2 marks**

	Site	Function
a- Human ovary 244 (mark)	On one side of the pelvic cavity	Production of ova and secretion hormones for regulating menstrual cycle and embryo development.
b- Amnion 252 (mark)	It surrounds the embryo	It contains a fluid serves to protect the embryo against shocks and dryness.

**2- 2marks**

- a- **Gynander insects:** are the insects that half their body is masculine (XY), whereas the other half is feminine.(XX). (mark) 314
- b- **Crossing over:** is an incomplete linkage that results in a change in the genetic characters but in a limited ratio that depends on the distance between the genes on the chromosome. (mark) 305
- 3- **Law of independent assortment:** When two individuals bearing two or more pairs of alleles are crossed, each pair of characteristics is assorted at random and is inherited independently of the other and will appear in the F<sub>2</sub> generation in the ratio 3:1. (mark) 284

**ANSWER OF QUESTION FOUR: (15 MARKS)****(A) (5X1=5 marks)**

- 1- Endosperm nucleus will not form, thus endosperm tissue that supplies the early developing embryo with food will not form. 235
- 2- Spores absorb water and divide several times till they grow to new individuals. 217
- 3- Sudden symptoms appear in the organ whose cells are mutated. 350
- 4- A false fruit will form. 236
- 5- They absorb water and enlarge in size and swell. 190

**(B) (2+3=5 marks)****1- (2 marks)**

- a- This process represents fertilization. (½ mark) 250
- b- Structure (1) consists of a head, a neck, a midpiece and a tail. (½ mark) 243
- c- To prevent the entrance of any other sperm. (½ mark) 250
- d- Large number of structure no. (1) participate in secreting the hyaluronic enzyme which dissolves a part of the ovum coat through which one sperm only enters. (½ mark) 250

**2- (3marks) 279**

**Suppose that the gene of black colour is B and the gene of brown colour is b (Any other symbols are correct)**

	Hybrid black mouse	X	Brown mouse
P:	<b>Bb</b>		<b>bb (mark)</b>
G:	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; text-align: center;"><b>B</b></div> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; text-align: center;"><b>b</b></div> </div>		<div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; text-align: center;"><b>b</b></div> <b>(½ mark)</b>
F:	<b>Bb</b>		<b>bb (mark)</b>
	Hybrid black mouse		Brown mouse (½ mark)

**(C) (3+2=5 marks)****1- (3X1= 3 marks)**

- a- Multiple alleles (**OR** Complete dominance, lack of dominance and multiple alleles). 293
- b- Lethal genes (**OR** incomplete dominance). 292
- c- Lack of dominance. 289

**2- (2 marks)**

When seeds are germinated in the dark, no chlorophyll is formed in the seedlings. If these seedlings are transferred into the light, chlorophyll will be formed in a few days. Thus, the plastids which are already present in the seedlings need light in order that the gene responsible for chlorophyll production exerts its effect. 323

**ANSWER OF QUESTION FIVE: (15 MARKS)****(A) (5X1=5 marks)**

- 1- Because the regeneration in *Hydra* is an asexual reproduction where it is able to regenerate the lost parts of its body and it also to produce new individuals if it is cut into several transverse pieces, while regeneration in crustaceans is limited to restoration of the cut parts only. 216
- 2- Because Down's syndrome arises as a result of abnormality in the autosomes (an extra autosome in the chromosome pair no. 21) 315
- 3- Due to the existence of a large amount of DNA in Salamander cells that is a noncoding DNA. 347
- 4- Because this character is controlled by a dominant gene that is only influenced by male sex hormones and its effect appears on the male in the presence of one dominant gene only, whereas in the female it requires the presence of two dominant genes. 321
- 5- Because the genetic material of some viruses exist in the form of a single stranded DNA, which cannot be repaired.

**(B) (2X3 = 6 marks)**

1-	<b>Nucleosome</b> 345 It is a string of DNA is wound around clusters of histones. (mark)	<b>Nucleotide</b> 336 It is made up of deoxyribose sugar, phosphate group and a nitrogenous base. (mark)
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2-	<b>Seed</b> 236 Exendospermic – the integuments of the ovary harden forming the seed testa. (mark)	<b>Grain</b> Endospermic - the integuments of the ovary and ovule fuse together forming a single seeded fruit. (mark)
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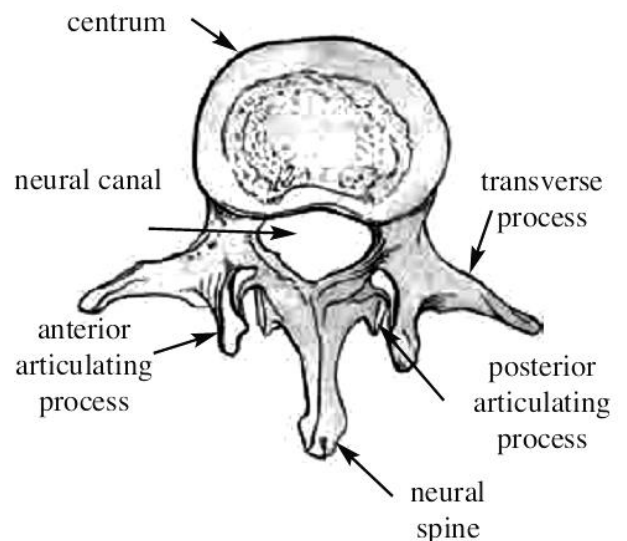
3-	<b>Multiplication phase</b> 242 In which the primary germ cells (2N) divide mitotically several times to produce spermatogonia cells (2N). (mark)	<b>Maturation phase</b> In which the primary spermatocytes (2N) undergo meiosis I to give the secondary spermatocytes (N) which undergo meiosis II to give the spermatids (N). (mark).
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**(C) (2+2 = 4 marks)**

- 1- **Correct drawing: mark - Labels: mark**  
(2 correct labels are enough) 193

2- **The first case:** is abnormal male having Klinefelter's syndrome - The **reason:** An abnormal ovum having two X chromosomes is fertilized with a sperm having Y chromosome and the chromosomal structure of the zygote is (44 + XXY). (mark) 313

**The second case:** abnormal female having Turner's syndrome - The **reason:** An ovum devoid of X chromosome is fertilized with a sperm having X chromosome and the chromosomal structure of is (44 + X). (mark) 314



انتهى نموذج الإجابة