Biology · Structure and Function in Living Organisms · Reproduction in Living Organisms

Methods of Reproduction (continued)

thanawiya-archive.com

143	3	66
questions	sets	pages

Contents

Multiple choice questions (101 questions) — Questions · p. 2 — Answers · p. 52

Essay questions (8 questions) — Questions · p. 37 — Answers · p. 61

Past exam questions (34 questions) — Questions · p. 41 — Answers · p. 62

Click a question number to jump to its answer, and an answer number to go back to the question.

Multiple choice questions — 101 questions

1 If an organism depends on asexual reproduction more than on sexual reproduction, which of the following is a reason for asexual reproduction?

(A) Continuous change in environmental conditions
(B) Living in stable environmental conditions
(C) The need for genetic variation
(D) The spread of some diseases in the environment

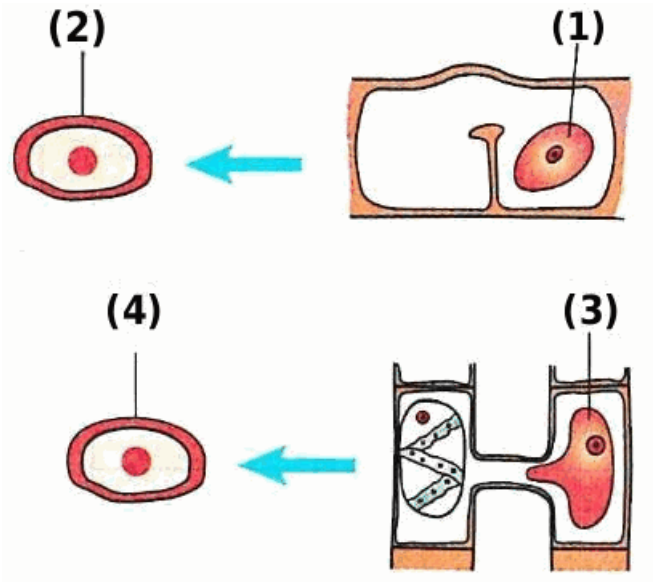
2 Which of the following types of reproduction is biologically costly?

(A) Reproduction by spores
(B) Regeneration
(C) Scalariform conjugation
(D) Budding

3 Which of the following organisms bears a greater biological cost when it reproduces?

(A) Hydra
(B) Spirogyra
(C) Amoeba
(D) Monkey

4 In the opposite figures, which cells divide by meiosis and, on germination, produce a filament that is more genetically different from the parent cells?



(A) (1)
(B) (2)
(C) (3)
(D) (4)

5 Although one filament of Spirogyra contained 6 cells, only 5 filaments were produced after reproduction. Which of the following can explain this?

(A) Scalariform and lateral conjugation took place

(B) Asexual reproduction took place

(C) Only lateral conjugation took place

(D) Only scalariform conjugation took place

---

6 Which of the following is a difference between the zygospore and the zygote in the life cycle of Spirogyra?

(A) The number of chromosome sets

(B) The ability to withstand harsh conditions

(C) The type of conjugation

(D) The type of reproduction that results from it

---

7 On which of the following divisions does sexual reproduction depend to form a new individual in Spirogyra?

(A) Meiosis only

(B) Mitosis followed by meiosis

(C) Mitosis only

(D) Meiosis followed by mitosis

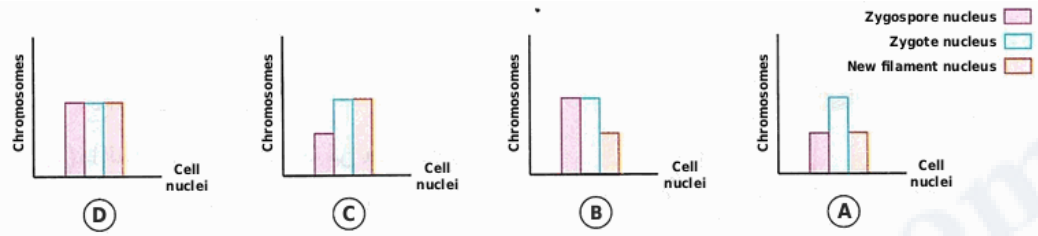
---

8 How many zygospores are produced from the reproduction of all the cells of two Spirogyra filaments lying side by side, one with 8 cells and the other with 10 cells, in suitable conditions?

(A) Zero (B) 8 (C) 9 (D) 10

---

9 Which of the following graphs represents the number of chromosomes in the nuclei of the cells of Spirogyra during its life cycle?



---

10 In what does the spore of bread mould resemble the zygospore of Spirogyra?

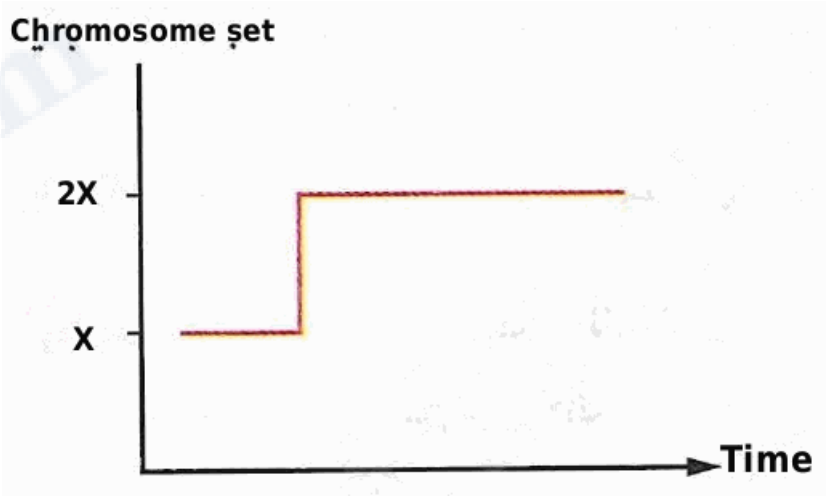
(A) The number of chromosome sets

(B) The way of germination

(C) The number of chromosomes

(D) Resisting unsuitable conditions

11 The opposite graph shows a stage in the life cycle of a single Spirogyra filament. What does it show?



(A) Scalariform conjugation took place without improvement of conditions
(B) Lateral conjugation took place without improvement of conditions
(C) Scalariform conjugation took place followed by improvement of conditions
(D) Lateral conjugation took place followed by improvement of conditions

---

12 Which of the following does not depend on meiosis to form a new individual?

(A) Parthenogenesis in the frog
(B) Scalariform conjugation in Spirogyra
(C) Tissue culture in tobacco
(D) Lateral conjugation in Spirogyra

---

13 In a freshwater pond containing Spirogyra, which of the following possibilities can express the number of nuclei before conjugation to their number directly after conjugation?

(A) 3 : 7
(B) 2 : 5
(C) 3 : 5
(D) 6 : 2

---

14 Which of the following gives the least genetic variation in the cells produced by two successive conjugations in Spirogyra?

(A) Lateral then scalariform
(B) Scalariform then scalariform
(C) Lateral then lateral
(D) Scalariform then lateral

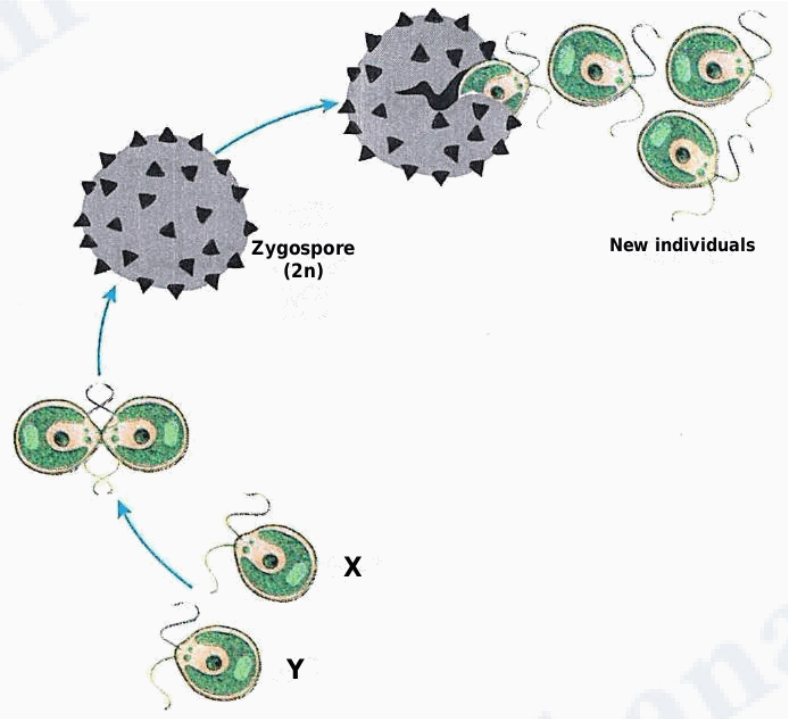
---

15 Which of the following is not one of the stages common to both scalariform and lateral conjugation in Spirogyra?

(A) Formation of the conjugation tube
(B) Formation of the zygote
(C) Formation of the zygospore
(D) Fusion of the protoplasm

16 From the opposite figure, which shows one type of reproduction in the unicellular alga Chlamydomonas:

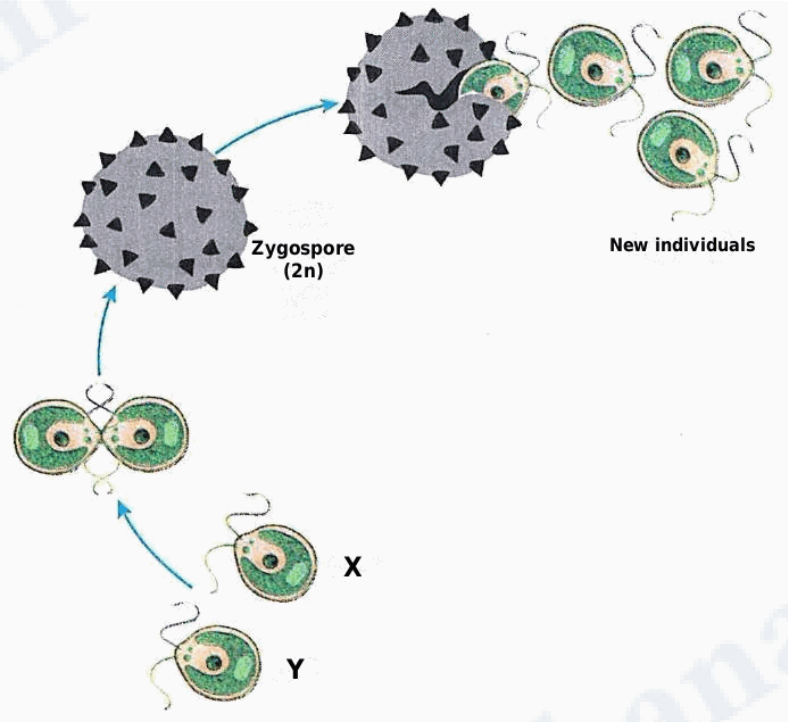
What type of reproduction is shown in the figure?



(A) Asexual by binary fission
(B) Asexual by spores
(C) Sexual by conjugation
(D) Sexual by gametes

17 From the opposite figure, which shows one type of reproduction in the unicellular alga Chlamydomonas:

What characterizes the individuals produced by this reproduction?



(A) Haploid and resemble individual (X) in its traits

(B) Haploid and combine the traits of individuals (X) and (Y)

(C) Diploid and resemble individual (Y) in its traits

(D) Diploid and combine the traits of individuals (X) and (Y)

---

18 Organisms (X) and (Y) reproduce sexually. (X) does not produce gametes and (Y) is not produced from a zygote. What do organisms (X) and (Y) represent, respectively?

(A) Honeybee female / bread mould

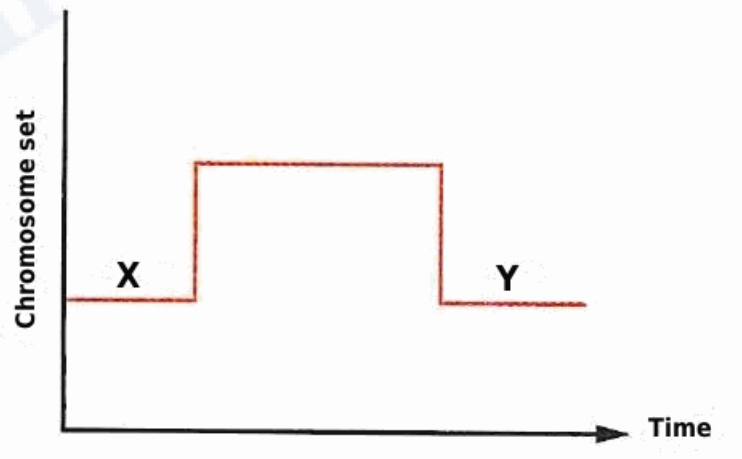
(B) Spirogyra / honeybee male

(C) Aphid female / honeybee male

(D) Aphid female / Spirogyra

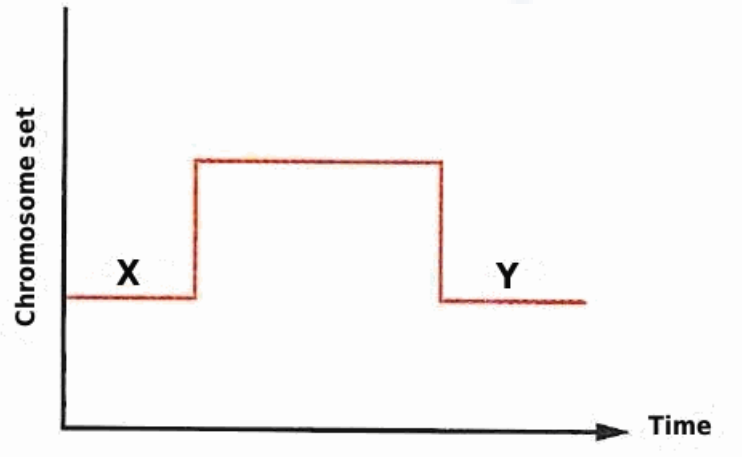
---

19 The opposite graph shows reproduction in Spirogyra. Given that (X) was produced by reproduction in suitable conditions:
In what does (X) differ from (Y)?



(A) The number of chromosomes
(B) The types of division that produce it
(C) The type of cells
(D) The way of nutrition

20 The opposite graph shows reproduction in Spirogyra. Given that (X) was produced by reproduction in suitable conditions:
What type of reproduction produces each of (X) and (Y), respectively?



(A) Sexual / sexual
(B) Asexual / asexual
(C) Asexual / sexual
(D) Sexual / asexual

21 Why is lateral conjugation not considered asexual reproduction although it takes place in one individual?

(A) Because it increases the number of chromosomes

(B) Because it takes place in unsuitable environmental conditions

(C) Because it takes place by the fusion of gametes

(D) Because it results from the fusion of two cells

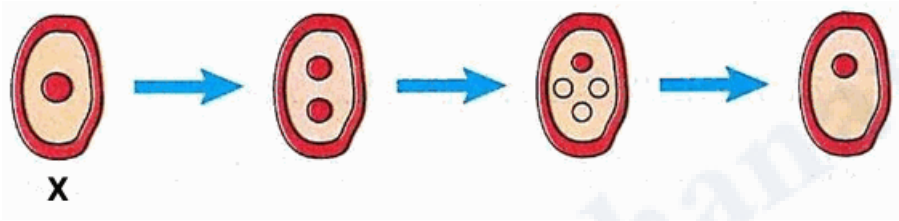
---

22 Which of the following organisms does not reproduce by both methods of reproduction?

(A) Sponge (B) Hydra (C) Spirogyra (D) Honeybee male

---

23 In Spirogyra, what happens to the number of chromosomes in the cells produced by the process shown in the figure, compared with structure (X)?



(A) It decreases to half

(B) It decreases to a quarter

(C) It increases to double

(D) It does not change

---

24 Which of the following choices shows the organisms that form a cyst, a zygospore and spores, respectively?

(A) Spirogyra / fern / mushroom

(B) Amoeba / Spirogyra / bread mould

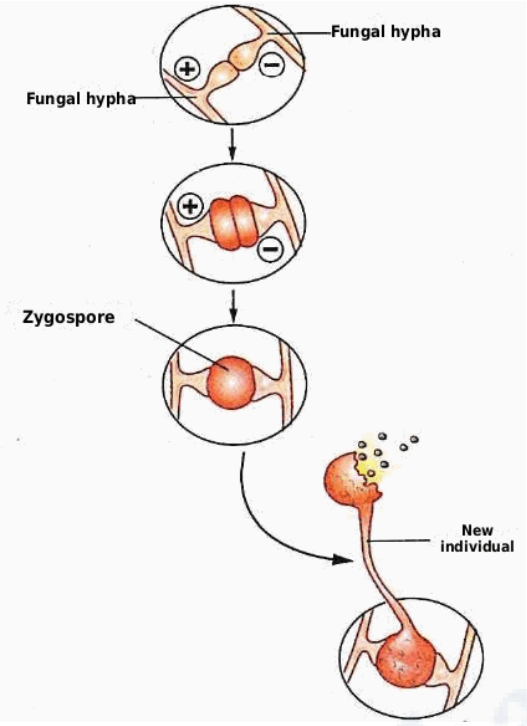
(C) Bread mould / Spirogyra / Amoeba

(D) Bread mould / fern / Spirogyra

---

25 The figure in front of you represents part of the life cycle of bread mould. In the light of what you have studied, answer:

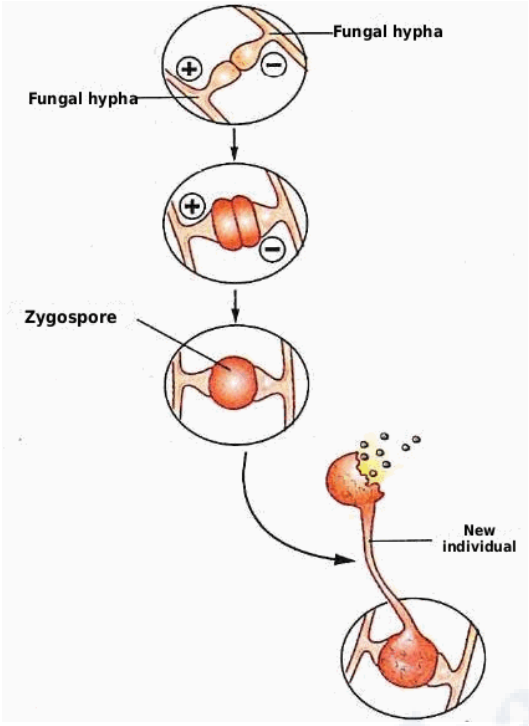
In which of the following organisms can this type of reproduction take place?



(A) Amoeba (B) Hydra (C) Sponge (D) Spirogyra

26 The figure in front of you represents part of the life cycle of bread mould. In the light of what you have studied, answer:

Which of the following can resemble this type of reproduction?



(A) Sexual reproduction by gametes

(B) Sexual reproduction by scalariform conjugation

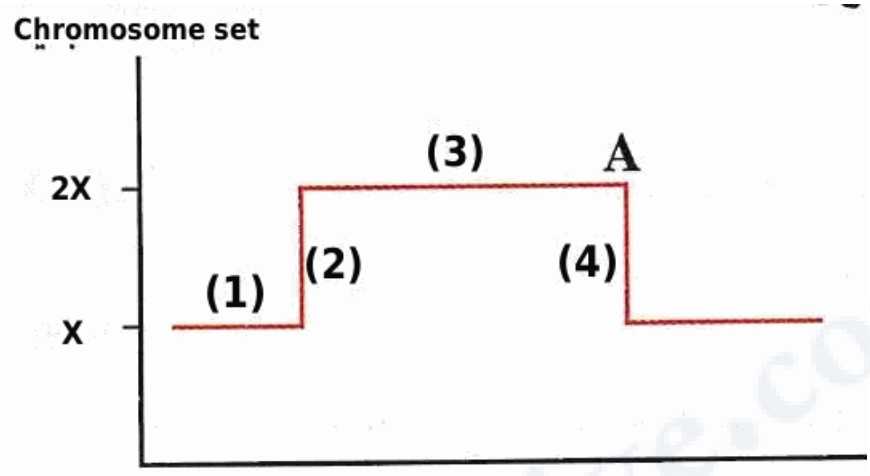
(C) Sexual reproduction by lateral conjugation

(D) Asexual reproduction by budding

---

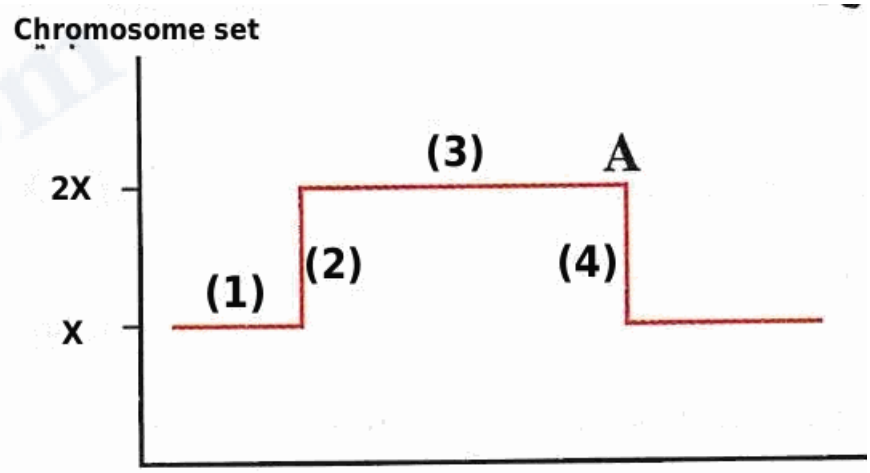
27 The opposite graph shows Spirogyra turning to conjugation:

Which of the following represents the stage when rain falls?



(A) (1) (B) (2) (C) (3) (D) (4)

28 The opposite graph shows Spirogyra turning to conjugation:
What does the letter (A) represent in the figure?



(A) An algal filament (B) Sex cells (C) Zygote (D) Zygospore

---

29 A protozoan reproduces by binary fission and sometimes by the fusion of the nuclei of two cells. In the light of what you have studied, answer:
Which of the following is true about reproduction by fusion of nuclei in this organism?

(A) It depends on mitosis
(B) It depends on meiosis
(C) It is one of the types of asexual reproduction
(D) It produces tetraploid individuals

---

30 A protozoan reproduces by binary fission and sometimes by the fusion of the nuclei of two cells. In the light of what you have studied, answer:
Which of the following is true about reproduction in this organism?

(A) The individuals produced by both binary fission and fusion of nuclei are genetically different
(B) The individuals produced by both binary fission and fusion of nuclei are genetically identical
(C) The individuals produced by binary fission are genetically different
(D) The individuals produced by fusion of nuclei are genetically different

---

31 If conjugation takes place between all the cells of two Spirogyra filaments lying side by side, one containing 10 cells and the other 6 cells, what is the maximum number of zygotes formed?

(A) 2 (B) 3 (C) 4 (D) 8

32 In which of the following cases is the biological cost of sexual reproduction in mice the lowest?

(A) Mating (X) males with (X) females
(B) Mating (X) males with (2X) females
(C) Mating (2X) males with (X) females
(D) Mating (X) males with (6X) females

33 Which of the following is always linked to sexual reproduction?

(A) The presence of gametes
(B) The presence of two individuals of different sexes
(C) No genetic variation
(D) Formation of a zygote

34 Which of the following choices is true about male gametes compared with female gametes, in number and size, respectively?

(A) More / smaller
(B) Fewer / larger
(C) More / larger
(D) Fewer / smaller

35 What is the type of fertilization in bony fish and reptiles, respectively?

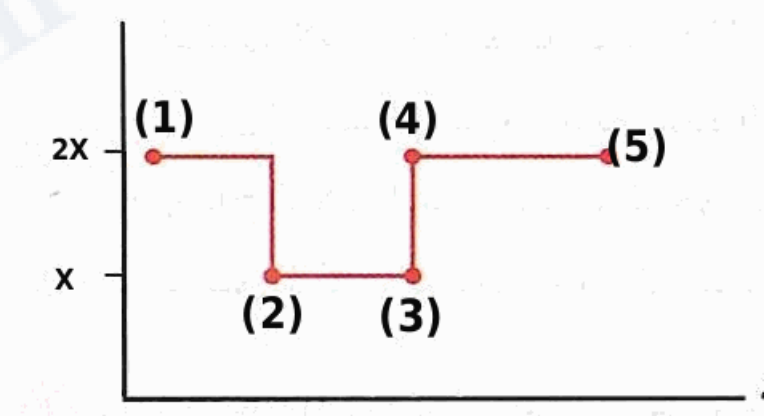
(A) Internal / external
(B) External / internal
(C) Internal / internal
(D) External / external

36 Which of the following organisms reproduces sexually without gametes?

(A) Spirogyra
(B) Fern
(C) Plasmodium
(D) Aphid

37 From the opposite graph, which represents the chromosome sets in the life cycle of an organism:

What does the graph express?



(A) Scalariform conjugation in Spirogyra

(B) Natural parthenogenesis in the aphid

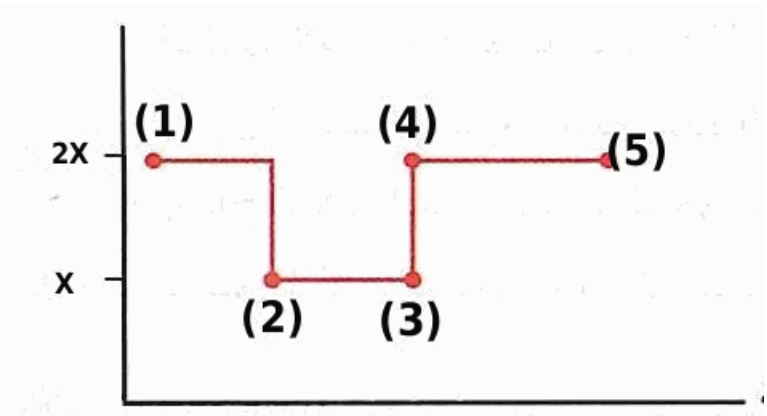
(C) Sexual reproduction by gametes

(D) Natural parthenogenesis in the honeybee

---

38 From the opposite graph, which represents the chromosome sets in the life cycle of an organism:

How does (3) change into (4)?



(A) By conjugation (B) By fertilization (C) By meiosis (D) By mitosis

---

39 What do the cells responsible for transferring genetic material in (humans - birds - snakes - frogs - fish) have in common?

(A) Their ability to swim in water (B) Internal fertilization

(C) External fertilization (D) Being haploid

---

40 Which of the following is a similarity between sexual reproduction in amphibians and in bony fish?

(A) The type of fertilization

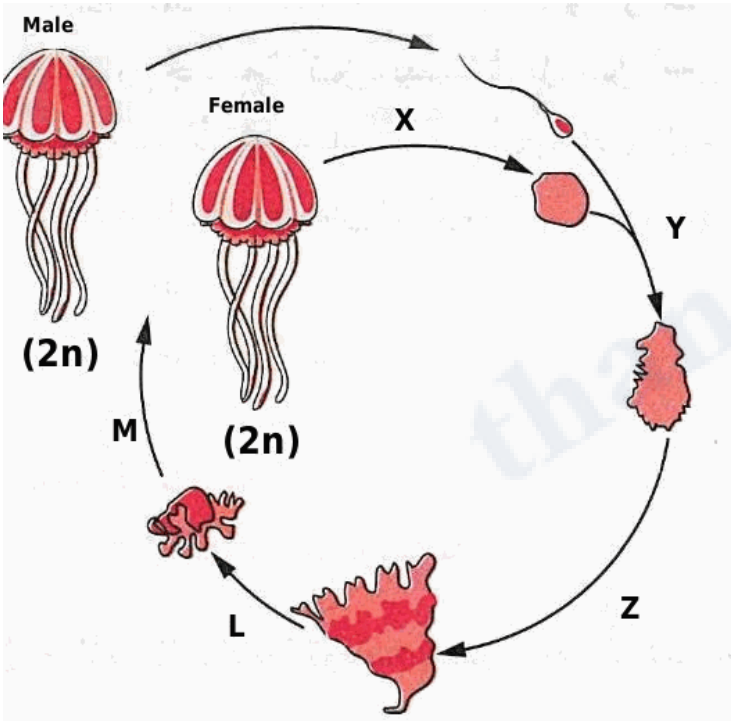
(B) The number of ova

(C) The number of chromosomes

(D) The number of individuals produced by reproduction

---

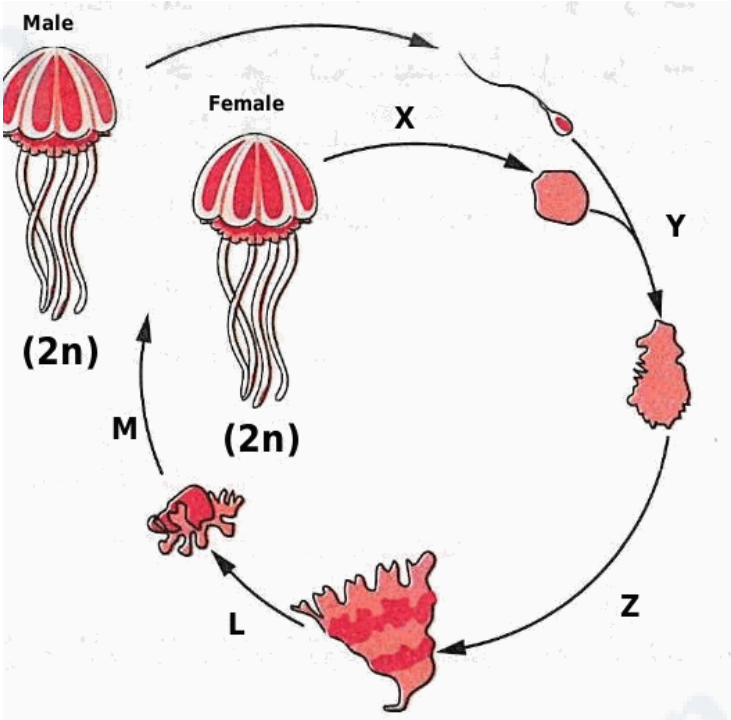
41 From the opposite figure, which shows the life cycle of the jellyfish:
Which process produces genetically identical cells?



(A) (X), (M) (B) (Y), (M) (C) (Y), (Z) (D) (Z), (M)

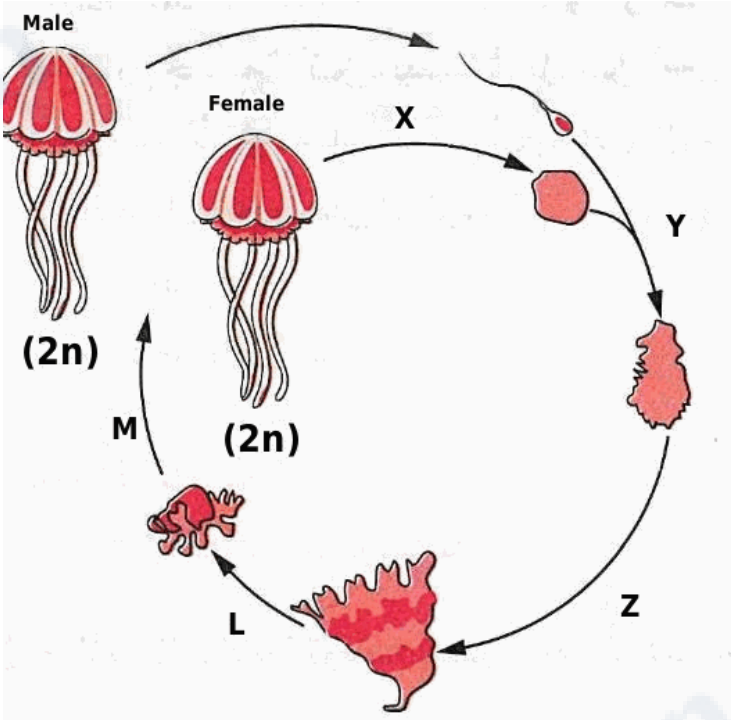
---

42 From the opposite figure, which shows the life cycle of the jellyfish:
Which process produces genetically different cells?



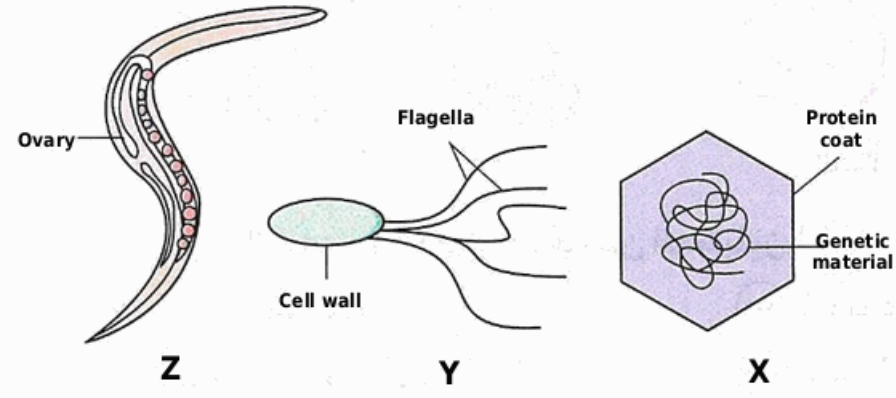
A (X) only B (Y) only C (X), (Y) D (Z), (L)

43 From the opposite figure, which shows the life cycle of the jellyfish:
What process does the letter (M) express?



(A) Meiosis without differentiation
(B) Mitosis without differentiation
(C) Meiosis and tissue differentiation
(D) Mitosis and tissue differentiation

44 The opposite figures show three organisms (X), (Y) and (Z). Which of these organisms can reproduce sexually by gametes?



(A) (X) only
(B) (Z) only
(C) (X), (Y)
(D) (Y), (Z)

45 Which of the following statements is true?

(A) Gametes are always formed by meiosis

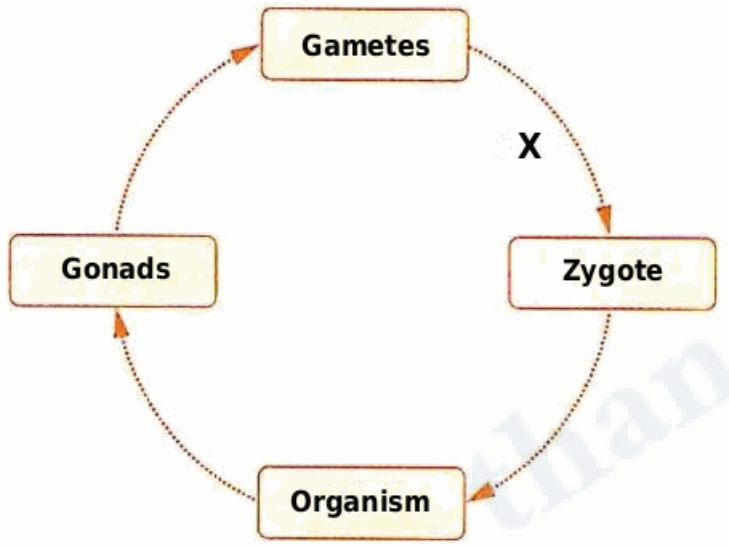
(B) Meiosis always reduces the number of chromosomes to half

(C) Sexual reproduction always needs two parents

(D) Sexual reproduction is always preceded by meiosis

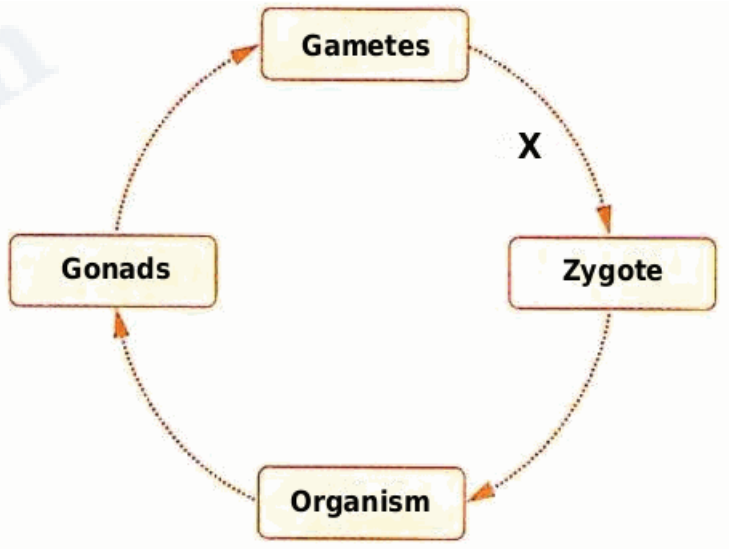
46 The opposite diagram shows the process of reproduction in an organism:

What do you expect this organism to be?



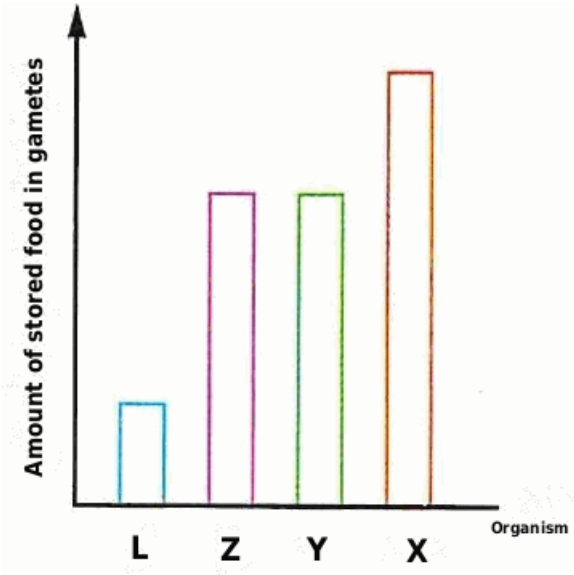
(A) Amoeba (B) Spirogyra (C) Starfish (D) Yeast

47 The opposite diagram shows the process of reproduction in an organism:
In the life cycle of which of the following organisms does process (X) take place?



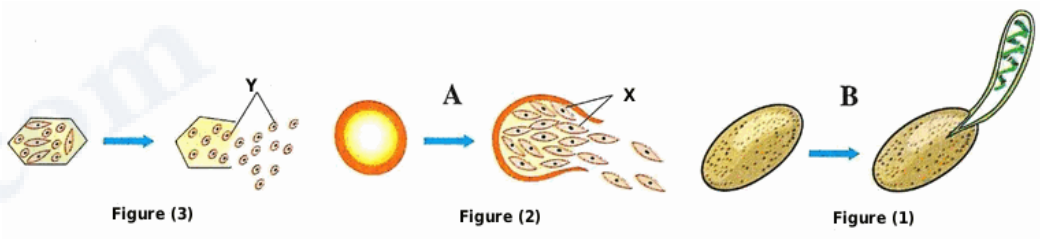
(A) Spirogyra only
(B) Aphid only
(C) Both the honeybee and the aphid
(D) Both the honeybee and Spirogyra

48 The opposite graph represents the amount of stored food in the female gametes of some vertebrates (X), (Y), (Z) and (L). If fertilization in (Y) and (Z) takes place outside the female's body, while in (X) and (L) it takes place inside the female's body, what do you expect animal (X) and animal (Y) to be, respectively?



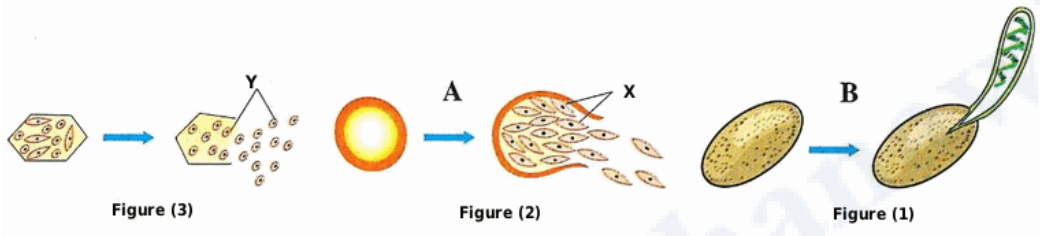
(A) Frog / mouse
(B) Eagle / rabbit
(C) Sparrow / frog
(D) Elephant / eagle

49 The following figures show some types of reproduction. Study them, then answer:
What is the similarity between the individuals produced by processes (A) and (B)?



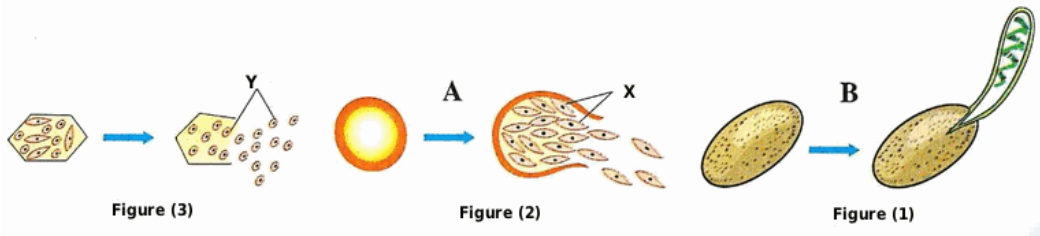
(A) The number of chromosomes
(B) The chromosome set
(C) The presence of genetic variation
(D) The size of the cells

50 The following figures show some types of reproduction. Study them, then answer:
What is the similarity between (X) and (Y)?



(A) Both are produced by sexual reproduction
(B) Both are produced by asexual reproduction
(C) Both are found in the human liver
(D) Both are found in the salivary glands of the mosquito

51 The following figures show some types of reproduction. Study them, then answer:
What is the aim of the division in figure (3)?



(A) Genetic variation
(B) Increasing the number
(C) Forming gametocytes
(D) Reducing the genetic material

52 How is malaria transmitted to a healthy person?

(A) The droplets of an infected person

(B) Touching an infected person

(C) The blood of an infected female Anopheles mosquito

(D) The saliva of an infected female Anopheles mosquito

---

53 What is the result of the asexual reproduction of Plasmodium in the mosquito?

(A) Formation of gametocytes

(B) Formation of sporozoites

(C) Formation of merozoites

(D) Formation of the ookinete (motile stage)

---

54 What is the infective stage for the female Anopheles mosquito in the life cycle of the malaria Plasmodium?

(A) Sporozoites

(B) Gametocytes

(C) Zygote

(D) Ookinete (motile stage)

---

55 If the number of chromosomes in the nucleus of a sporozoite is (X), what is the number of chromosomes in the nucleus of a merozoite?

(A) X - 1

(B) X

(C) 2X

(D) X + 1

---

56 How is the infective stage for humans formed in the life cycle of the malaria Plasmodium?

(A) By mitosis of the oocyst nucleus

(B) By mitosis of the merozoites

(C) By meiosis of the zygote nucleus

(D) By meiosis of the oocyst nucleus

---

57 In what do the infective stage for the female Anopheles mosquito and the infective stage for humans resemble each other in the life cycle of the malaria Plasmodium?

(A) The place where they are found

(B) The place where they are formed

(C) The way they are formed

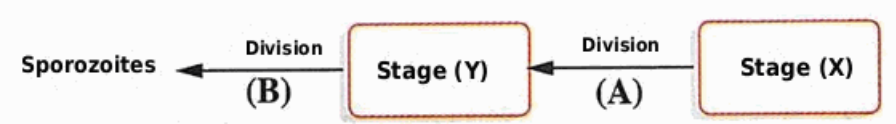
(D) The number of chromosomes

---

58 Which of the following can be seen under the microscope when examining the blood of a person infected with malaria?

(A) Sporozoites and female gametocytes
(B) Merozoites
(C) Merozoites and male gametocytes
(D) Mature gametocytes

59 The opposite diagram shows some stages of the life cycle of the malaria Plasmodium in the female Anopheles mosquito.
What is the importance of the division indicated by the letter (A)?



(A) Forming gametes
(B) Increasing the number of stage (Y)
(C) Reducing the number of chromosomes
(D) Forming the ookinete (motile stage)

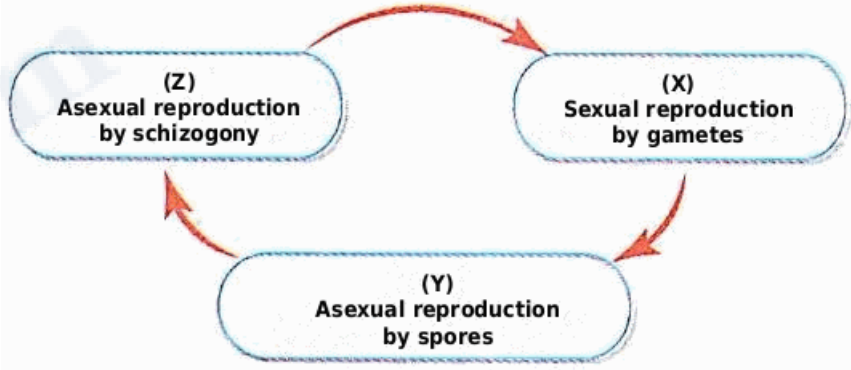
60 Which stage can be found during the life cycle of the malaria Plasmodium in both the infected human and the infected female Anopheles mosquito?

(A) Sporozoites
(B) Merozoites
(C) Oocyst
(D) Mature gametocytes

61 Which of the following is formed by transformation (without division) during the life cycle of Plasmodium?

(A) Merozoites and the ookinete
(B) Gametocytes and sporozoites
(C) The zygote and gametocytes
(D) Gametocytes and the ookinete

62 The opposite diagram shows the life cycle of the malaria Plasmodium. Which of the choices in the following table expresses the places where (X), (Y) and (Z) take place?



(A) X: inside the stomach of the female mosquito, Y: outside the stomach of the female mosquito, Z: human liver cell

(B) X: inside the stomach of the female mosquito, Y: human liver cell, Z: red blood cell

(C) X: human liver cell, Y: red blood cell, Z: inside the stomach of the female mosquito

(D) X: outside the stomach of the female mosquito, Y: human liver cell, Z: red blood cell

---

63 At which stage does genetic variation take place in the life cycle of Plasmodium?

(A) Formation of gametocytes

(B) Formation of sporozoites

(C) Formation of the oocyst

(D) Formation of merozoites

---

64 How correct are the two following statements: "Every malaria patient has anemia" and "Every anemia patient has malaria"?

(A) Both statements are correct

(B) The first statement is correct and the second is wrong

(C) The first statement is wrong and the second is correct

(D) Both statements are wrong

---

65 In the life cycle of Plasmodium there is a primary (definitive) host and an intermediate host. If the primary host is the one in which the gametes fuse, what is the intermediate host?

(A) Humans only

(B) Female or male Anopheles mosquito

(C) Female Anopheles mosquito only

(D) Male Anopheles mosquito only

---

66 Which of the following happens if all female Anopheles mosquitoes are exterminated?

(A) The disease is transmitted by male Anopheles mosquitoes

(B) Malaria infection rates rise

(C) The number of malaria patients does not increase

(D) The genetic variation of Plasmodium increases

---

67 Which of the following does not match its place?

(A) Merozoites - red blood cells

(B) Sporozoites - mosquito saliva

(C) Gametocytes - salivary glands of the mosquito

(D) Zygote - mosquito stomach

---

68 Which of the following distinguishes the stages of the life cycle of the malaria Plasmodium inside the mosquito's body from the stages inside the human body?

(A) Asexual reproduction takes place

(B) Sexual reproduction takes place

(C) Several cycles of asexual reproduction take place

(D) Asexual reproduction followed by sexual reproduction takes place

---

69 During the life cycle of the malaria Plasmodium, where are the diploid stages produced?

(A) In the salivary glands of the female Anopheles mosquito

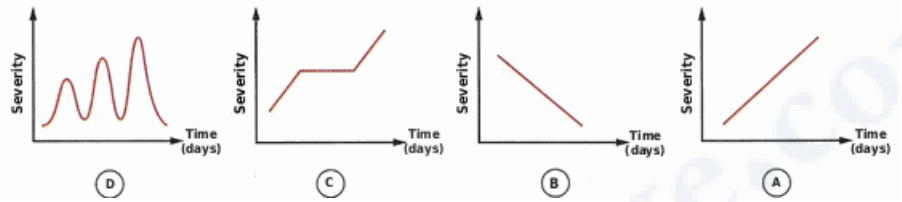
(B) In the stomach cavity of the female Anopheles mosquito

(C) In human red blood cells

(D) In the stomach wall of the male Anopheles mosquito

---

70 Which of the following graphs represents the severity of malaria symptoms in humans during the period of infection?

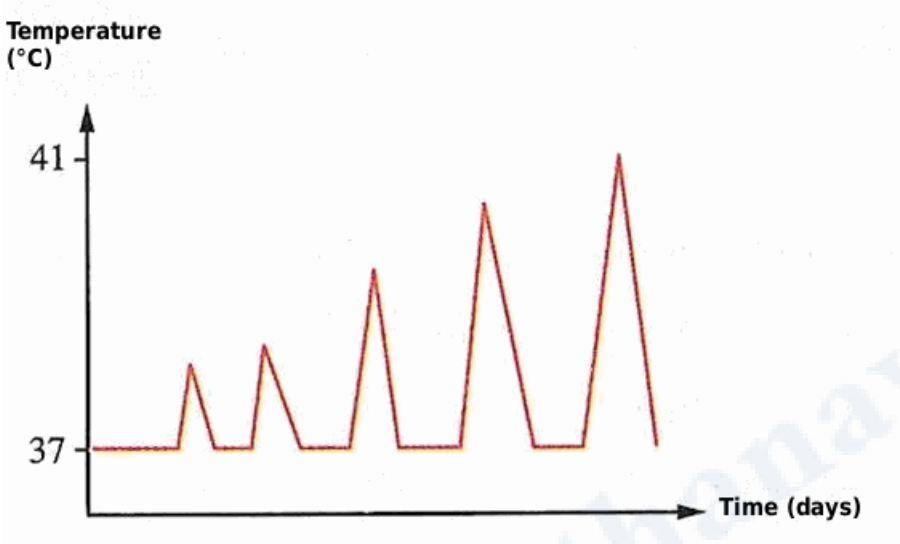


---

71 How long does the malaria Plasmodium parasite need for the symptoms to appear three successive times in an infected person?

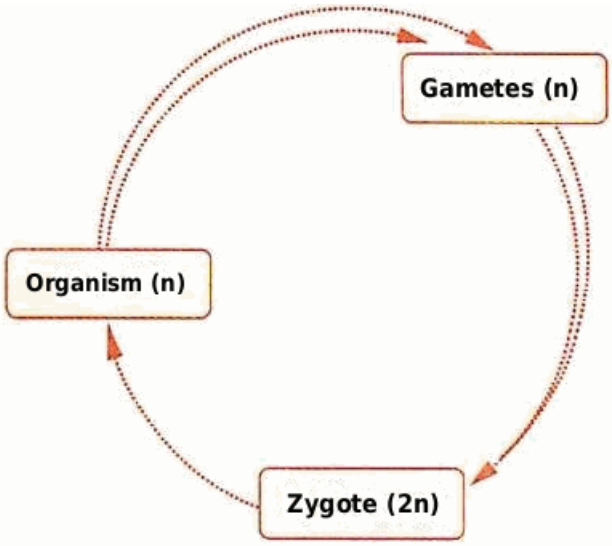
(A) 3 days (B) 6 days (C) 10 days (D) Three weeks

72 The opposite graph shows the change in body temperature of a person infected with malaria during 10 days of attacking red blood cells. How many times were merozoites released from the infected blood cells of this person?



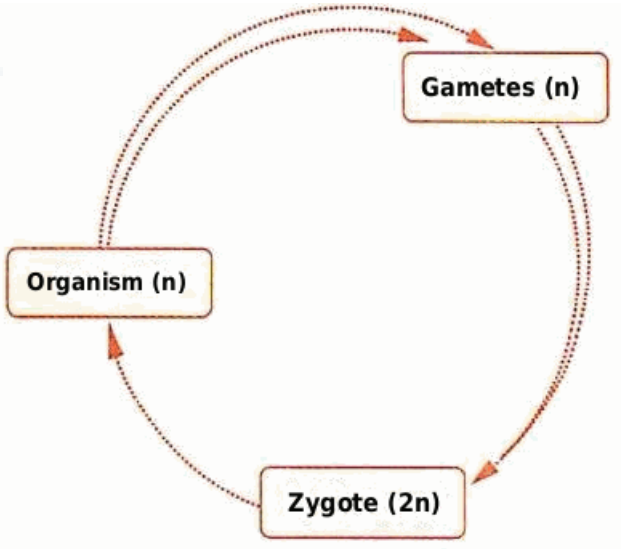
(A) Once (B) Five times (C) Ten times (D) Twenty times

73 The opposite diagram shows some stages of the life cycle of an organism:
In which of the following organisms does the opposite life cycle take place?



(A) Spirogyra (B) Bread mould
(C) Fern (D) Malaria Plasmodium

74 The opposite diagram shows some stages of the life cycle of an organism:
In which stage does meiosis take place in the life cycle of this organism?



(A) The ookinete (motile stage)
(B) The zygote
(C) The zygospore
(D) The sporangia

75 Which of the following represents the timing of meiosis relative to conjugation in Spirogyra and to the formation of the gametophyte in the fern, respectively?

(A) Before / after
(B) Before / before
(C) After / before
(D) After / after

76 In what does the male gamete resemble the female gamete in the Adiantum (maidenhair fern) plant?

(A) Movement
(B) The number of chromosomes
(C) Shape
(D) Size

77 In which of the following does meiosis depend on the improvement of conditions?

(A) The zygospore of Spirogyra
(B) The ookinete of Plasmodium
(C) The spore mother cells of the fern
(D) The ovary of honeybee queens

78 In the life cycle of which of the following are spores surrounded by a thick wall formed?

(A) Hydra
(B) Amoeba
(C) Adiantum (maidenhair fern)
(D) Plasmodium

79 By what type of division are the gametes of the honeybee male and of the fern plant formed, respectively?

(A) Mitosis / mitosis (B) Mitosis / meiosis (C) Meiosis / mitosis (D) Meiosis / meiosis

80 Which of the following structures in the life cycle of the fern is formed by meiosis?

(A) Spores
(B) The ovum
(C) The antherozoids (sperms)
(D) The sporophyte

81 In which of the following does water not take part during the life cycle of the fern?

(A) Spores of the sporophyte reaching their places of germination
(B) Germination of the spore released from the sporangia
(C) Ciliated sperms reaching the mature archegonia
(D) Making food for the gametophyte and the sporophyte

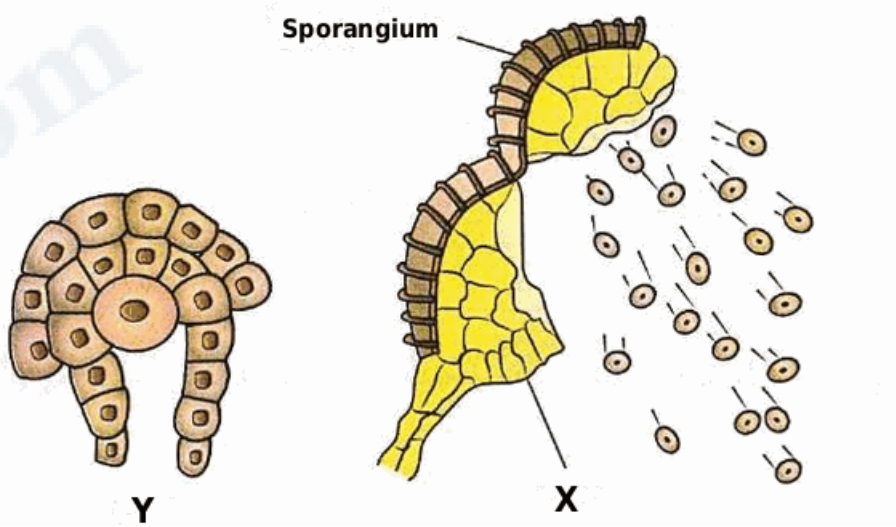
82 Which processes cause genetic variation in the individuals produced by the life cycle of the fern plant?

(A) Spore formation only
(B) Gamete formation only
(C) Formation of both spores and gametes
(D) Spore formation and fertilization

83 Which of the following can reproduce sexually although there is only one individual?

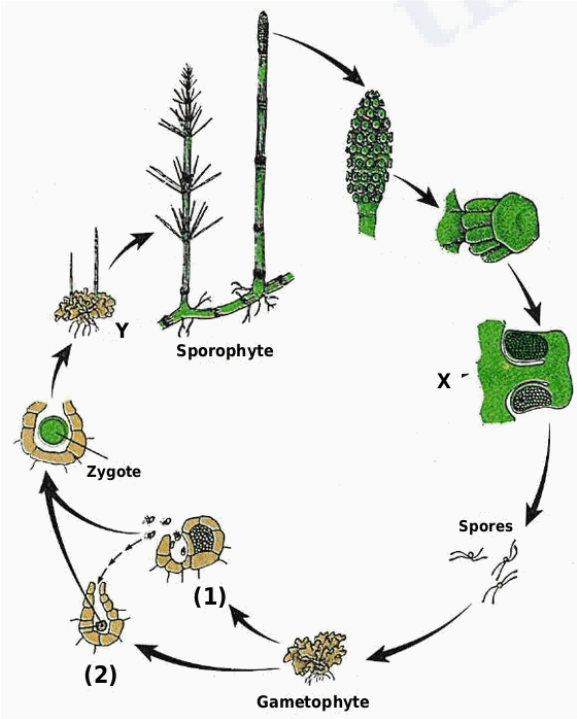
(A) Spirogyra and the gametophyte of Adiantum
(B) Spirogyra and the sporozoites of the malaria Plasmodium
(C) The gametophyte and the sporophyte of Adiantum
(D) The sporophyte of the fern and the merozoites of the malaria Plasmodium

84 From the two opposite figures, which choice gives the type of division that takes place in each of structures (X) and (Y) in a fern plant, and the chromosome set of each?



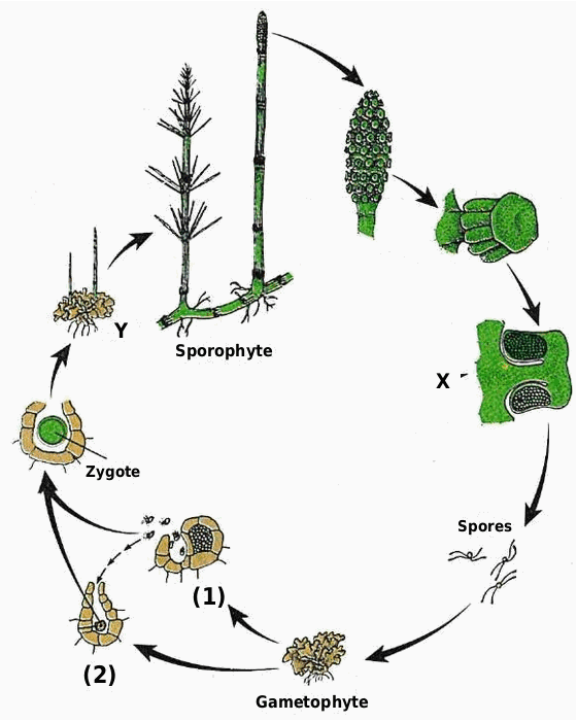
(A) X: mitosis, n — Y: mitosis, n
(B) X: meiosis, 2n — Y: mitosis, n
(C) X: mitosis, 2n — Y: mitosis, n
(D) X: meiosis, n — Y: meiosis, 2n

85 The opposite figure shows the life cycle of a fern plant. Study it, then answer: What is the chromosome set of structure (X) and structure (Y), respectively?



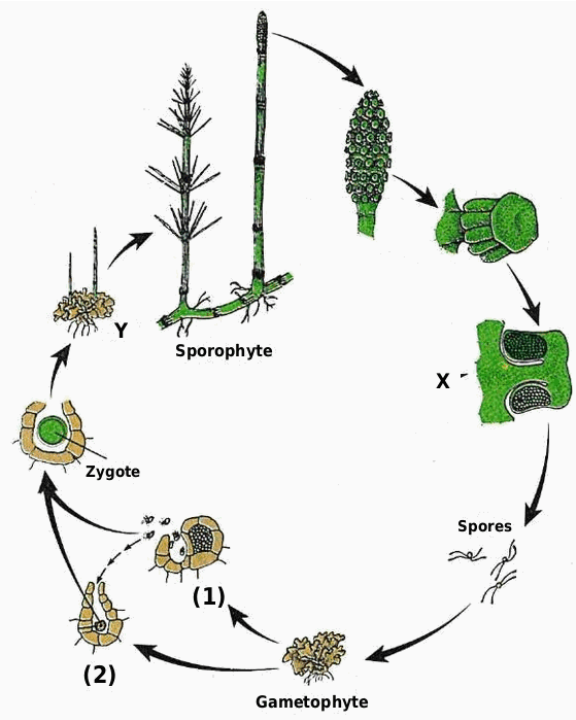
(A) n / 2n
(B) n / n
(C) 2n / n
(D) 2n / 2n

86 The opposite figure shows the life cycle of a fern plant. Study it, then answer:
How many meiotic divisions take place during one life cycle?



(A) 1 (B) 2 (C) 3 (D) 4

87 The opposite figure shows the life cycle of a fern plant. Study it, then answer:
What is the difference between (1) and (2)?



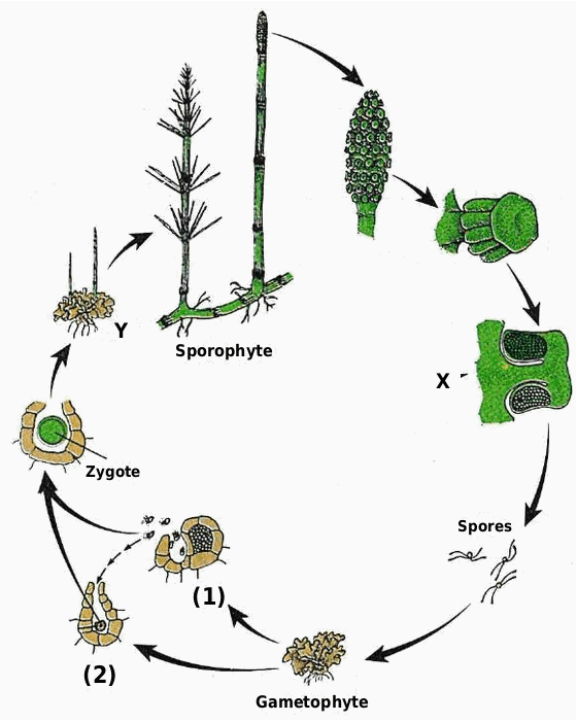
(A) The type of division that leads to their formation

(B) The structures produced by the division of each of them

(C) The chromosome number

(D) The source of nutrition

88 The opposite figure shows the life cycle of a fern plant. Study it, then answer:
Given that (1) and (2) do not mature at the same time, what is the importance of this?



(A) Ensuring that asexual reproduction takes place

(B) Ensuring genetic variation

(C) Ensuring genetic stability

(D) Ensuring that the chromosome number stays constant

---

89 Which of the choices in the following table applies to the opposite diagram?



(A) Organism: sporophyte, division (X): mitosis, division (Y): meiosis

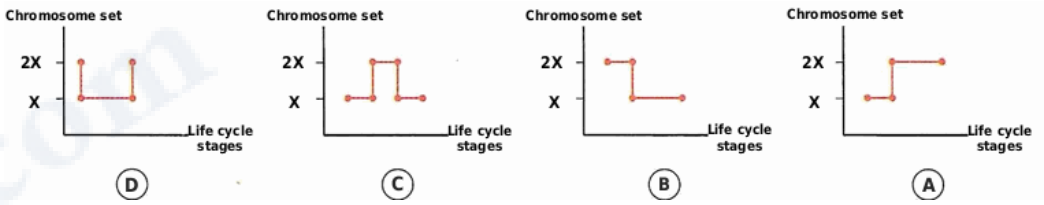
(B) Organism: sporophyte, division (X): mitosis, division (Y): mitosis

(C) Organism: gametophyte, division (X): mitosis, division (Y): mitosis

(D) Organism: gametophyte, division (X): meiosis, division (Y): mitosis

---

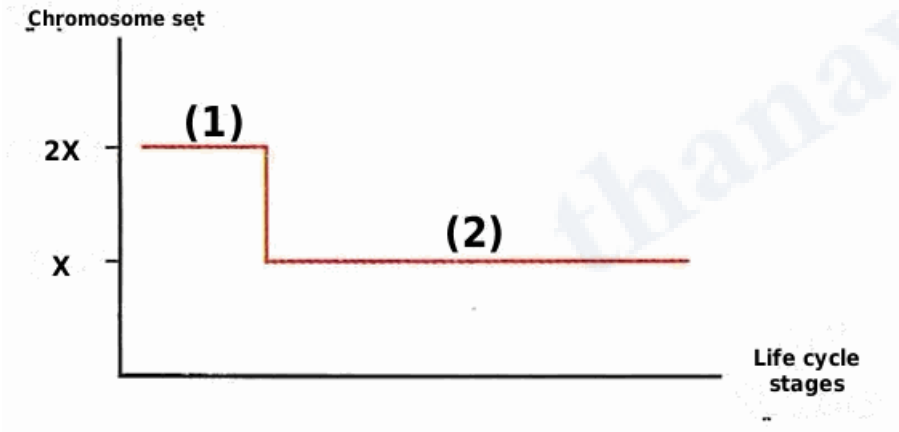
90 Which of the following graphs correctly expresses a complete life cycle of the fern, starting from the main plant?



91 Which of the following differs from the other choices in the number of chromosome sets?

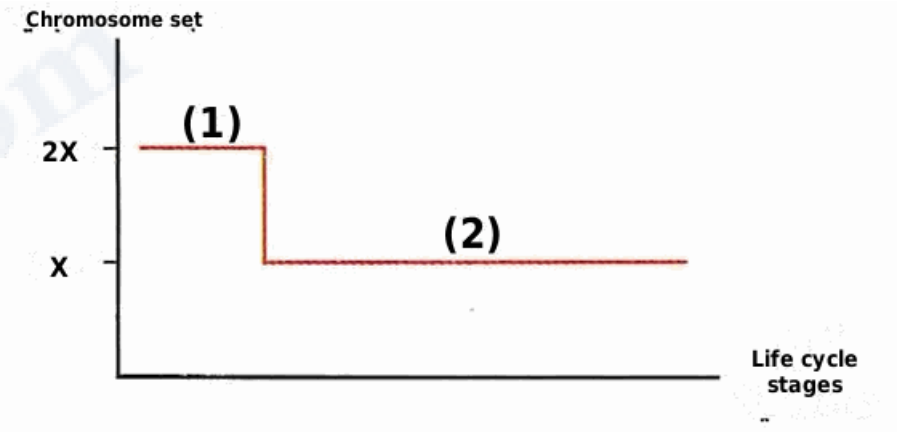
(A) Spores
(B) The gametophyte of the fern
(C) The sporophyte of the fern
(D) Archegonia

92 The opposite graph represents the chromosome sets of part of the life cycle of an organism: Which of the following does not express the change from (1) to (2)?



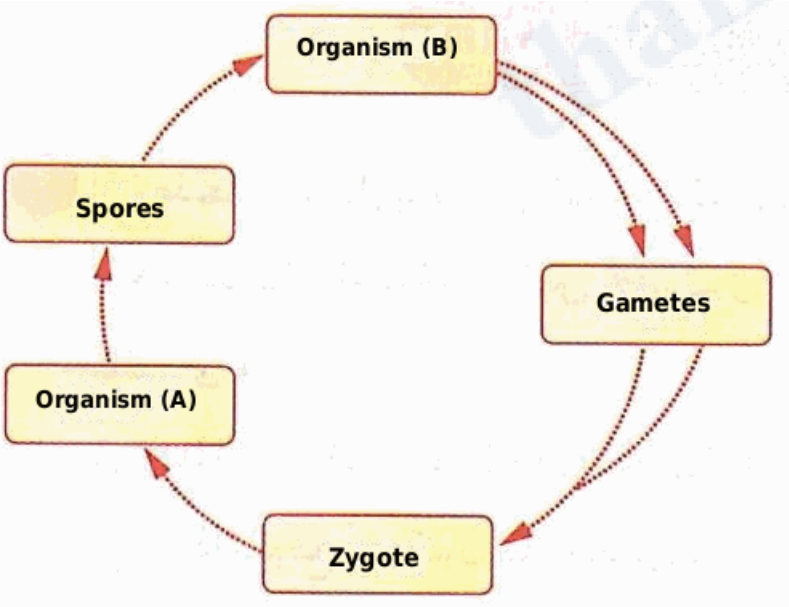
(A) Gamete formation in the fern plant
(B) Reproduction by spores in the fern plant
(C) Oocyst formation in Plasmodium
(D) Formation of the gametes of the honeybee queen

93 The opposite graph represents the chromosome sets of part of the life cycle of an organism:
In which of the following cases can (2) not return to (1)?



(A) Fertilization
(B) Conjugation
(C) Artificial parthenogenesis
(D) Natural parthenogenesis

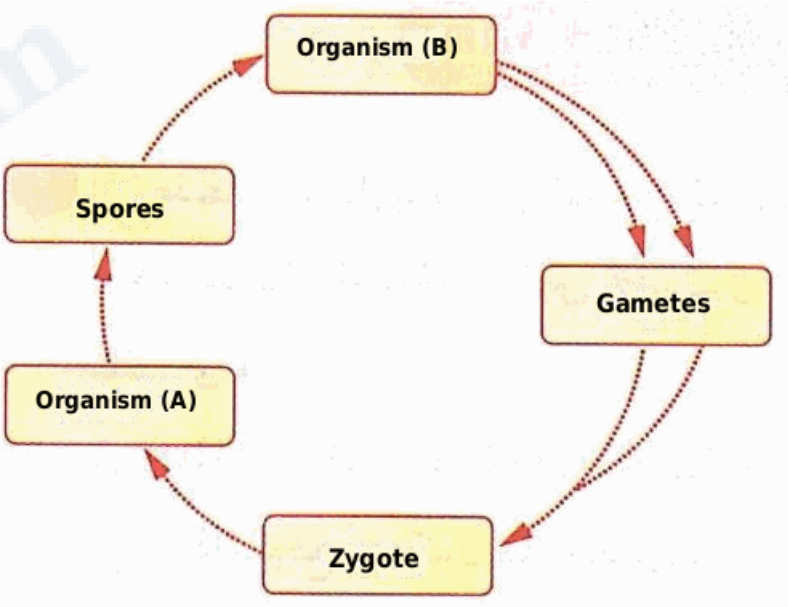
94 Study the opposite diagram, then answer:
In which of the following organisms does the opposite life cycle take place?



(A) Spirogyra
(B) Bread mould
(C) Fern plant
(D) Planaria worm

95 Study the opposite diagram, then answer:

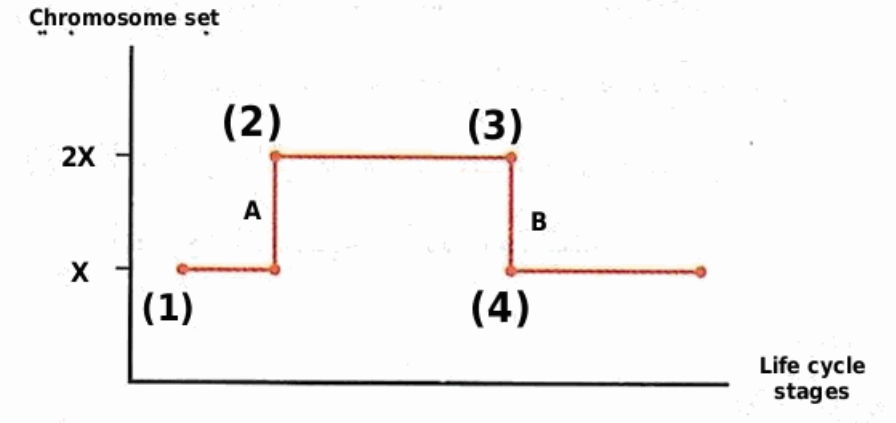
In what does organism (A) resemble organism (B)?



(A) Shape
(B) Size
(C) The number of chromosomes
(D) The way of nutrition

96 The opposite graph represents the chromosome sets of some stages in the life cycle of an organism:

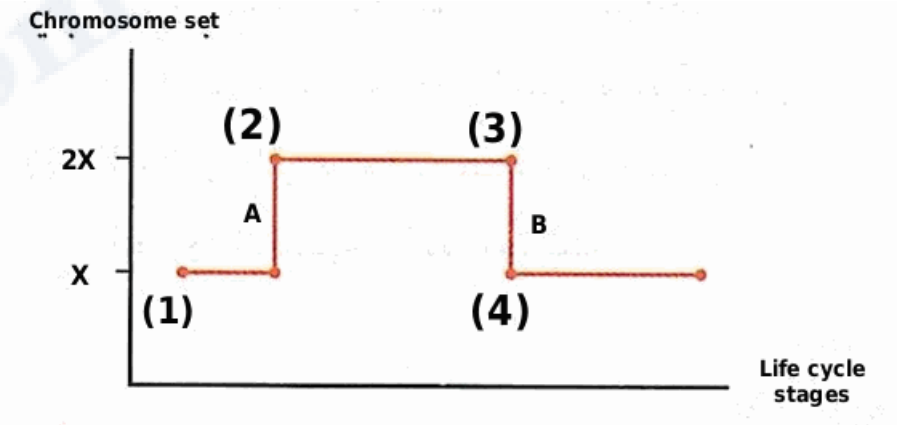
This graph expresses the life cycle of .....



(A) Spirogyra
(B) Malaria Plasmodium in the human liver
(C) Malaria Plasmodium in human blood
(D) Amoeba

97 The opposite graph represents the chromosome sets of some stages in the life cycle of an organism:

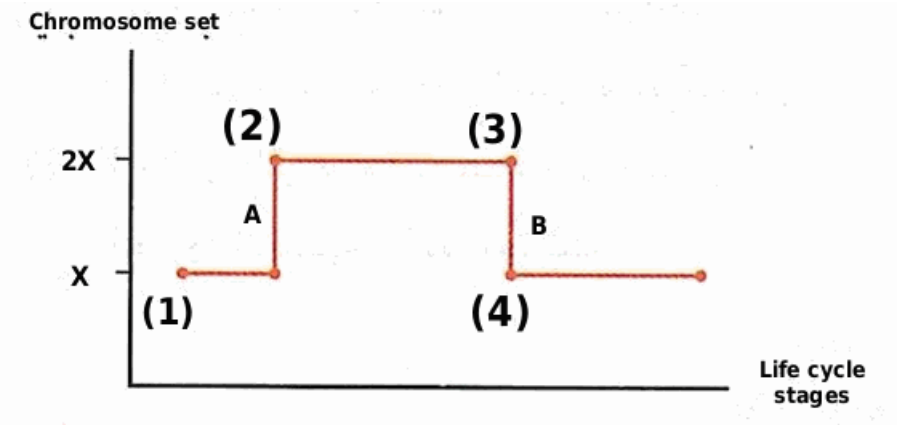
Processes (A) and (B) take place in ..... conditions.



(A) unsuitable and suitable, respectively
(B) suitable and unsuitable, respectively
(C) suitable
(D) unsuitable

98 The opposite graph represents the chromosome sets of some stages in the life cycle of an organism:

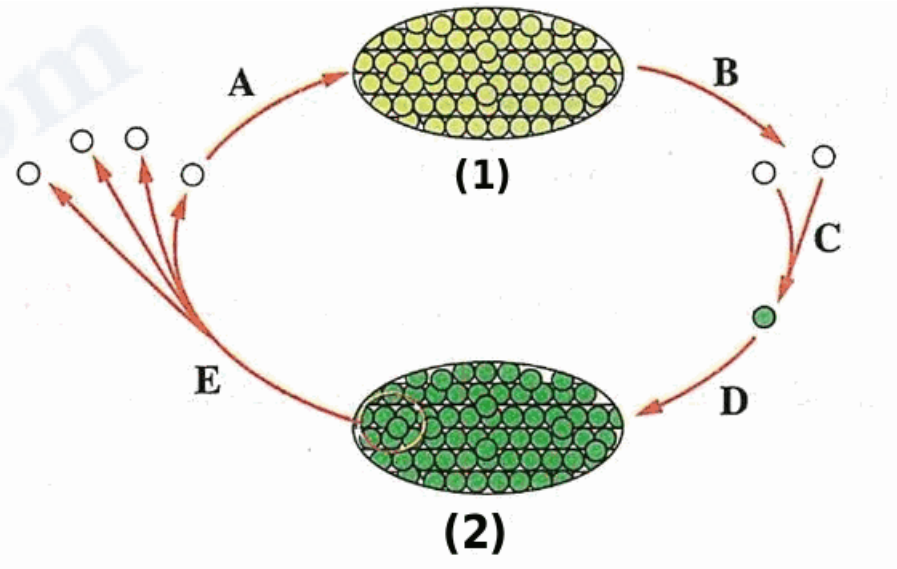
If we suppose that number (1) refers to the gametes of the fern, what does number (4) refer to?



(A) Archegonia
(B) Antheridia
(C) Spores
(D) Sporophyte

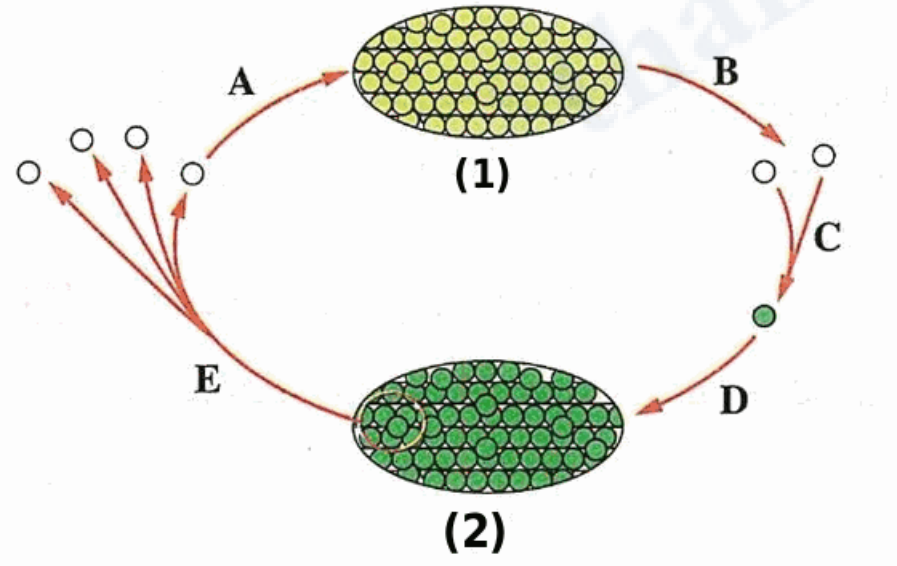
99 The opposite figure shows the life cycle of a fern plant:

In which of the following stages does meiosis take place?



100 The opposite figure shows the life cycle of a fern plant:

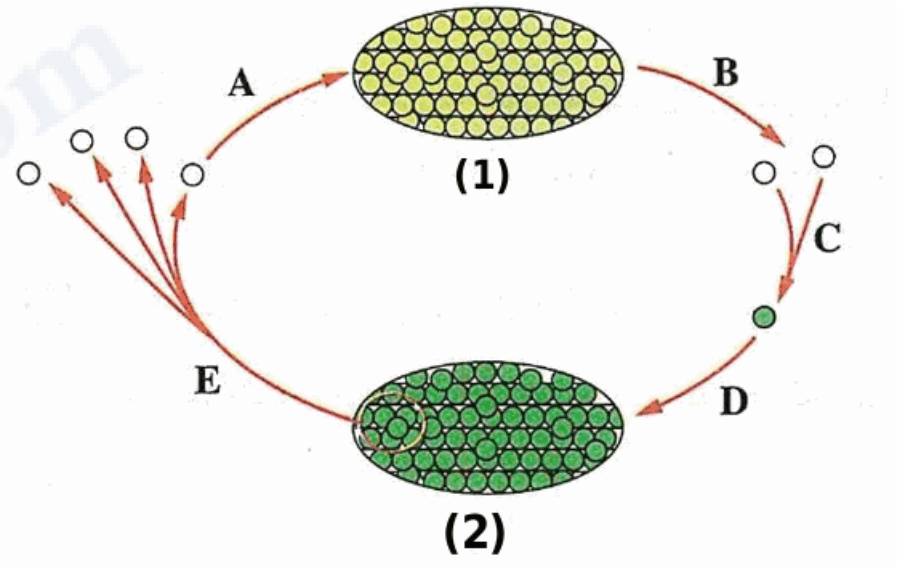
In which of the following stages does mitosis take place?



(A) A, C (B) D, E (C) A, B, D (D) A, B, C

101 The opposite figure shows the life cycle of a fern plant:

In what does structure (1) differ from structure (2)?



(A) The need for a moist environment

(B) The way of nutrition

(C) The presence of reproductive structures

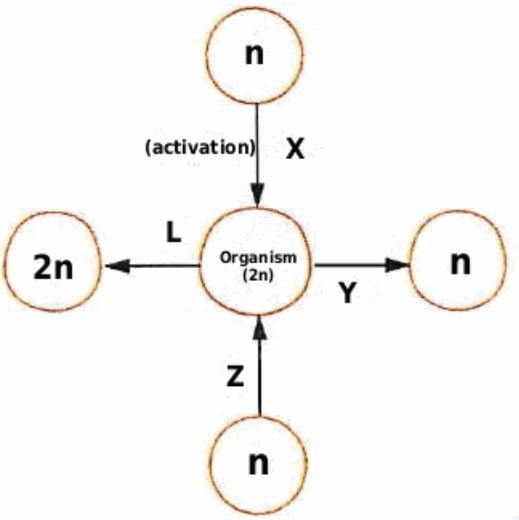
(D) The type of reproduction that results from it

Essay questions — 8 questions

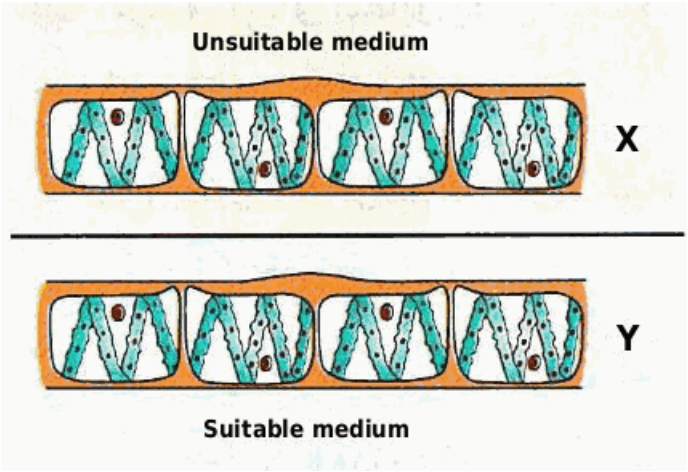
1 The opposite diagram shows the changes in the number of chromosome sets that take place in the cells of an organism:

(1) What do the letters (X), (Y), (Z) and (L) refer to?

(2) What do you expect this organism to be?



2 The opposite drawing shows two Spirogyra filaments (X) and (Y). What is the maximum number of new filaments produced by reproduction that will be identical in their traits to the original filaments? Explain your answer.

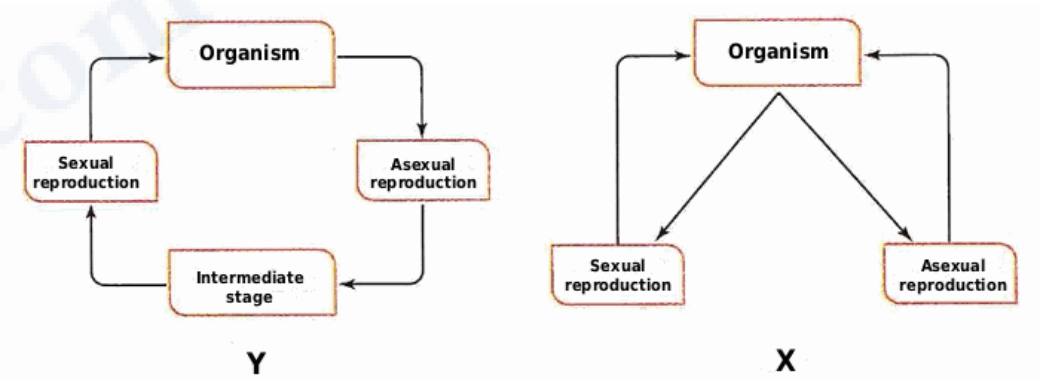


3 What is the difference between the infective stage for the female Anopheles mosquito and the infective stage for humans in the life cycle of the malaria Plasmodium?

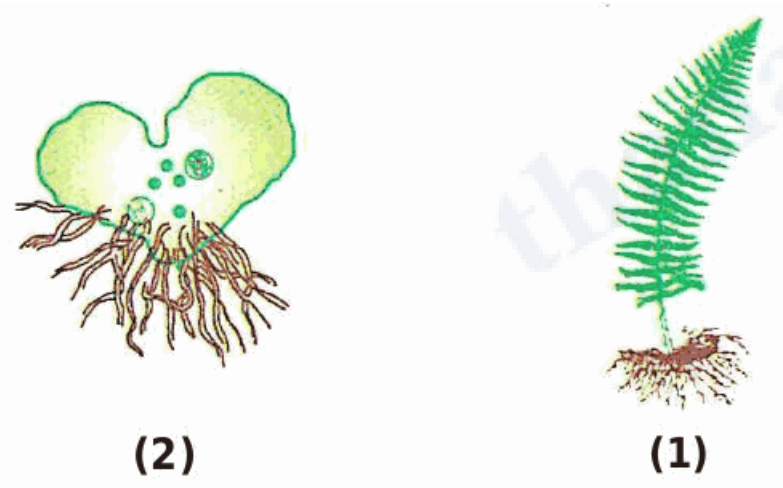
4 Study the two following diagrams, then answer:

(1) Which of the two cases represents alternation of generations? Explain your answer.

(2) Give one example of each of the two cases (X) and (Y) from what you have studied.



5 What is the difference between plant (1) and plant (2) in: the chromosome set - the degree of advancement of the body?



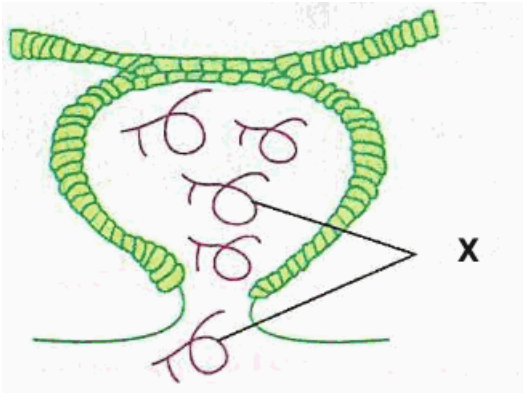
6 The opposite figure shows one of the sex organs in a fern plant. In the light of this, answer:

(1) What does this figure represent? Where is it found?

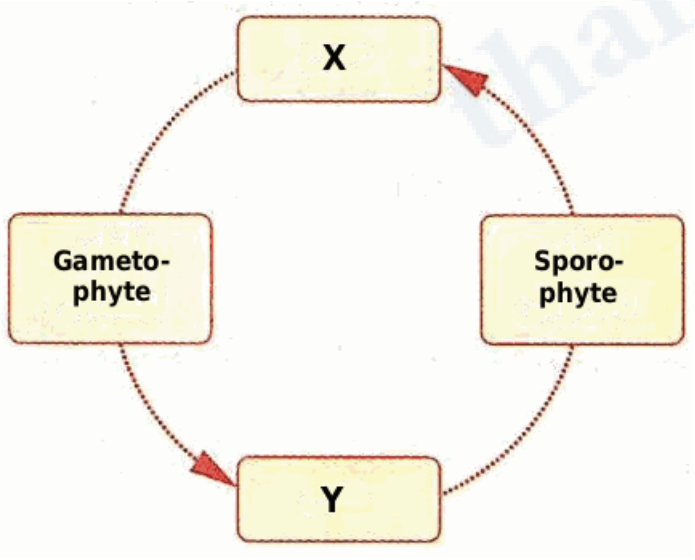
(2) What is the name of cells (X)? How many chromosome sets are in these cells?

(3) How are cells (X) formed?

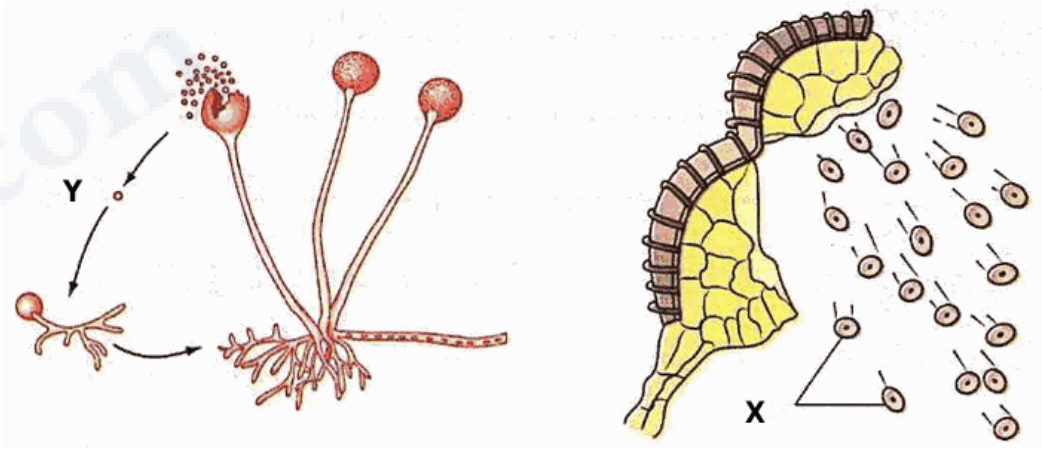
(4) What is the means of pollination needed to complete fertilization? How does fertilization take place?



7 The opposite diagram shows the life cycle of a fern. What does each of (X) and (Y) represent?

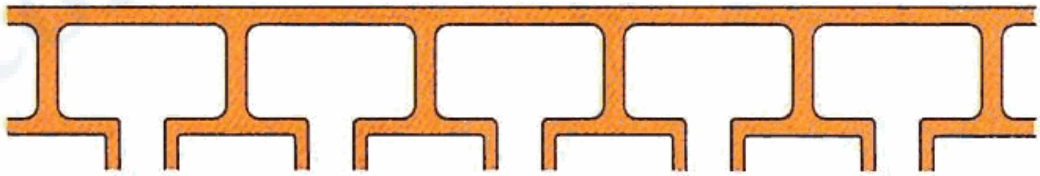


8 Study the two opposite figures, then state the differences between structure (X) and structure (Y).



Past exam questions — 34 questions

1 The opposite figure shows a Spirogyra filament isolated from a dry canal. What type of reproduction is in this filament? (Trial exam / May 2021)



(A) Asexual reproduction by mitosis

(B) The type of reproduction cannot be inferred

(C) Sexual reproduction by lateral conjugation

(D) Sexual reproduction by scalariform conjugation

---

2 What is the difference between scalariform conjugation in Spirogyra and reproduction in bony fish? (Trial exam / June 2021)

(A) Formation of the zygote

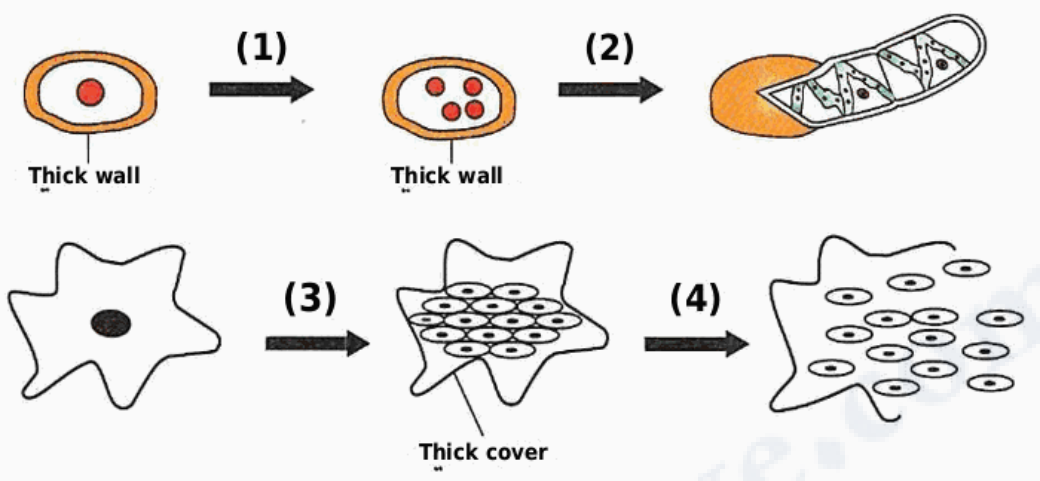
(B) The surrounding conditions

(C) The type of reproduction

(D) The number of individuals taking part in it

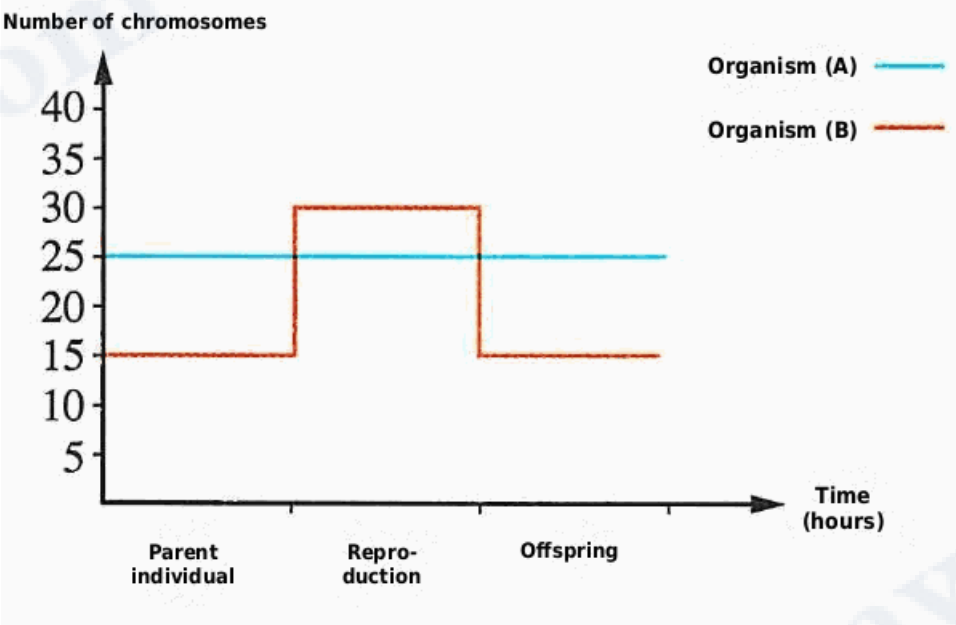
---

3 Study the opposite figure, which shows some stages of reproduction in two different primitive organisms, then deduce which number / numbers refer to a reduction in the number of chromosomes. (1st session 2021)



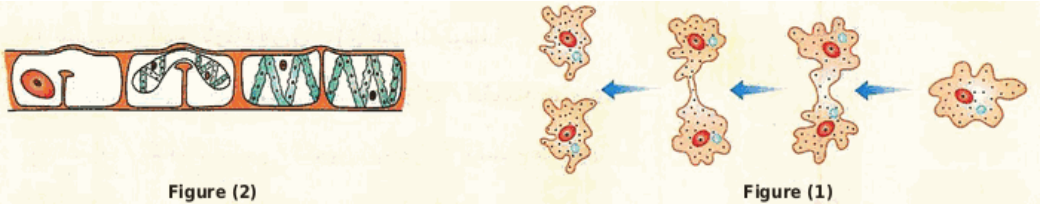
(A) (1), (4) (B) (1) only (C) (2), (3) (D) (3) only

4 The opposite graph shows the change in the number of chromosomes in two different organisms as a result of reproduction. What is the similarity between organisms (A) and (B)? (1st session 2021)



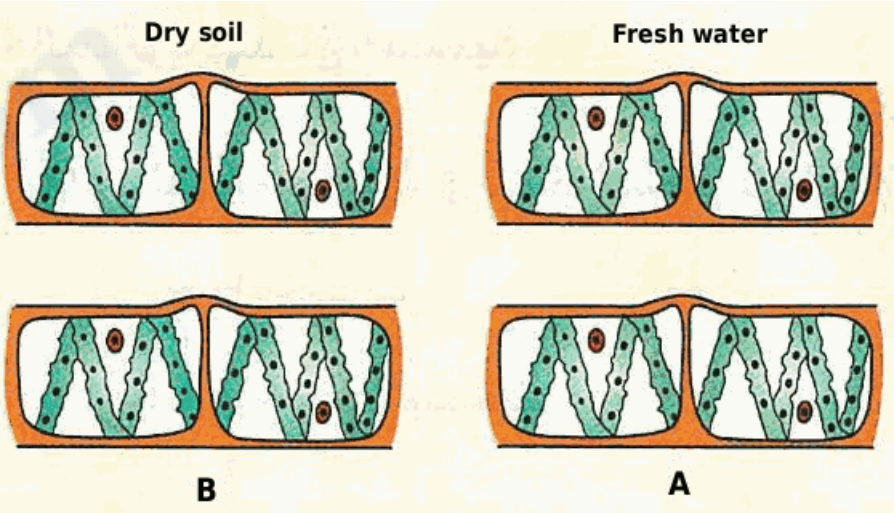
(A) Each of them reproduces sexually
(B) Each of them reproduces asexually
(C) The parent individuals are haploid (n)
(D) The parent individuals are diploid (2n)

5 State the similarity between the two processes in the following figures. ..... (2nd session 2021)



(A) They take place in suitable conditions
(B) They result from mitosis
(C) They result from meiosis
(D) Both need one parent

6 The opposite figure shows Spirogyra filaments. What is the importance of reproduction in case (A)? (2nd session 2022)



(A) Withstanding harsh conditions
(B) Genetic variation
(C) Producing diploid individuals
(D) Producing individuals identical to the parents

---

7 If the original number of chromosome sets of the body cells of an organism is (2N), what is the number of chromosome sets of the cells of the individuals produced by its reproduction by conjugation? (1st session 2023, Sample exam 2025)

(A) 2N (B) 4N (C) N or 2N (D) 2N or 4N

---

8 Which of the following activities can the cells of Spirogyra not carry out? (1st session 2024)

(A) Forming gametes (B) Sexual reproduction
(C) Asexual reproduction (D) Photosynthesis

---

9 Study the following table, then answer: (2nd session 2024)

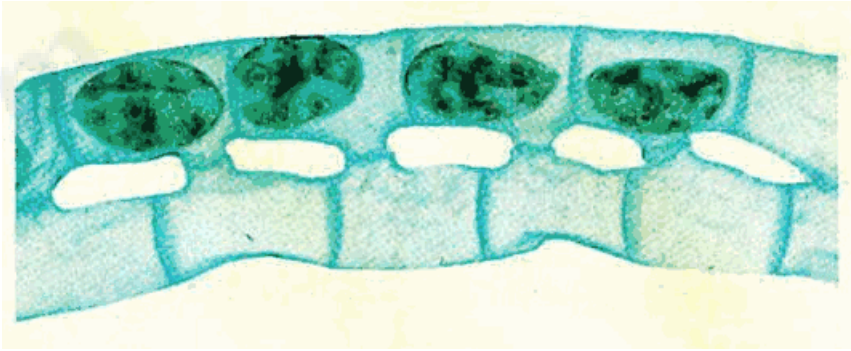
Organism (A): chromosome number of body cells N, chromosome number of gametes: none, method of reproduction: sexual and asexual.

Organism (B): chromosome number of body cells N, chromosome number of gametes N, method of reproduction: sexual only.

What are the names of the two organisms referred to by the letters (A) and (B), respectively?

(A) Plasmodium / Spirogyra (B) Spirogyra / honeybee male
(C) Starfish / Plasmodium (D) Plasmodium / fern

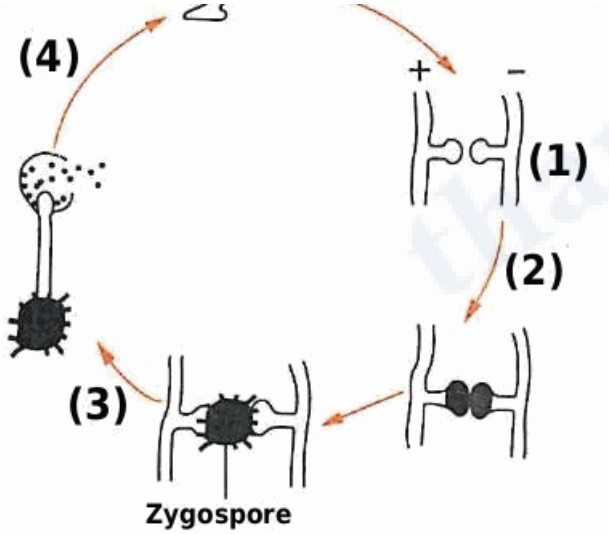
10 How many individuals are produced at the end of the sexual mating process shown in the opposite figure? (1st session 2025)



(A) Two individuals (B) 4 individuals (C) 8 individuals (D) 16 individuals

---

11 The opposite figure shows the life cycle of bread mould in unsuitable conditions. What do the numbers (1) to (4) refer to, respectively? (Sample exam 2026)



(A) Conjugation / zygote formation / meiosis / mitosis

(B) Conjugation / asexual reproduction / zygote formation / mitosis

(C) Asexual reproduction / conjugation / meiosis / mitosis

(D) Mitosis / asexual reproduction / meiosis / conjugation

---

12 What distinguishes reproduction in the tilapia fish from sexual reproduction in rabbits? (Trial exam 2023, Sample exam 2025)

(A) The type of fertilization

(B) The type of division that forms the gametes

(C) The small size of the ova

(D) Variation in genetic traits

13 What distinguishes sexual reproduction in humans from sexual reproduction in honeybees? (2nd session 2023)

(A) The type of division that forms the female gametes

(B) The type of division that forms the male gametes

(C) The number of parents taking part in reproduction

(D) The type of division of the cell produced by fertilization

---

14 Which of the following organisms uses meiosis to produce gametes? (1st session 2024)

(A) Spirogyra (B) Honeybee queen (C) Plasmodium (D) Fern

---

15 Which of the following distinguishes asexual reproduction from sexual reproduction? (2nd session 2025)

(A) It depends on meiosis to increase the number of individuals

(B) Genetic variation takes place in the individuals produced

(C) Increasing the number of individuals with a change in genetic traits

(D) Preserving the species, usually with constant genetic traits

---

16 Which of the following types of reproduction uses the most energy? (Sample exam 2026)

(A) Reproduction by fusion of gametes in Plasmodium

(B) Reproduction by fusion of gametes in bees

(C) Scalariform conjugation in Spirogyra

(D) Reproduction by fusion of gametes in rabbits

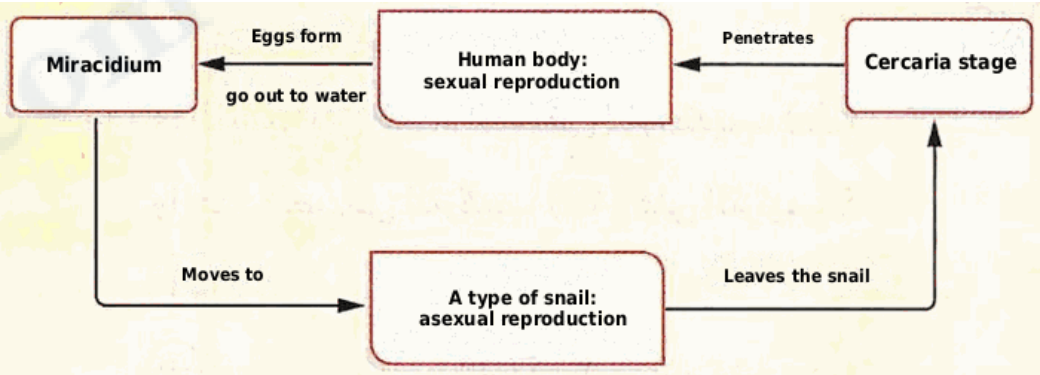
---

17 How long does the malaria Plasmodium parasite need for the symptoms to appear 5 successive times in an infected person? (Trial exam / May 2021)

(A) A month (B) 10 days (C) 5 days (D) Two weeks

---

18 Study the opposite diagram, which expresses the life cycle of the parasitic Bilharzia worms. What is the importance of the phenomenon expressed by the diagram? (Trial exam / June 2021)



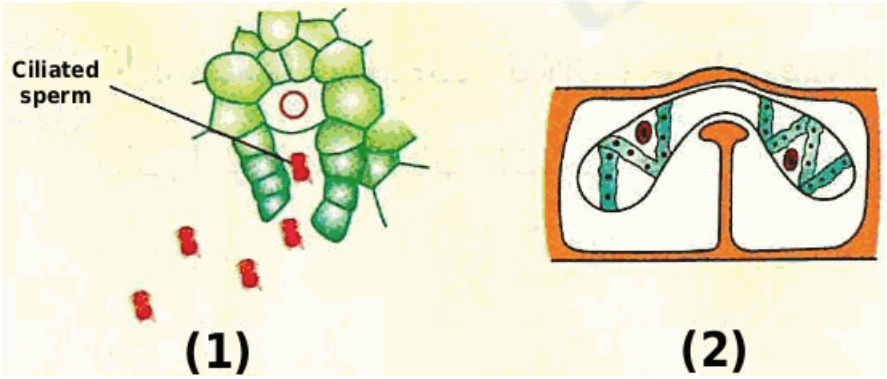
(A) Increasing the number of individuals and genetic variation

(B) Increasing the number of individuals and the biological cost

(C) Constant genetic traits and facing unsuitable conditions

(D) Lower biological cost and no adaptation to environmental changes

19 Study the following figure, then deduce the similarity between the two processes shown in the figure. (1st session 2022)



(A) The method of reproduction

(B) The type of reproduction

(C) The timing of meiosis

(D) Constant genetic traits

20 Which of the following organisms produce their female gametes by mitosis? (Trial exam 2023)

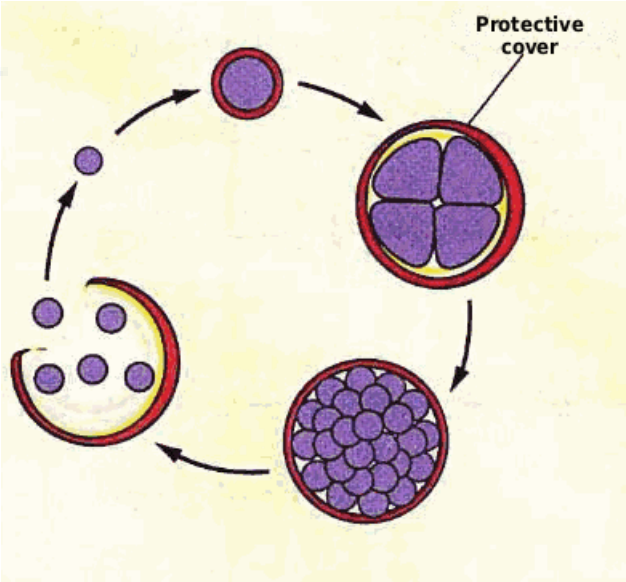
(A) Starfish and aphid

(B) Fern and starfish

(C) Fern and the malaria parasite

(D) Honeybee queen and aphid

21 Study the opposite figure, which shows one type of reproduction in an organism, then state the type of reproduction shown in the figure. (1st session 2023, Sample exam 2025)



(A) Schizogony in the malaria Plasmodium

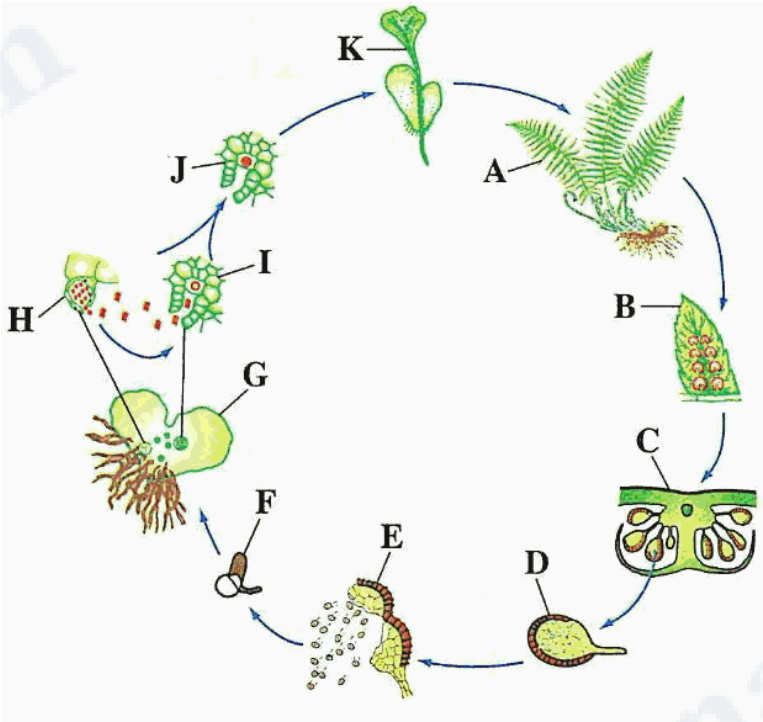
(B) Repeated binary fission in Amoeba

(C) Sporulation in bread mould

(D) Division of the sporangium of Spirogyra

22 Study the opposite figure, which shows the life cycle of the fern plant, then deduce:

(1) How many individuals (A) are produced from (G)? (1st session 2023)



(A) An unlimited number of individuals

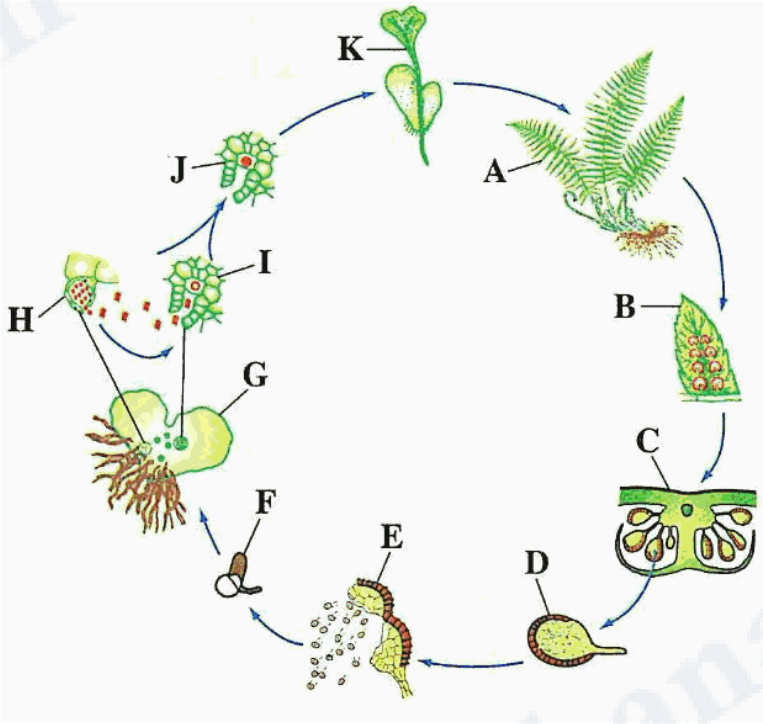
(B) A number equal to the number of structure (H)

(C) One individual only

(D) A number equal to the number of structure (I)

23 Study the opposite figure, which shows the life cycle of the fern plant, then deduce:

(2) What is the ratio between the chromosome number of structure (A) and the chromosome number of structure (G), respectively? (Sample exam 2025)



(A) 1 : 2 (B) 2 : 1 (C) 1 : 1 (D) 2 : 3

24 The opposite table shows the number of mitotic and meiotic divisions during the life cycle of four different organisms (given that the aim of all the divisions is reproduction). Which letter refers to the life cycle of the fern plant? (2nd session 2023)

A: mitosis 1, meiosis 1 / B: mitosis 2, meiosis 1 / C: mitosis 3, meiosis 1 / D: mitosis 2, meiosis 2

25 What is the difference between meiosis in the life cycle of ferns and in the life cycle of the malaria Plasmodium? (1st session 2024)

(A) Reducing the number of chromosomes to half

(B) The number of nuclei produced

(C) The aim of the division

(D) Genetic variation taking place

26 Which generation of the life cycle of the malaria parasite repeats an unlimited number of times? (2nd session 2024)

(A) The sexual one in the mosquito's stomach

(B) The asexual one in the mosquito's stomach wall

(C) The asexual one in human liver cells

(D) The asexual one in human red blood cells

---

27 If a sporangium of a fern contains 100 spore mother cells, how many spores will this sporangium produce? (Sample exam 2025)

(A) 100 (B) 200 (C) 400 (D) 800

---

28 Study the following table, which expresses the characteristics of reproduction of organisms (X), (Y) and (Z): (Sample exam 2025)

Organism (X): fast production ✗, genetic variation ✓, withstanding harsh conditions ✗

Organism (Y): fast production ✓, genetic variation ✗, withstanding harsh conditions ✓

Organism (Z): fast production ✓, genetic variation ✓, withstanding harsh conditions ✓

What may organisms (X), (Y) and (Z) represent, respectively?

(A) Plasmodium / Spirogyra / frog

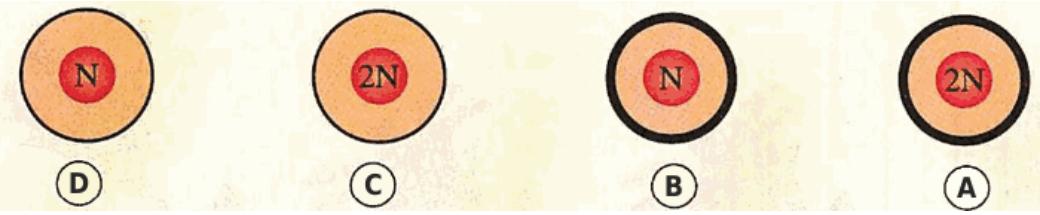
(B) Amoeba / Plasmodium / Spirogyra

(C) Frog / bread mould / fern

(D) Plasmodium / fern / Spirogyra

---

29 Which letter indicates the cell produced by the asexual reproduction of the fern plant? (2nd session 2025)



---

30 The formation of the zygote during reproduction by conjugation in Spirogyra differs from the formation of the zygote during reproduction in the gametophyte of ferns in ..... (Sample exam 2026)

(A) the method of reproduction used

(B) the chromosome set of the zygote

(C) the type of cells taking part

(D) genetic variation

---

31 State which of the two types of division, mitosis and meiosis, has a role in preserving genetic traits, and which has a role in the evolution of the organism, with explanation. (Sample exam 2026)

32 What are the reproductive organs used in the life cycle of ferns? What generation does each of these organs produce? (2nd session 2025)

33 "Meiosis takes place in the life cycles of Plasmodium and Adiantum (maidenhair fern) to achieve different aims." Explain this statement. (1st session 2025)

34 From your study of the life cycle of the fern plant, what type of division takes place in the cells found in the sori of the leaves and in the cells found in the gametophyte? What is its aim in each case? (Sample exam 2026)

Answer key and solutions

Multiple choice questions

1 B	2 C	3 D	4 D	5 A	6 B	7 D	8 A	9 B	10 D
11 B	12 C	13 C	14 C	15 A	16 C	17 B	18 B	19 B	20 C
21 D	22 D	23 A	24 B	25 D	26 B	27 D	28 D	29 B	30 D
31 D	32 D	33 D	34 A	35 B	36 A	37 C	38 B	39 D	40 A
41 D	42 C	43 D	44 B	45 B	46 C	47 C	48 C	49 B	50 B
51 B	52 D	53 B	54 B	55 B	56 A	57 D	58 B	59 C	60 A
61 D	62 A	63 C	64 B	65 A	66 C	67 C	68 B	69 B	70 D
71 B	72 B	73 D	74 A	75 C	76 B	77 A	78 C	79 A	80 A
81 A	82 D	83 A	84 B	85 D	86 A	87 B	88 B	89 C	90 D
91 C	92 A	93 D	94 C	95 D	96 A	97 A	98 C	99 D	100 C
101 D									

1 **Answer (B)**

An organism living in stable conditions depends on asexual reproduction.

2 **Answer (C)**

Scalariform conjugation is sexual reproduction that needs two individuals and uses energy, so its biological cost is high.

3 **Answer (D)**

The monkey reproduces sexually and needs parental care, so its cost is greater.

4 **Answer (D)**

(4) came from scalariform conjugation between two different filaments, so it produces a more varied filament, while (2) came from lateral conjugation within one filament.

5 **Answer (A)**

Lateral conjugation between two cells of the same filament gives one zygote, so the number of filaments produced decreases.

6 **Answer (B)**

The zygospore has a thick wall that withstands harsh conditions, while the zygote does not.

7 **Answer (D)**

The filament grows by mitosis, then conjugation takes place and the zygote divides by meiosis on germination.

8 **Answer (A)**

Conjugation takes place in unsuitable conditions; in suitable conditions Spirogyra reproduces asexually, so no zygospores are formed.

9 **Answer (B)**

The nuclei of the zygospore and the zygote are (2n) and the new filament is (n).

10 **Answer (D)**

Each of them surrounds itself with a thick wall to resist unsuitable conditions.

11 **Answer (B)**

The chromosomes rose from (X) to (2X) without returning, so lateral conjugation took place between two cells of the same filament without improvement of conditions.

12 **Answer (C)**

Tissue culture depends on mitosis only.

13 **Answer (C)**

5 cells before conjugation and 3 after it (two zygotes and one cell that did not conjugate), which is possible.

14 **Answer (C)**

Lateral conjugation takes place within the same filament, so it gives the least variation.

15 **Answer (A)**

The conjugation tube is formed in scalariform conjugation only; in lateral conjugation a hole forms in the wall between the two cells.

16 **Answer (C)**

The fusion of two cells is sexual conjugation.

17 **Answer (B)**

The individuals produced are haploid and combine the traits of the two individuals.

18 **Answer (B)**

Spirogyra reproduces sexually without gametes, and the honeybee male is not produced from a zygote.

19 **Answer (B)**

(X) is produced by mitosis, and (Y) is produced after meiosis.

20 **Answer (C)**

(X) is asexual in suitable conditions, and (Y) is sexual, after the zygote.

21 **Answer (D)**

Lateral conjugation results from the fusion of two cells, so it is sexual reproduction.

22 **Answer (D)**

The honeybee male is produced by parthenogenesis and reproduces sexually only.

23 **Answer (A)**

The zygospore (2n) divides by meiosis, so the chromosomes decrease to half.

24 **Answer (B)**

Amoeba forms a cyst, Spirogyra a zygospore and bread mould spores.

25 **Answer (D)**

The figure shows conjugation, which takes place in Spirogyra.

26 **Answer (B)**

Conjugation of two different filaments resembles scalariform conjugation.

27 **Answer (D)**

Rain improves conditions, so the zygote germinates and divides by meiosis and the chromosomes decrease from (2X) to (X), which is stage (4).

28 **Answer (D)**

(A) is the zygospore (2n), surrounded by a thick wall, waiting for conditions to improve.

29 **Answer (B)**

The fusion of nuclei is followed by meiosis so that the original number of chromosomes returns.

30 **Answer (D)**

Fusion of nuclei is sexual, so it produces genetically different individuals, while binary fission produces identical individuals.

31 **Answer (D)**

Scalariform conjugation between 6 cells and 6 cells gives 6 zygotes, and 4 cells are left, some of which conjugate laterally to give two zygotes, so the total is 8.

32 **Answer (D)**

When (X) males mate with (6X) females, the offspring are six times the number of males, so numbers increase at the lowest cost.

33 **Answer (D)**

Sexual reproduction is always linked to the formation of a zygote; there may be no gametes or two different individuals, as in conjugation.

34 **Answer (A)**

Male gametes are more numerous and smaller.

35 **Answer (B)**

Fertilization in bony fish is external, and in reptiles it is internal.

36 **Answer (A)**

Spirogyra reproduces sexually by conjugation without gametes.

37 **Answer (C)**

The graph represents sexual reproduction by gametes: reduction then fertilization.

38 **Answer (B)**

The change from (n) to (2n) takes place by fertilization.

39 **Answer (D)**

The gametes in all these animals are haploid.

40 **Answer (A)**

Fertilization is external in amphibians and bony fish.

41 **Answer (D)**

(Z) and (M) are mitotic divisions that produce identical cells.

42 **Answer (C)**

(X) is meiosis to form gametes and (Y) is fertilization, so they produce different cells.

43 **Answer (D)**

(M) is mitosis with tissue differentiation to form the individual.

44 **Answer (B)**

(Z) is a worm with an ovary, so it reproduces sexually by gametes, while the virus and the bacteria do not.

45 **Answer (B)**

Meiosis always reduces the chromosomes to half, so the number stays constant after fertilization; gametes may be formed by mitosis, as in honeybee males.

46 **Answer (C)**

Gametes and a zygote are formed in this organism, which applies to the starfish.

47 **Answer (C)**

(X) is fertilization, which takes place in the honeybee and in the aphid.

48 **Answer (C)**

Fertilization is internal in (X) and (L), and the amount of food is large in (X), so it is a bird like the sparrow, and (Y) has external fertilization, like the frog.

49 **Answer (B)**

The individuals produced in both processes are haploid.

50 **Answer (B)**

(X) is sporozoites and (Y) is merozoites, and both are produced by asexual reproduction.

51 **Answer (B)**

The division in figure (3) increases the number of merozoites.

52 **Answer (D)**

Malaria is transmitted by the saliva of an infected female Anopheles.

53 **Answer (B)**

Asexual reproduction in the mosquito forms sporozoites.

54 **Answer (B)**

The infective stage for the mosquito is the gametocytes in human blood.

55 **Answer (B)**

The merozoite is produced from the sporozoite by mitosis, so the number of chromosomes is (X).

56 **Answer (A)**

Sporozoites are formed by mitosis of the oocyst nucleus.

57 **Answer (D)**

Both stages are haploid.

58 **Answer (B)**

Merozoites appear in the blood of the infected person.

59 **Answer (C)**

The zygote (2n) divides by meiosis to reduce the number of chromosomes.

60 **Answer (A)**

Sporozoites are found in the mosquito and then move to the human.

61 **Answer (D)**

Gametocytes are formed by the transformation of merozoites, and the ookinete (motile stage) is formed by the transformation of the zygote.

62 **Answer (A)**

The gametes are inside the mosquito's stomach, the spores outside its stomach, and schizogony (multiple fission) in the human liver.

63 **Answer (C)**

Genetic variation takes place when the gametes fuse and form the zygote, then the oocyst.

64 **Answer (B)**

Malaria destroys red blood cells, so it causes anemia, but not every anemia is caused by malaria.

65 **Answer (A)**

The primary host is the mosquito, so the intermediate host is the human.

66 **Answer (C)**

Without female Anopheles, malaria is not transmitted, so the number of patients does not increase.

67 **Answer (C)**

Gametocytes are found in the blood and the stomach, not in the salivary glands.

68 **Answer (B)**

Sexual reproduction takes place in the mosquito, while in the human it is only asexual.

69 **Answer (B)**

The zygote (2n) is formed in the stomach cavity of the female mosquito.

70 **Answer (D)**

The symptoms come back and become more severe as the release of merozoites repeats.

71 **Answer (B)**

The symptoms repeat about every two days.

72 **Answer (B)**

The number of temperature peaks is the number of times merozoites were released, which is 5.

73 **Answer (D)**

An organism (n) forms gametes (n), then a zygote (2n) whose number is reduced by meiosis, and this happens in the malaria Plasmodium.

74 **Answer (A)**

The zygote changes into the ookinete (motile stage), which divides by meiosis.

75 **Answer (C)**

In Spirogyra, meiosis comes after conjugation, and in the fern it comes before the formation of the gametophyte.

76 **Answer (B)**

Both gametes are haploid.

77 **Answer (A)**

The zygospore stays dormant until conditions improve, then divides by meiosis.

78 **Answer (C)**

The spores of the fern have a thick wall.

79 **Answer (A)**

The gametes of the honeybee male and of the fern plant are formed by mitosis.

80 **Answer (A)**

The spores in the fern are produced by meiosis.

81 **Answer (A)**

The spores are spread by air, and water does not take part in their arrival.

82 **Answer (D)**

Spore formation by meiosis and fertilization cause genetic variation.

83 **Answer (A)**

Spirogyra conjugates laterally, and the gametophyte of Adiantum carries both the antheridia and the archegonia.

84 **Answer (B)**

(X) is a sporangium (2n) that divides by meiosis, and (Y) is a gametophyte (n) that divides by mitosis to form gametes.

85 **Answer (D)**

(X) and (Y) belong to the sporophyte (2n).

86 **Answer (A)**

Meiosis takes place once, in the sporangia.

87 **Answer (B)**

(1) is the antheridia, which produce sperms, and (2) is the archegonia, which produce the ovum.

88 **Answer (B)**

The antheridia and archegonia not maturing together ensures cross-fertilization and genetic variation.

89 **Answer (C)**

The gametophyte (n) is produced from spores by mitosis and produces its gametes by mitosis too.

90 **Answer (D)**

The life cycle starts with a plant (2n), then (n), then (2n).

91 **Answer (C)**

The sporophyte is (2n) and the others are (n).

92 **Answer (A)**

Gamete formation in the fern is by mitosis, which does not change the number of chromosomes.

93 **Answer (D)**

Natural parthenogenesis does not bring back the number (2n).

94 **Answer (C)**

A life cycle with spores, gametes and a zygote takes place in the fern plant.

95 **Answer (D)**

Organisms (A) and (B) are both autotrophic by photosynthesis.

96 **Answer (A)**

The graph expresses the life cycle of Spirogyra: conjugation, then meiosis.

97 **Answer (A)**

Conjugation takes place in unsuitable conditions, and meiosis when conditions improve.

98 **Answer (C)**

(1) is gametes, then the zygote and the sporophyte (2n), then (4) is spores.

99 **Answer (D)**

Meiosis takes place when spores are formed (E).

100 **Answer (C)**

Mitosis takes place in (A), (B) and (D).

101 **Answer (D)**

Structure (1) is the gametophyte, which reproduces sexually, and (2) is the sporophyte, which reproduces by spores.

Essay questions

1 **Model answer**

(1) (X): artificial parthenogenesis.

(Y): meiosis (gamete formation).

(Z): fertilization.

(L): mitosis (asexual reproduction by regeneration).

(2) Starfish.

2 **Model answer**

4: filament (Y) reproduces asexually in suitable conditions, producing 4 new filaments genetically identical to the original filaments.

3 **Model answer**

The infective stage for the female Anopheles mosquito: immature gametocytes, formed by the transformation of some merozoites inside red blood cells; they move to the mosquito through the blood of the infected person.

The infective stage for humans: sporozoites, formed by mitosis during reproduction by spores; they move to human blood through the saliva of the infected mosquito.

4 **Model answer**

(1) Case (Y): in the life cycle of the organism a generation that reproduces sexually alternates with a generation that reproduces asexually.

(2) (X) Spirogyra, (Y) the malaria Plasmodium or the fern plant.

5 **Model answer**

Chromosome set: plant (1) (the sporophyte) is diploid (2n), plant (2) (the gametophyte) is haploid (n).

Degree of advancement of the body: plant (1) is more advanced, plant (2) is less advanced.

6 **Model answer**

(1) The antheridia, found at the front of the lower surface of the gametophyte of the fern plant.

(2) Ciliated sperms (antherozoids), haploid (n).

(3) They are formed by mitosis inside the mature antheridia.

(4) Water: the ciliated sperms (male gametes) swim over the soil water until they reach the mature archegonia and fertilize the ovum (female gamete) inside them, forming the zygote (2n), which divides by mitosis and differentiates into a new sporophyte (2n) that grows on the gametophyte.

7 **Model answer**

(X) a spore (n), (Y) a zygote (2n).

8 **Model answer**

The number of chromosomes, the type of division that results from it, and the genetic variation of the individuals produced on germination.

Past exam questions

1	2	3	4	5	6	7	8	9	10
D	B	B	C	D	D	A	A	B	B
11	12	13	14	15	16	17	18	19	20
A	A	B	B	D	D	B	A	A	C
21	22	23	24	25	26	27	28	29	30
B	D	B	A	C	D	C	C	B	C
31	32	33	34						
—	—	—	—						

1 **Answer (D)**

Conjugation tubes appear between the cells of the filament and the cells of another filament, so it is sexual reproduction by scalariform conjugation (it takes place in unsuitable conditions, such as a dry canal).

2 **Answer (B)**

Scalariform conjugation takes place in unsuitable conditions, while the reproduction of fish is not linked to them.

3 **Answer (B)**

The thick-walled zygote of Spirogyra (2n) divides by meiosis (1), so the number of chromosomes is reduced.

(2), (3) and (4) are mitotic divisions.

4 **Answer (C)**

The number of chromosomes of organism (B) doubles on reproduction and then returns as it was, so it is haploid (n) and reproduces by conjugation.

Organism (A) has 25 chromosomes (an odd number), so it is haploid too.

5 **Answer (D)**

(1) is binary fission in Amoeba and (2) is lateral conjugation in Spirogyra, and both need one parent.

6 **Answer (D)**

In fresh water (suitable conditions) the filament reproduces asexually, producing individuals identical to the parents.

7 **Answer (A)**

The cells produced by conjugation divide by meiosis, and the individuals produced have the same chromosome number as the parents (2N).

8 **Answer (A)**

Spirogyra cells do not form gametes; the content of the cell acts as a gamete during conjugation.

9 **Answer (B)**

(A) is haploid, does not form gametes and reproduces sexually and asexually: Spirogyra.

(B) is haploid, forms gametes (n) and reproduces sexually only: the honeybee male.

10 **Answer (B)**

The figure shows 4 pairs of conjugating cells forming 4 zygotes, and each zygote gives one individual, so the result is 4 individuals.

11 **Answer (A)**

(1) conjugation of two filaments (+) and (−), (2) zygote formation, (3) meiosis of the zygospore, (4) spore formation by mitosis.

12 **Answer (A)**

Fertilization in tilapia is external, while in rabbits it is internal.

13 **Answer (B)**

Male gametes in humans are formed by meiosis, while in the honeybee male they are formed by mitosis.

14 **Answer (B)**

The honeybee queen (2n) forms the ova by meiosis.

15 **Answer (D)**

Asexual reproduction preserves the species, usually with constant genetic traits.

16 **Answer (D)**

Reproduction by fusion of gametes in rabbits (advanced animals) has a higher biological cost and uses more energy.

17 **Answer (B)**

The symptoms repeat every 48 hours, so repeating them 5 times needs 10 days.

18 **Answer (A)**

The diagram shows alternation of generations (a sexual generation in humans and an asexual generation in the snail), so the number of individuals increases and genetic variation takes place.

19 **Answer (A)**

(1) is the formation of ciliated sperms in the fern and (2) is conjugation in Spirogyra, and both are sexual reproduction.

20 **Answer (C)**

The fern forms its gametes by mitosis in the gametophyte (n), and the malaria parasite forms its gametes by the transformation of merozoites (n).

21 **Answer (B)**

A cell surrounds itself with a protective cover, then its nucleus divides several times and produces many individuals, which is repeated binary fission in Amoeba.

22 **Answer (D)**

Each fertilized ovum inside an archegonium (I) gives a sporophyte, so the number of individuals (A) equals the number of structure (I).

23 **Answer (B)**

(A) is the sporophyte (2n) and (G) is the gametophyte (n), so the ratio is 2 : 1

24 **Answer (A)**

In the fern, meiosis takes place once to form spores, and mitosis once to form gametes.

25 **Answer (C)**

Meiosis in ferns forms spores, and in Plasmodium it forms haploid individuals from the zygote, so the aim is different.

26 **Answer (D)**

The asexual reproduction of the parasite inside red blood cells repeats an unlimited number of times.

27 **Answer (C)**

Each spore mother cell divides by meiosis and gives 4 spores, so the number of spores = 4 × 100 = 400

28 **Answer (C)**

(X) has genetic variation only: the frog, and (Y) produces fast and withstands harsh conditions: bread mould.

(Z) has all three characteristics because of alternation of generations: the fern.

29 **Answer (B)**

Asexual reproduction of the fern produces thick-walled haploid (N) spores.

30 **Answer (C)**

In conjugation the content of the cell acts as a gamete, while in the gametophyte of ferns two specialized gametes fuse (a ciliated sperm and an ovum).

31 **Model answer**

Mitosis preserves genetic traits because it produces cells identical to the mother cell in the number and type of chromosomes.

Meiosis has a role in the evolution of the organism because crossing over takes place between homologous chromosomes and they are distributed randomly, so variation in genetic traits takes place.

32 **Model answer**

The antheridia (male sex organs) and the archegonia (female sex organs).

The sporophyte.

33 **Model answer**

In Plasmodium, meiosis of the zygote (2n) takes place in the mosquito's stomach to form haploid individuals (n), which are the start of asexual reproduction (the asexual generation).

In Adiantum, meiosis of the spore mother cells takes place inside the sporangia to form spores (n), which grow into the gametophyte.

34 **Model answer**

The cells in the sori (inside the sporangia): divide by meiosis to form spores (n).

The cells in the gametophyte: divide by mitosis to form gametes (ciliated sperms and ova).