



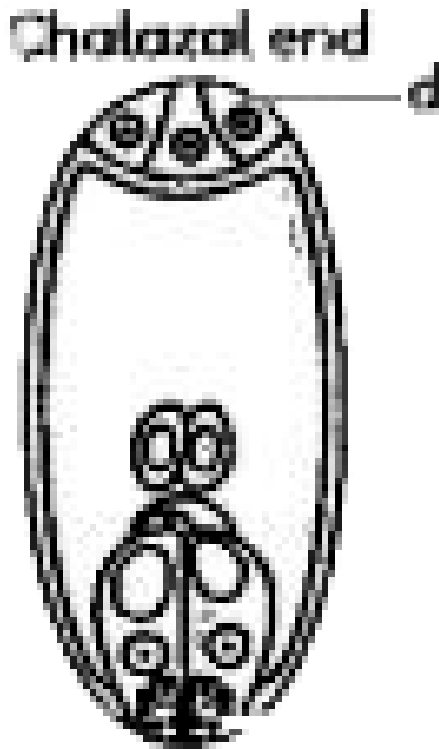
BIOLOGY

BOOKS - EDUCART PUBLICATION

SAMPLE PAPER 3

Section A

1. Identify 'd' in the given figure.



A. Synergids

B. Antipodals

C. Filiform apparatus

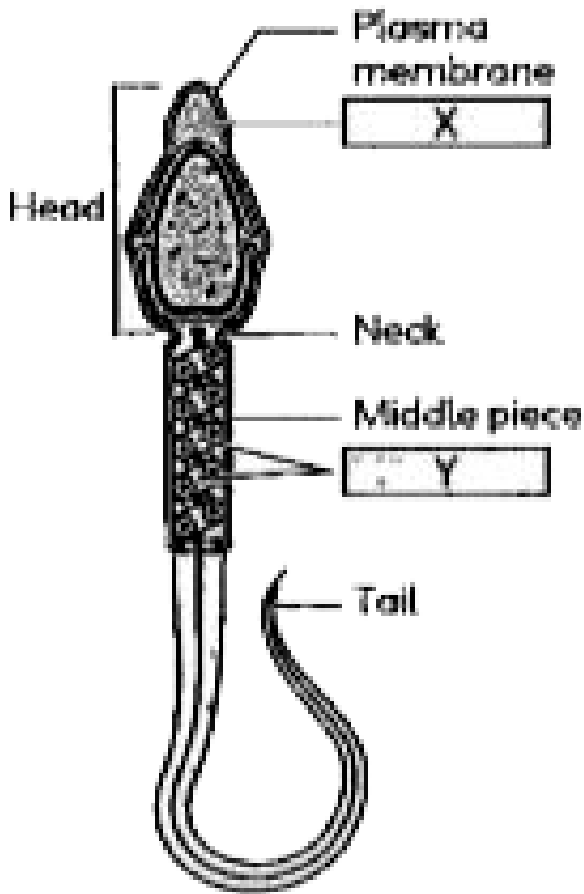
D. Central nuclei

Answer: B



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2. Identify X and Y, respectively:



A. X = Mitochondria, Y = Acrosome

B. X = Acrosome, Y = Mitochondria

C. X = Nucleus, Y = Acrosome

D. X = Acrosome, Y = Nucleus

Answer: B

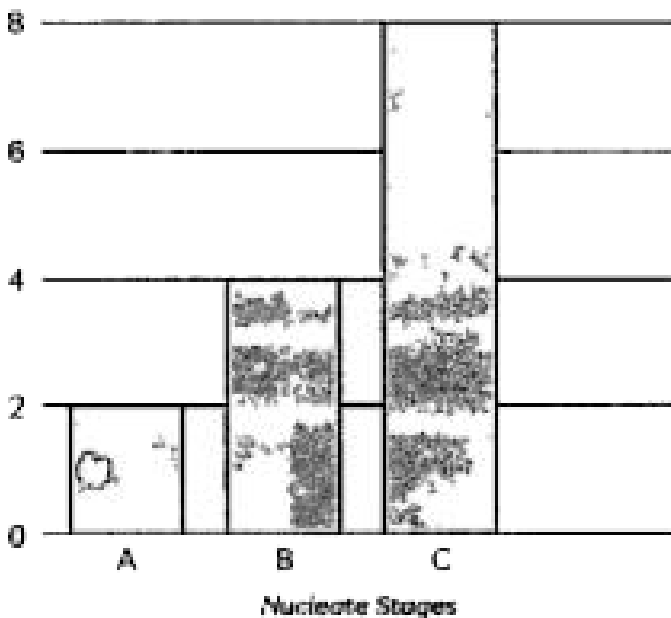


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3. In the megaspore tetrad formed by megasporogenesis, out of the four cells only one of the megaspores is functional while the other three degenerate. The female gametophyte (embryo sac) develops only from

this functional megaspore. This method of development of embryo sac from a single megaspore is termed as monosporic development. For example - Polygonum.

Study the graph and find out the stage in the development of female gametophyte at which the cell wall formation will take place.



A. A

B. B

C. C

D. Both (a) and (b)

Answer: C



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4. Find out the correctly matched option.

	Layer	Function
(A)	Tapetum	Providing nourishment to the developing pollen grains.
(B)	Epidermis	Inhibiting the dehiscence of anther.
(C)	Middle layers	Inhibiting the dehiscence of anther.
(D)	Endothecium	Providing nourishment to the developing pollen grains.

A. A

B. B

C. C

D. D

Answer: A

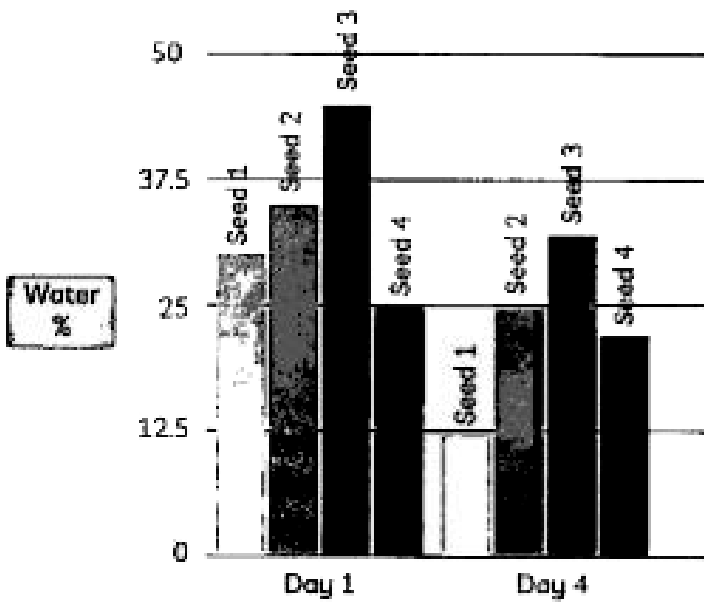


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5. Observe the following graph and answer.

The final product of sexual reproduction in flowering plants is seed. It has the following characteristics:

It is the fertilised ovule. · They are formed inside the fruits.



Which, among the given seed samples closer to maturity?

- A. Seed 1
- B. Seed 2
- C. Seed 3
- D. Seed 4

Answer: A



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6. Which one of the following is an invasive plant which came to India as a contaminant and is a major cause of pollen allergy in the country?

- A. *Hibiscus sinensis*
- B. *Parthenium*
- C. *Eichhornia crassipes*

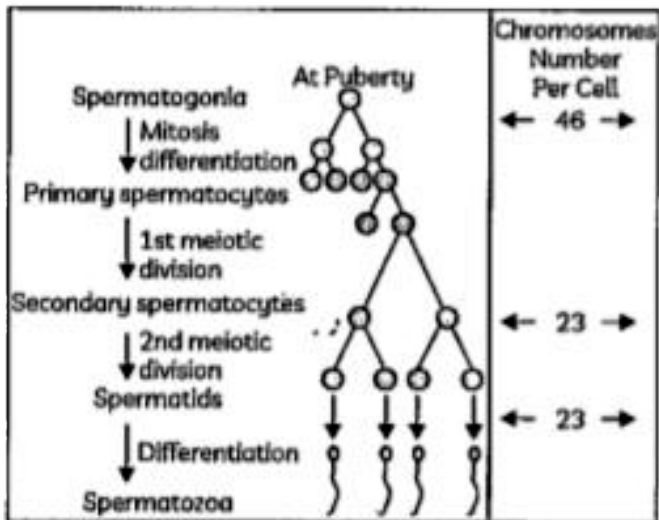
D. Triticum aestivum

Answer: B

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7. Observe the given diagram and the table.

Answer the question that follows:



Z	Spermatogonia Undergo Mitosis To Increase in Number!
Growth	Spermatogonia Increase In Size! Each Spermatogonium is Diploid And Has 46 Chromosomes.
Maturation	Some Spermatogonia Called Primary Spermatocytes Undergo 1st Meiosis Forming 2 Haploid Secondary Spermatocytes! Secondary Spermatocytes (23 Chromosomes Per Cell) Undergo 2nd Meiotic Division To Form 4 Haploid Spermatids.
X	4 Haploid spermatids Undergo X to Form Spermatozoa (Sperms).
Y	Sperm Heads Become Embedded In Sertoli Cells And The Undergo Y To Be Released From The Seminiferous Tubules!

The correct option will be:

	X	Y	Z
(a)	Differentiation	Spermiation	Multiplication
(b)	Multiplication	Spermiation	Differentiation
(c)	Spermiation	Multiplication	Differentiation
(d)	Differentiation	Multiplication	Spermation



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8. Which among these hormones are produced during human pregnancy?

A. hCG

B. Relaxin

C. HPL (Human placental lactogen)

D. All of these

Answer: D



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9. Embryo sac is to ovule as is to an anther.

A. Stamen

B. Filament

C. Pollen grain

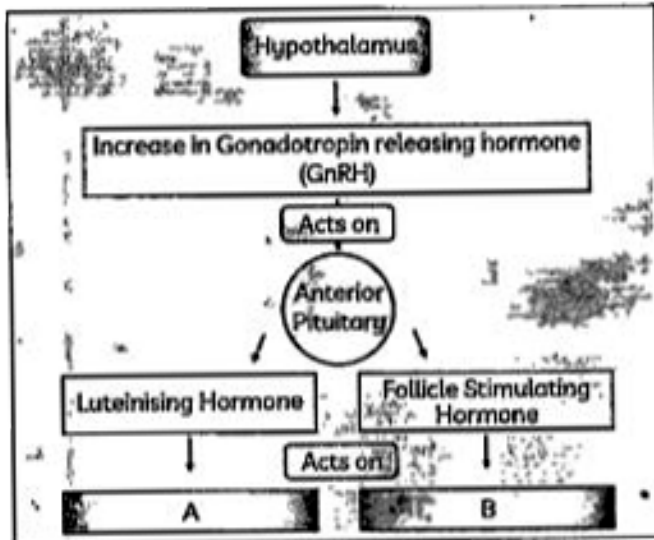
D. Androecium

Answer: C



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10. Which of the following statements are true related to A, B?



A. A are Leydig cells, B are Sertoli cells.

B. B are Sertoli, A are Leydig cells.

C. A are responsible for stimulation of spermiation factors.

D. B are responsible for stimulation of spermiation factors.

Answer: D



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11. Double fertilisation in angiosperms was discovered by

A. Sergei Nawaschin

B. Strassburger

C. J.C. Bose

D. Mendel

Answer: A



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12. The technical term for a single cotyledon in a Maize grain is:

A. Coleoptile

B. Scutellum

C. Coleorhiza

D. Plumule

Answer: B



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13. Which of these retain the perisperm?

A. Beetroot

B. Mango

C. Maize

D. Coconut

Answer: A



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14. Arrange the following steps in correct order: (TRANSLATION):

(1) Joining of initiator tRNA with the start codon by its anticodon through H-bonds.

(II) The start codon - AUG, lies downstream to this mRNA, which initiates the translation process.

(III) A complex is formed by attachment of small ribosomal subunit to 5' end of mRNA.

(iv) Chain elongation

A. (I), (II), (III), (IV)

B. (IV), (III), (II), (I)

C. (III), (II), (I), (IV)

D. (II), (II), (IV), (I)

Answer: C



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15. Fruits are seen in only a few Papaya plants while the flowers are present in all. This is because:

- A. It is a dioecious plant.
- B. Fruit is formed by female Papaya plant. (
- C. Female reproductive parts are present only in some Papaya plants.
- D. All of these.

Answer: D



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16. *Solanum melongena* plant produces 520 viable seeds after sexual reproduction. How many male gametes would have played in producing 520 viable seeds?

A. 1240

B. 0

C. 1040

D. 1000

Answer: C



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17. Eliminate the odd one out:

A. Vas deferens

B. Epididymis

C. Ampulla

D. Sertoli cells

Answer: C



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18. Mendel chose Garden pea because:

(I) Annual plant with a short life cycle.

(II) Many contrasting traits or characters were available

(III) Bisexual flowers

(IV) Its utility for human consumption

Choose the correct option:

A. (I), (II)

B. (III),(IV)

C. (I), (II) , (IV)

D. (I), (II), (III)

Answer: D



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19. The embryos produced from Polyembryony are:

A. Genetically similar

B. Genetically dissimilar

C. Can be Genetically similar/ dissimilar

D. None of these

Answer: C



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20. Megasporogenesis happens in.....

A. Exine layer.

B. Nucellus

C. Tapetum

D. Both (a) and (b)

Answer: B



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21. Pattern of inheritance where F_1 phenotype does not resemble either of the two parents and is in between the two is known as:

A. Co-dominance

B. Incomplete dominance

C. Dominance

D. Both (b) and (c)

Answer: B



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22. Syphilis is caused by

A. *Mycobacterium syphilae*

B. *Treponema pallidum*

C. *Neisseria gonorrhoeae*

D. HIV

Answer: B



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23. is a bacteriophage that infects E.coli.

A. Alpha 60

B. T2

C. TZ

D. Beta 60

Answer: B



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24. A cistron is:

A. Part of a RNA polymerase

B. Type of a RNA polymerase

C. DNA segment coding for a polypeptide

D. Both (a) and (c)

Answer: C



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Section B

1. Assertion (A): Condoms can play multiple roles apart from preventing STD transmission.

Reason (B): Condoms form, an artificial barrier

against delivery of sperms to the female reproductive tract.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A



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2. Assertion: Patients with STD's often go undetected for a long period in our society.

Reason (B): Social stigmas, asymptomatic patients contribute to the delay of timely detection of STD's.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A



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3. Assertion (A): After the first sexual intercourse, the Hymen breaks up.

Reason (B): The presence of an intact hymen is an indicator of virginity.

- A. Both A and R are true and R is the correct explanation of A
- B. Both A and R are true but R is not the correct explanation of A
- C. A is true but R is false
- D. A is false but R is true

Answer: C



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4. Assertion (A): Genes for yellow body and white eyes showed only 1.3 percent recombination whereas genes for white body and miniature wing showed 37.2 percent recombination as they were loosely linked in Morgan's experiment.

Reason (B): Genes conferring yellow body, and white eyes are closely linked.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A



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5. Which among these are assisted reproductive techniques?

(I) GIFT (II) MRI

(III) ICSI (IV) ZIFT

A. (I) and (II)

B. (II) and (IV)

C. (I), (III) and (IV)

D. (II), (III) and (IV)

Answer: C



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6. The ovarian cavity has another name. It is also called as:

A. Nucellus

B. Locule

C. Micropylar region

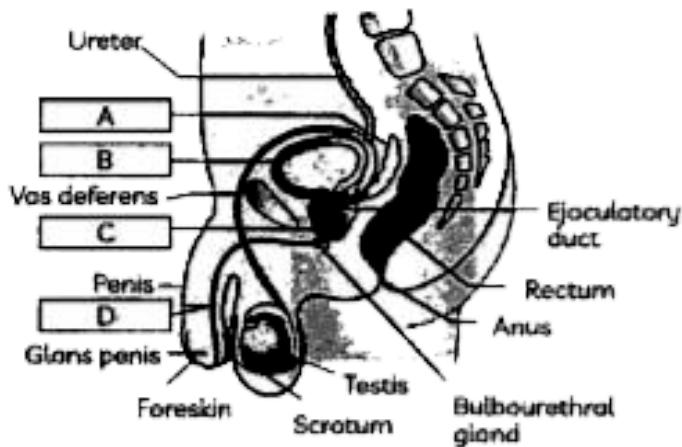
D. Micropyle

Answer: B



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7. Out of A,B,C,D, whose secretion contains Fructose which is essential for providing energy to the sperms?



Diagrammatic Sectional View of Male Pelvis Showing Reproductive System

A. A

B. B

C. C

D. D

Answer: A



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8. The bagging technique in hybridization experiments is applied to:

A. make sure that pollen is protected from physical agents of pollination in the initial growing phase.

B. Obtain a random pollination event

C. To increase seed output

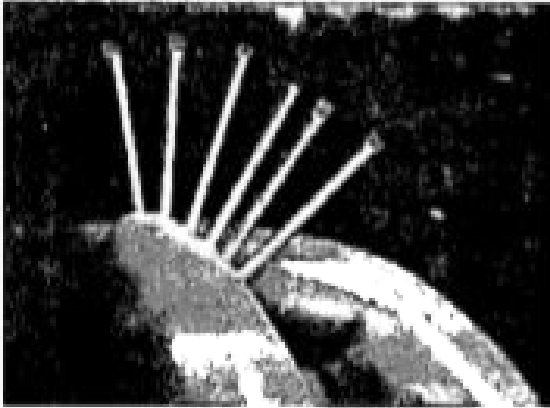
D. make sure that stigma is protected from
contamination from unwanted pollen
grains

Answer: D

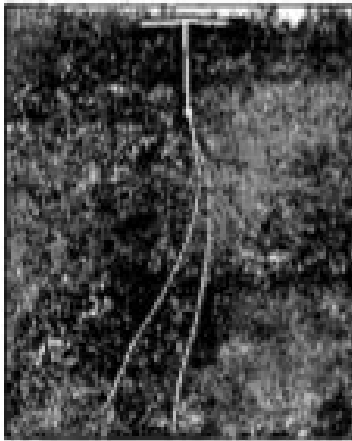


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9. Which of the following statements are true related to figure X and Y?



X



Y

(1) X represents Cu-T

(II) X represents IMPLANT

(III) X and Y are condoms

(iv) Y represents an IUD

A. (I), (II)

B. (II), (IV)

C. (II) (III)

D. (I), (IV)

Answer: B



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10. Colostrum primarily contains
antibodies for the baby.

A. IgA

B. IgM

C. Igk

D. IgG

Answer: A



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11. Hybrid seeds need to be essentially produced year after year. Why?

A. (a) To cope up with segregation of characters.

B. To preserve hybrid characters.

C. Both (a) and (b)

D. Correct option is not given

Answer: C



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12. Which event results in gain or loss of chromosomes during cell division cycle?

A. Seggregation of chromosomes at Meta phase.

B. Seggregation of chromosomes at Anaphase.

C. Seggregation of chromosomes at Telo phase.

D. Both (a) and (c)

Answer: B



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13. A Punnett square can help in obtaining:

A. Genotypes

B. Phenotypes

C. Genotypic and Phenotypic ratios

D. All of these

Answer: D



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14. Autopolyploids are the organisms with:

A. Chromosomes are derived from different species.

B. Multiple chromosomal sets that come from multiple species.

C. Multiple chromosomal sets that come from a single species.

D. Both (a) and (c)

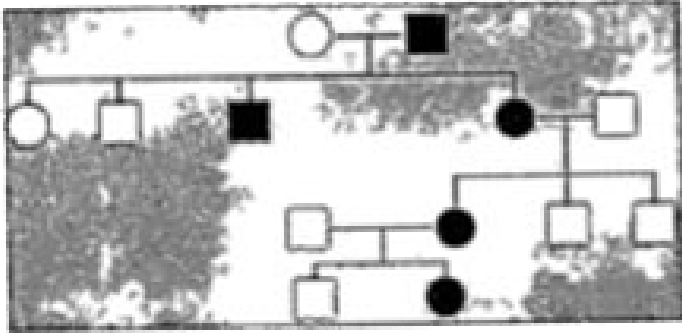
Answer: B



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15. In human beings, inheritance pattern of traits cannot be studied by controlled crosses in pea plant or other organisms and also in humans the progeny produced is very small and takes long time, therefore, pedigree analysis provides a strong tool to trace the inheritance of a specific trait, abnormality or disease. A case displaying a pedigree across a

family:



Study the pedigree chart given above and find out whether the given hypothetical trait is:

- A. Dominant
- B. Recessive
- C. No trait is present
- D. Can't say

Answer: A



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16. A colour blind woman marries a man with normal vision. Their sons are going to be:

A. All normal

B. Half colour blind and Half normal

C. One-fourth will be normal and Three fourth will be colour blind.

D. All colour blind.

Answer: D



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17. In operon concept, regulator gene functions as:

A. Inhibitor

B. Repressor

C. Regulator

D. All of these

Answer: D



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18. The concept of a transcriptionally regulated system was first given by:

A. Avery and McLeod

B. Hershey and Chase

C. Francois Jacob and Jacques Monod

D. Watson and Crick

Answer: C



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19. If RNA polymerase binds to the promoter on a transcription unit during transcription in a bacterium, it:

- A. helps remove introns
- B. inactivates the exons.

C. terminates the process

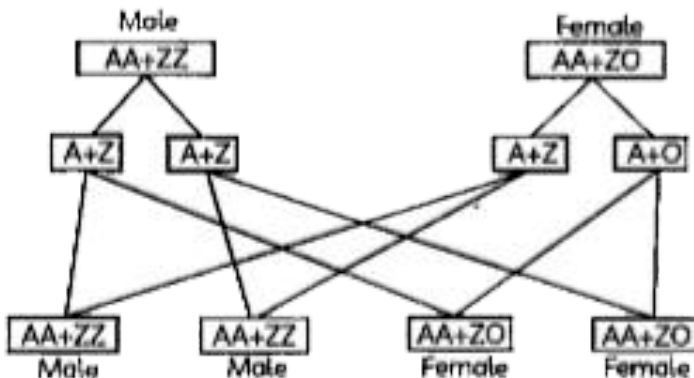
D. initiates the process

Answer: D



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20. The given figure shows:



A. Sex Determination In Humans

B. Sex Determination In Birds

C. Sex Determination In Butterflies

D. Sex Determination In Tigers

Answer: B



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21. proposed that there should be some mechanism by which the code can be

read and also it can be linked to the amino acids during translation process.

A. Crick

B. Avery

C. Owens

D. Orwell

Answer: A



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22. X=were found to be inheritable from parents to children. Therefore, Y = became the basis of paternity testing, in case of disputes.

A. X = Genetic abnormalities, Y = Southern blotting.

B. X = Polymorphisms, Y = DNA fingerprinting.

C. X = Blood anomalies, Y = Northern blotting

D. X = DNA gradations, Y=HGP analysis

Answer: B



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23. How many enzymes are required for the breakdown of Lactose in E.coll?

A. one

B. two

C. three

D. four

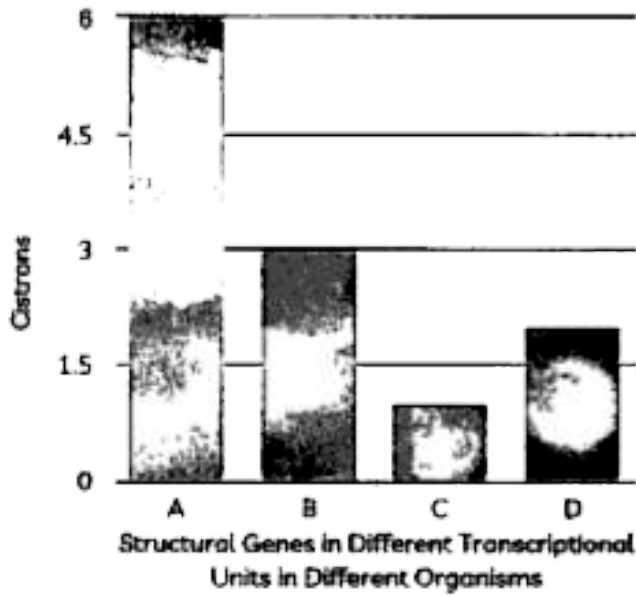
Answer: C



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24. There are non-coding sequences in eukaryotic genes called JUNK DNA. Exons are the coding sequences while the Introns are the non coding ones. The synthesised strand of mRNA has some intronic unwanted sequences which are removed by Splicing. The given graph shows the cistronic distribution in

the structural gene in different organisms.



A. C

B. A

C. A,B, D

D. B, C, D

Answer: C



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Section C

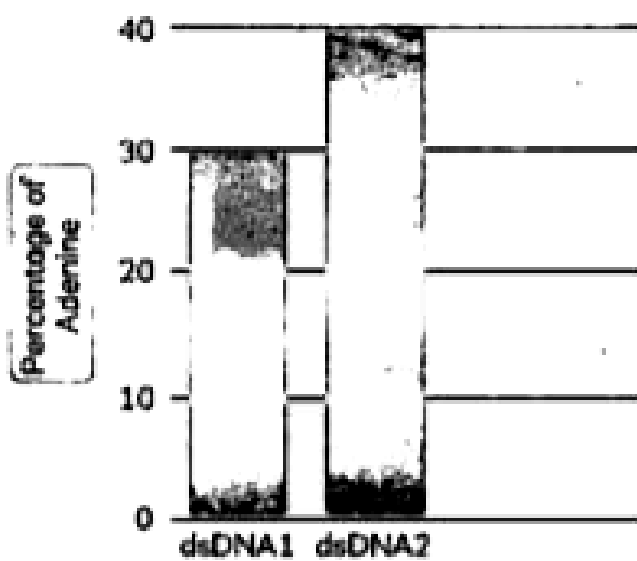
1. Erwin Chargaff (1950) - Chargaff analyzed the DNA of different species and determined the composition of A, T, C, and G bases in them. He then formulated 'Chargaff's Rule' which states that:

"The ratios between Adenine (A) and Thymine

(T) and Guanine (G) and Cytosine (C) are constant and equals to one in a double stranded DNA."

One of the salient features of the Double helix structure of DNA given by Watson and Crick was that the DNA is made of two polynucleotide chains. The backbone of the polynucleotide chain is made up of sugarphosphate, and the nitrogenous bases project inside.

Given below is a graph showing the percentage of Adenine in tow different double stranded DNA.



Study the graph given above and find out the percentage of Guanine in dsDNA1:

- A. 0.3
- B. 0.2
- C. 0.6
- D. 0.45

Answer: B



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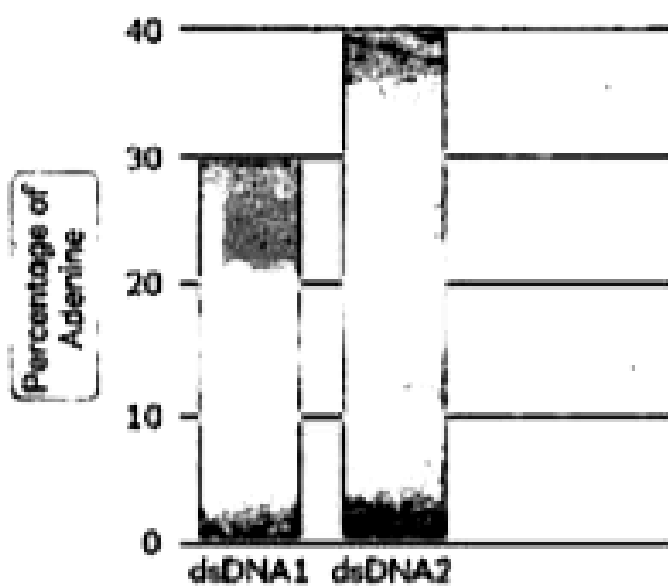
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Given below is a graph showing the percentage of Adenine in tow different double stranded DNA.



The bases in the two strands are paired through:

- A. Hydrogen bonds
- B. Phosphodiester bonds
- C. Glycosidic bonds

D. Phosphoester bonds

Answer: A



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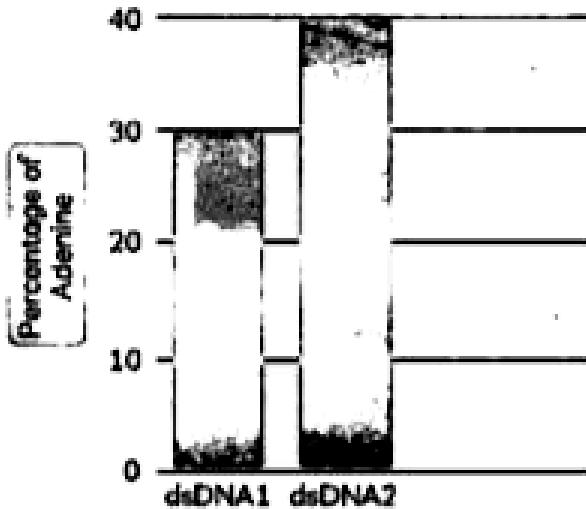
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Given below is a graph showing the percentage of Adenine in tow different double stranded DNA.



The two chains in the DNA double helix have:

- A. An anti-parallel polarity
- B. Parallel polarity
- C. Partly parallel and partly anti parallel
- D. None of these

Answer: A



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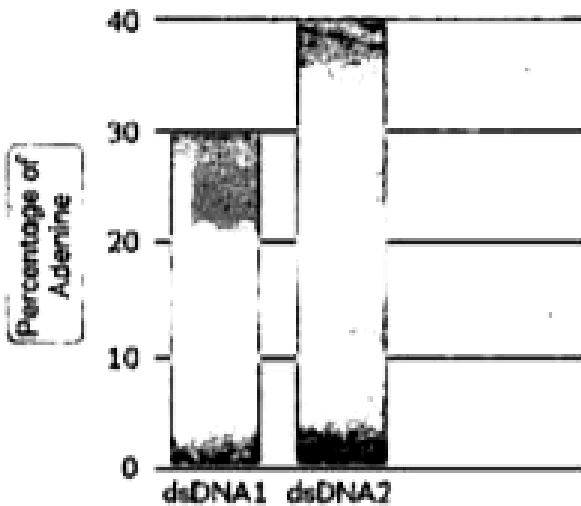
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Given below is a graph showing the percentage of Adenine in tow different double stranded DNA.



Consider the template strand given below: ---A
T G C A T G C A T A C- The sequence of RNA
that will be transcribed from the above
transcription unit along with its polarity will
be:

A. 5'-UACGUACGUAUG-3'

B. 3'-UACGUACGUAUG-5'

C. 5'-UA CAUG C GUAUG-3'

D. 5'-UACGUACGGAUG-3'

Answer: A



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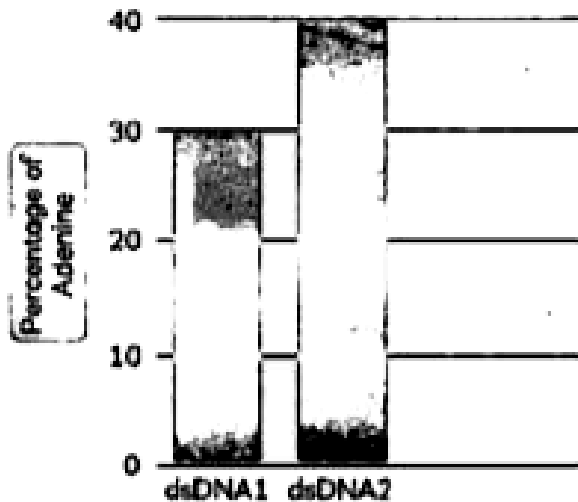
which states that:

"The ratios between Adenine (A) and Thymine (T) and Guanine (G) and Cytosine (C) are constant and equals to one in a double stranded DNA."

One of the salient features of the Double helix structure of DNA given by Watson and Crick was that the DNA is made of two polynucleotide chains. The backbone of the polynucleotide chain is made up of sugarphosphate, and the nitrogenous bases project inside.

Given below is a graph showing the

percentage of Adenine in two different double stranded DNA.



Study the graph given above and find out the percentage of Cytosine in dsDNA2:

A. 0.3

B. 0.1

C. 0.6

D. 0.4

Answer: B



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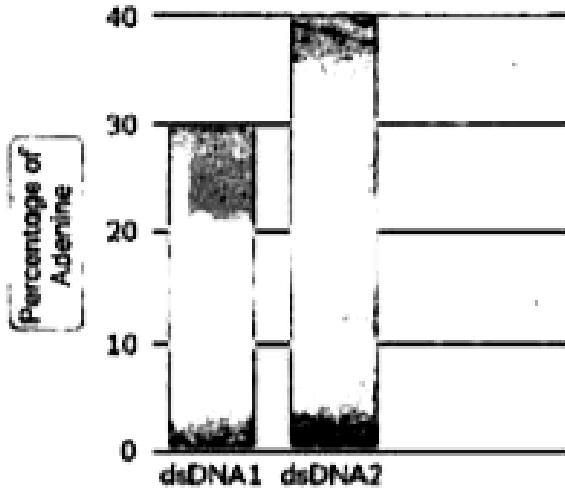
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One of the salient features of the Double helix structure of DNA given by Watson and Crick was that the DNA is made of two polynucleotide chains. The backbone of the polynucleotide chain is made up of sugarphosphate, and the nitrogenous bases project inside.

Given below is a graph showing the percentage of Adenine in tow different double

stranded DNA.



In ds DNA, "The ratios between Adenine (A) and Thymine (T) and Guanine (G) and Cytosine (C) are constant and equal to:

A. 4

B. 2

C. 1

D. 22

Answer: C

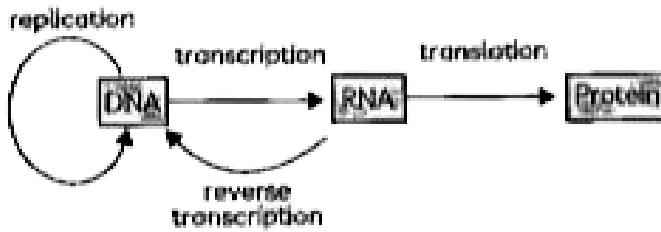


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7. Observe the diagram given below and answer:

Which among these conforms to the function of central dogma in biology w.r.t. the flow of

information:



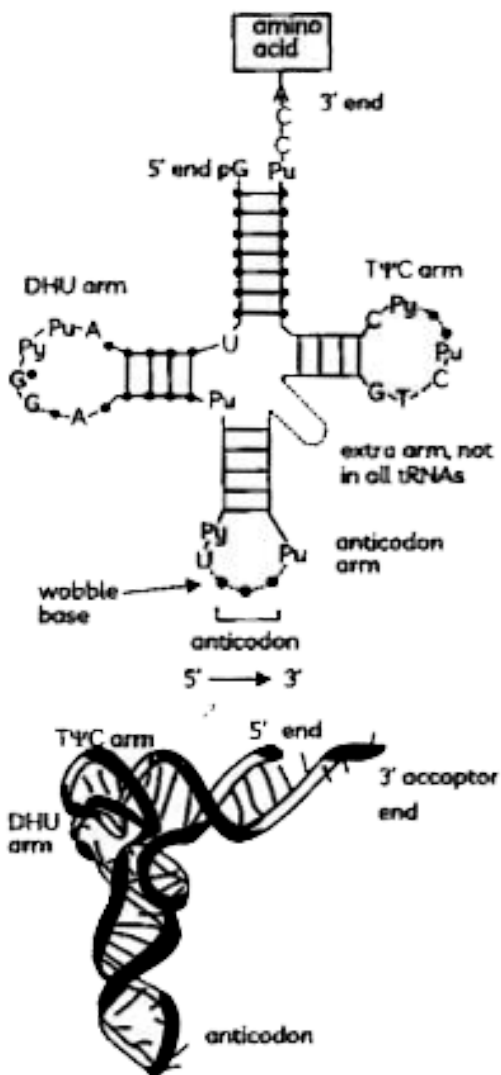
- A. DNA to RNA
- B. RNA to Protein
- C. DNA to RNA to Protein
- D. All of them

Answer: D



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8. Observe the given figure and identify the incorrect statement:



(I) Anticodon loop: It is a trinucleotide sequence complementary to that of a corresponding codon in a messenger RNA (mRNA) sequence. A total of 7 bases are present in it. Out of that 3 form anticodon for recognition and attachment to mRNA codon.

(II) Amino acid acceptor end: Amino acids bind at this end. The site is at 3' end opposite to the anticodon and has a CCA-OH group.

(III) T-loop: It helps in binding to the ribosome.

(IV) D-loop/DHU loop: It has the binding site for enzyme acetyl phosphorylase.

A. (I), (II)

B. (II)

C. (IV)

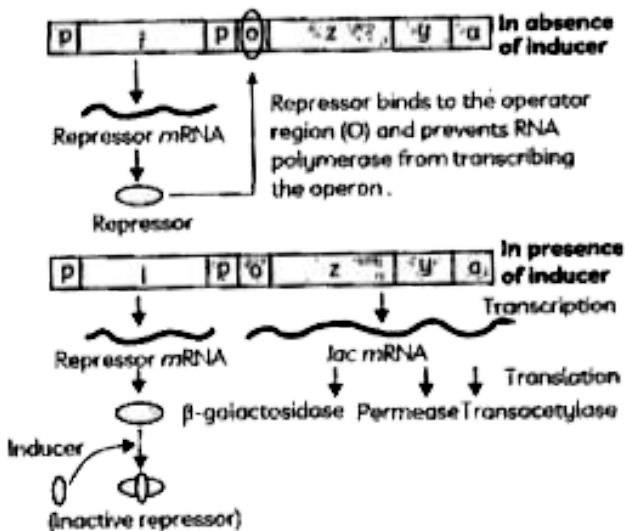
D. (III), (IV)

Answer: C



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9. Observe the given figure and identify the incorrect statement:



(I) Regulation of lac operon by repressor is a negative regulation.

(11) In its mechanism, the repressor of the lac operon binds to its operator and prevents the expression of the concerned gene.

(III) The transcription of the lac/structural genes depends upon the operator gene.

(IV) The transcription of the lac/structural genes depends upon the regulatory gene.

A. (I), (II)

B. (IV)

C. (II)

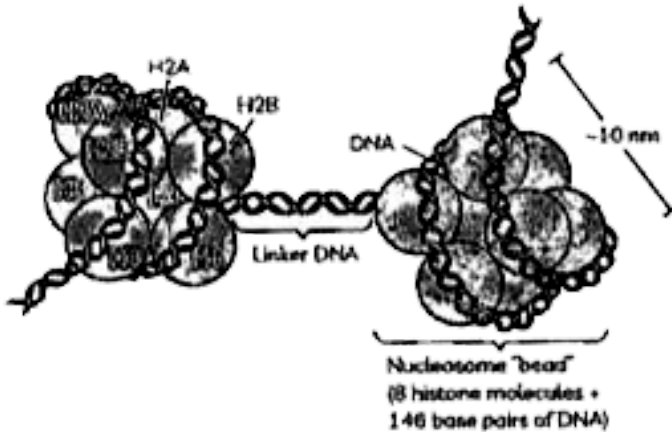
D. (III), (IV)

Answer: B



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10. Observe the diagram given below and answer the question that follows:



In a typical nucleus, some region of chromatin are loosely packed (and stains light) and are referred to as:

A. Heterochromatin

B. Euchromatin

C. Histones

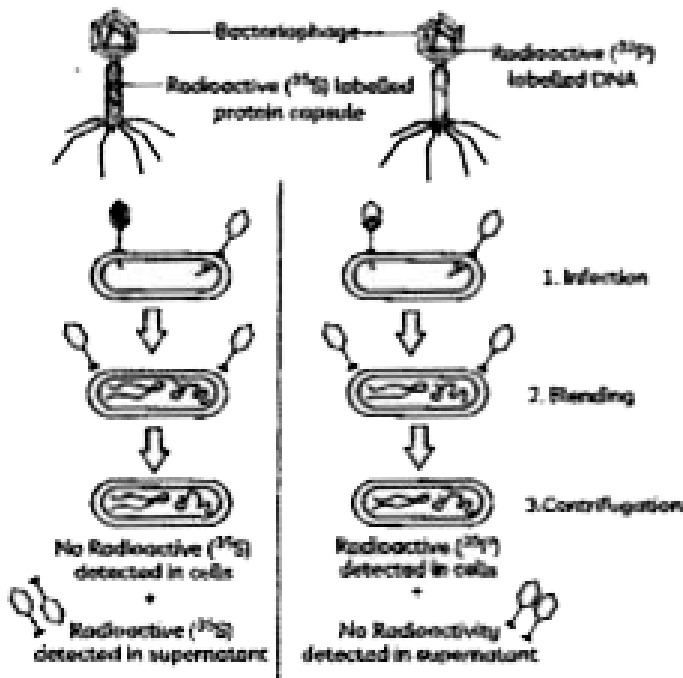
D. NHC's

Answer: B



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11. The given experiment proved that:



In the given figure, the strength of linkage will be higher in

A. DNA is the genetic material which is passed from virus to bacteria.

B. only DNA, not the protein coat entered the bacterial cell.

C. Both A and B

D. Neither A nor B















Answer: C



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12. Gregor Johann Mendel is known as the "Father of genetics". He was the first one to conduct the experiments to understand the pattern of inheritance and variations in living organisms. Mendel chose garden pea (*Pisum sativum*) and conducted hybridization experiments on it for seven years (1856-1863) and proposed the 'Laws of Inheritance' in living organisms. In his experiments, Mendel performed artificial pollination or cross-pollination with the help of emasculation (removal of anthers) using several true

breeding pea lines. Mendel proposed "Law of Dominance" and "Law of Segregation"

Character	Dominant Trait	Recessive Trait
Stem length	 Tall	 Dwarf
Pod shape	 Inflated	 Constricted
Seed shape	 Round	 Wrinkled
Seed colour	 Yellow	 Green
Flower position	 Axial	 Terminal
Flower colour	 Purple	 White
Pod colour	 Green	 Yellow

Law of purity of gametes is another name for Law of segregation because:

A. characters do not blend

B. characters produce a intermediate new character

C. both characters appears in all generations

D. none of these.

Answer: A



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