BIOLOGY

BOOKS - CBSE MODEL PAPER

SAMPLE PAPER 2022

Section A

1. The structure of bilobed anther consists of

A. 2 thecae, 2 sporangia

B. 4 thecae, 4 sporangia

C. 4 thecae, 2 sporangia

D. 2 thecae, 4 sporangia

Answer:

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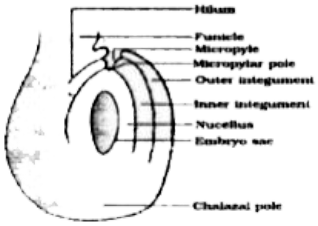
2. In the figure of anatropous ovule given below, choose the correct option for the characteristic distribution of cells within the

typical embryo sac



	Number of cells at chalazal end	Number of cells at micropylar end	Number of nuclei left in central cell
A	3	2	3
B	3	3	2
C	2	3	3
D	2	2	4

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3. The coconut water from tender coconut is

A. cellular endosperm.

B. free nuclear endosperm.

C. both cellular and nuclear endosperm.

D. free nuclear embryo.

Answer:

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4. Pollen grains are well preserved as fossils because of presence of

A. sporopollenin

B. cellulose

C. lignocellulose

D. pectocellulose

Answer:

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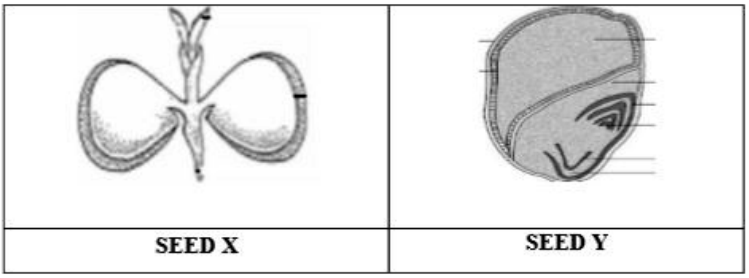
5. Which of the following statements are true related to Seed X and Y?



(i) Seed X is dicot and endospermic or albuminous.

(ii) Seed X is dicot and non-endospermic or non-albuminous.

(iii) Seed Y is monocot and endospermic or albuminous.

(iv) Seed Y is monocot and non-endospermic or non-albuminous.

Choose the correct option with the respect to the nature of the seed

A. (i), (iii)

B. (ii), (iii)

C. (i), (iv)

D. (ii), (iv)

Answer:

6. Which of the following statements are correct with respect to hormones secreted by placenta?

(i) Placenta secretes relaxin during later stage of pregnancy.

(ii) Placenta secretes high amount of FSH during pregnancy.

(iii) Placenta secretes relaxin during initial stage of pregnancy.

(iv) Placenta secretes hCG and hPL during pregnancy.

A. (i) and (iv)

B. (i), (ii) and (iv)

C. (iii) and (iv)

D. (ii), (iii) and (iv)

Answer:

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7. Figure A shows the front view of the human female reproductive system and Figure Bshows the development of a fertilized human egg cell

Figure A

Figure A

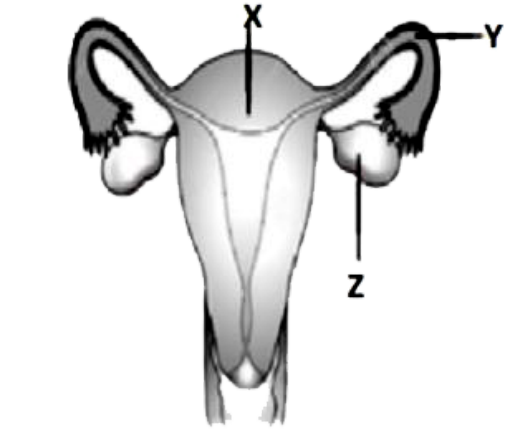
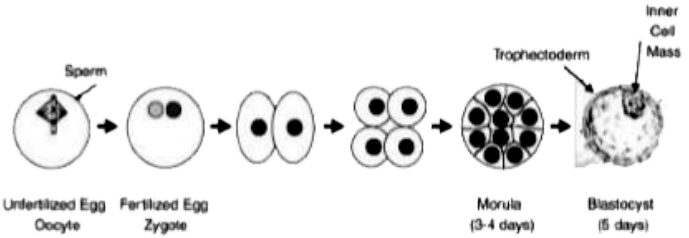


Figure B.



Identify the correct stage of development of human embryo (Figure B) that takes place at the site X, Y and Z respectively in the human female reproductive system (Figure A).

Choose the correct option from the table

below:

	X	Y	Z
A	Morula	Fertilized egg	Blastocyst
B	Unfertilized egg	Fertilized egg	Morula
C	Blastocyst	Fertilized egg	Unfertilized egg
D	Fertilized egg	Morula	Blastocyst

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8. Penetration of the sperm in the ovum is followed by

A. formation of first polar body.

B. completion of meiosis II.

C. first meiosis

D. dissolution of zona pellucida.

Answer:

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9. Correct sequence of hormone secretion from beginning of menstruation is

A. FSH, progesterone, estrogen.

B. estrogen, FSH, progesterone.

C. FSH, estrogen, progesterone.

D. estrogen, progesterone, FSH.

Answer:

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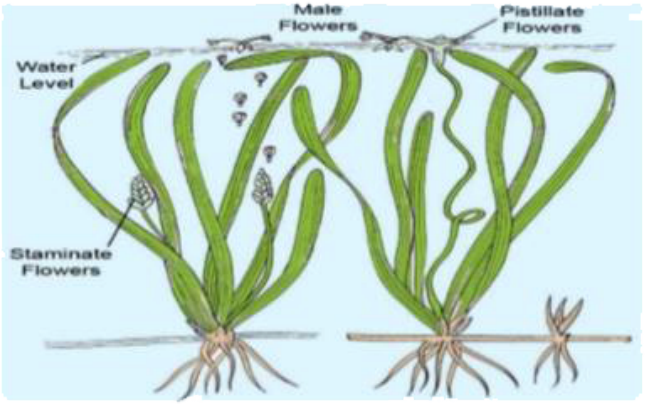
10. In the dioecious aquatic plant shown, identify the characteristics of the male flowers

that reach the female flowers for pollination:



	Size of the flower	Colour of flower	Characteristic feature of pollengrain
A	small	brightly coloured	Light weight and non-sticky
B	large	colourless	large and sticky
C	small	white	small, covered with mucilage
D	large	colourless	non sticky

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11. The thalamus also contributes to fruit formation in

A. banana.

B. orange.

C. strawberry.

D. guava.

Answer:

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12. How many types of gametes would be produced if the genotype of a parent is AaBB?

A. 1

B. 2

C. 3

D. 4

Answer:

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13. Which of the following statements indicates parallelism in genes and chromosomes?

(i) They occur in pairs

(ii) They segregate during gamete formation

(iii) They show linkage

(iv) Independent pairs segregate independently

A. (i) and (iii)

B. (ii) and (iii)

C. (i), (ii) and (iii)

D. (i), (ii) and (iv)

Answer:

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14. Which of the following amino acid substitution is responsible for causing sickle cell anemia?

A. Valine is substituted by Glutamic acid in the α globin chain at the sixth position

B. Valine is substituted by Glutamic acid in the β globin chain at seventh position

C. Glutamic acid is substituted by Valine in the α globin chain at the sixth position

D. Glutamic acid is substituted by Valine in the β globin chain at the sixth position

Answer:

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15. In human beings, where genotype AABBCC represents dark skin colour, aabbcc represents light skin colour and AaBbCc represents

intermediate skin colour, the pattern of genetic inheritance can be termed as:

A. Pleiotropy and codominance

B. Pleiotropy and incomplete dominance

C. Polygenic and qualitative inheritance

D. Polygenic and quantitative inheritance

Answer:

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16. Which of the following combination of chromosome numbers represents the correct sex determination pattern in honey bees?

A. Male 32, Female 16

B. Male 16, Female 32

C. Male 31, Female 32

D. Female 32, Male 31

Answer:

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17. Rajesh and Mahesh have defective haemoglobin due to genetic disorders. Rajesh has too few globin molecules while Mahesh has incorrectly functioning globin molecules.Identify the disorder they are suffering from.

	Rajesh	Mahesh
A.	Sickle cell anaemia - an autosome linked recessive trait	Thalassemia – an autosome linked dominant trait
B	Thalassemia – an autosome linked recessive blood disorder	Sickle cell anaemia - an autosome linked recessive trait
C.	Sickle cell anaemia - an autosome linked recessive trait	Thalassemia – an autosome linked recessive blood disorder
D.	Thalassemia – an autosome linked recessive blood disorder	Sickle cell anaemia - an autosome linked dominant trait

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18. Which of the following criteria should be fulfilled by a molecule to act as a genetic material?

(i) It should be able to replicate.

(ii) It should be structurally and chemically stable.

(iii) It should be able to ndergor slow mutations.

(iv)It should be able to express itself in the form of 'Mendelian characters'

A. (i) and (ii)

B. (ii) and (iii)

C. (iii) and (iv)

D. (ii) and (iv)

Answer:

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19. The promoter site and the terminator site for transcription are located at

A. 3' (downstream) end and 5' (upstream) end, respectively of the transcription unit

B. 5' (upstream) end and 3' (downstream) end, respectively of the transcription unit

C. the 5' (upstream) end of the transcription unit

D. the 3' (downstream) end of the transcription unit

Answer:

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20. Which of the following is correct about mature RNA in eukaryotes?

A. Exons and introns do not appear in the mature RNA.

B. Exons appear, but introns do not appear in the mature RNA.

C. Introns appear, but exons do not appear in the mature RNA.

D. Both exons and introns appear in the mature RNA.

Answer:

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21. In E.coli, the lac operon gets switched on when :

A. lactose is present and it binds to the repressor.

B. repressor binds to operator.

C. RNA polymerase binds to the operator.

D. lactose is present and it binds to RNA polymerase.

Answer:

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22. Oswald Avery, Colin MacLeod and Maclyn McCarty used enzymes to purify biochemicals such as proteins, DNA and RNA from the heat-killed S cells to see which ones could transform live R cells into S cells in Griffith's experiment. They observed that

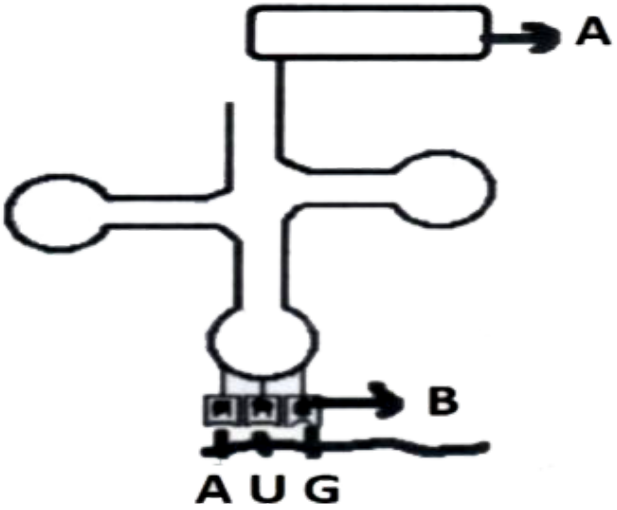
A. Proteases and RNases affected transformation.

B. DNase inhibited transformation.

C. Proteases and Lipases affected transformation.

D. RNases inhibited transformation.

Answer:



23.

AUG on the mRNA will result in the activation of which of the following RNA having correct combination of amino acids:

	Site A	Site B
A.	UAC	Methionine
B.	Methionine	UAC
C.	Methionine	AUG
D.	AUG	Methionine

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24. Short stretches of DNA used to identify complementary sequence in a sample arecalled

A. probes

B. markers

C. VNTRs

D. primers

Answer: A

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Section B

1. Assertion: Lactational amenorrhea is the natural method of contraception.

Reason: It increases the phagocytosis of sperm.

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

B. Both A and R are true and 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:

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2. Assertion: Saheli, an oral contraceptive for females, contains a steroidal preparation.

Reason: It is a "once a week" pill with very few side effects.

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

B. Both A and R are true and 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:

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3. Assertion: Parturition is induced by neural signal in maternal pituitary.

Reason: At the end of gestation period, the maternal pituitary releases prolactin which causes uterine contractions.

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

B. Both A and R are true and 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:

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4. Assertion: When the two genes in a dihybrid cross are situated on the same chromosome, the proportion of parental gene combinations is much higher than nonparental type.

Reason: Higher parental gene combinations

can be attributed to crossing over betweentwo genes.

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

B. Both A and R are true and 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:

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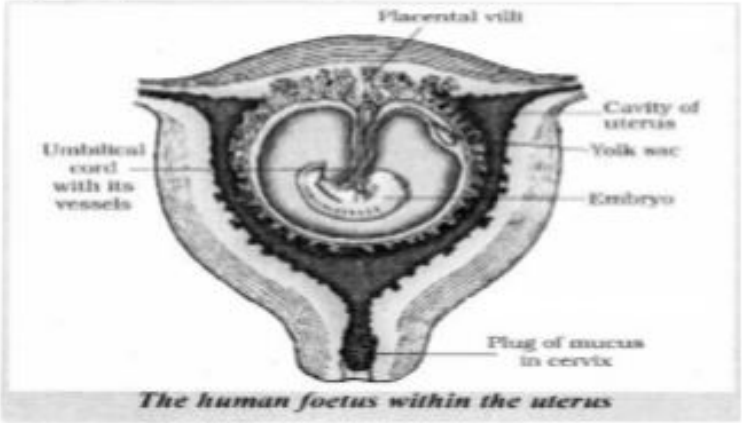
5. Concentration of which of the following substances will decrease in the maternal blood as it flows from embryo to placenta through the umbilical cord?



The human foetus within the uterus

i. Oxygen

ii. Amino Acids

iii. Carbon dioxide

iv. Urea

A. i and ii

B. ii and iv

C. iii and iv

D. i and iv

Answer:

6. In a fertilized ovule, n, 2n and 3n conditions occur respectively in

A. antipodal, zygote and endosperm

B. zygote, nucellus and endosperm

C. endosperm, nucellus and zygote.

D. antipodals, synergids and integusments

Answer:

7. A botanist studying Viola (common pansy) noticed that one of the two flower types withered and developed no further due to some unfavorable condition, but the other flower type on the same plant survived and it resulted in an assured seed set. Which of the following will be correct?

A. The flower type which survived is Cleistogamous and it always exhibits autogamy

B. The flower type which survived is Chasmogamous and it always exhibits geitonogamy.

C. The flower type which survived is Cleistogamous and it exhibits both autogamy and geitonogamy.

D. The flower type which survived is Chasmogamous and it never exhibits autogamy.

Answer:

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8. During parturition, a pregnant woman is having prolonged labour pains and child birth has to be fastened. It is advisable to administer a hormone that can

A. increase the metabolic rate.

B. release glucose in the blood.

C. stimulate the ovary.

D. activate smooth muscles.

Answer:

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9. A female undergoing IVF treatment has blocked fallopian tubes. The technique by which the embryo with more than 8 blastomeres will be transferred into the female for further development is

A. ZIFT

B. GIFT

C. IUT

D. AI

Answer:

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10. The mode of action of the copper ions in an IUD is to

A. increase the movement of sperms.

B. decrease the movement of the sperms.

C. make the uterus unsuitable for implantation.

D. make the cervix hostile to the sperms.

Answer:

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11. To produce 400 seeds, the number of meiotic divisions required will be

A. 400

B. 200

C. 500

D. 800

Answer:

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12. A cross is made between tall pea plants having green pods and dwarf pea plants havingyellow pods. In the F2 generation, out

of 80 plants how many are likely to be tall plants?

A. 15

B. 20

C. 45

D. 60

Answer:

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13. In Antirrhinum, RR is phenotypically red flowers, rr is white and Rr is pink. Select the correct phenotypic ratio in F1 generation when a cross is performed between RR X Rr:

A. 1 red: 2 Pink: 1 white

B. 2 Pink: 1 white

C. 2 Red: 2 Pink

D. All Pink

Answer:

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14. What would be the genotype of the parents if the offspring have the phenotypes in 1:1 proportion?

A. Aa X Aa

B. AA X AA

C. Aa X AA

D. Aa x aa

Answer:

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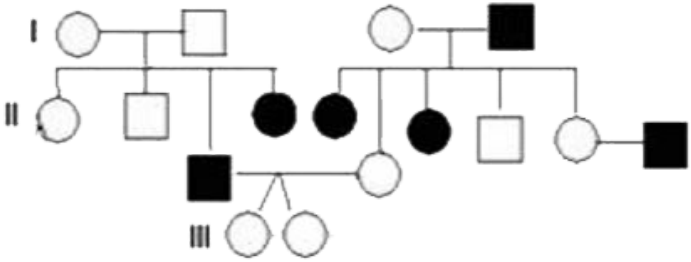
15. 

What is the pattern of inheritance in the above pedigree chart?

A. Autosomal dominant

B. Autosomal recessive

C. Sex -linked dominant

D. Sex -linked recessive

Answer:

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16. A couple has two daughters. What is the probability that the third child will also be a female?

A. $25\ \%$

B. $50\ \%$

C. $75\ \%$

D. $100\ \%$

Answer:

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17. Genotypic ratio of 1:2:1 is obtained in a cross between

A. AB X AB

B. Ab X Ab

C. Ab X ab

D. ab X ab

Answer:

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18. Total number of nucleotide sequences of DNA that codes for a hormone is 1530. The proportion of different bases in the sequence is found to be Adenine = 34%, Guanine = 19%, Cytosine = 23%, Thymine = 19%.

Applying Chargaff's rule, what conclusion can be drawn?

A. It is a double stranded circular DNA.

B. It is a single stranded DNA.

C. It is a double stranded linear DNA.

D. It is a single stranded DNA coiled on Histones.

Answer:

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19. A stretch of an euchromatin has 200 nucleosomes. How many bp will there be in the stretch and what would be the length of the typical euchromatin?

A. 20,000 bp and 13,000 $\times 10^{-9}$m

B. 10,000 bp and 10,000 $\times 10^{-9}$m

C. 40,000 bp and 13,600 $\times 10^{-9}$m

D. 40,000 bp and 13,900 $\times 10^{-9}$ m

Answer:

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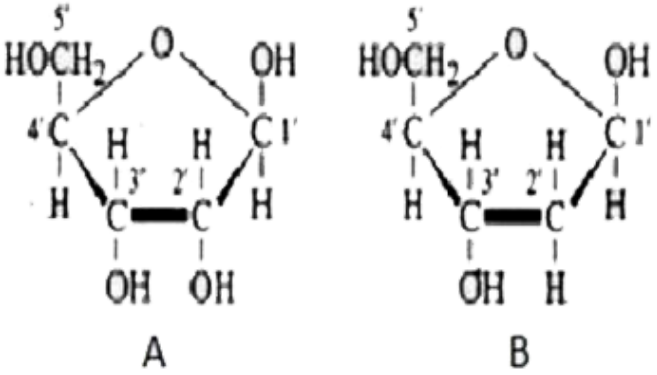
20. Observe structures A and B given below. Which of the following statements are correct?



A. A is having 2'-OH group which makes it less reactive and structurally stable,

whereas B is having 2'-H group which makes it more reactive and unstable.

B. A is having 2'-OH group which makes it more reactive and structurally unstable, whereas B is having 2'-H group which makes it less reactive and structurallystable.

C. A and B both have -OH groups which make it more reactive and structurally stable.

D. A and B both are having -OH groups which make it less reactive and structurally stable

Answer:

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21. If Meselson and Stahl's experiment is continued for sixth generations in bacteria, the ratio of Heavy strands $^{15}N/^{15}N$: Hybrid

$^{15}N/^{14}N$: light $^{14}N/^{14}N$ containing DNA in the sixth generation would be

A. $1:1:1$

B. $0:1:7$

C. $0:1:15$

D. $0:1:31$

Answer:

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22. Two important RNA processing events lead to specialized end sequences in most human mRNAs: _____(i)_____ at the 5' end, and _____ (ii)_____ at the 3' end. At the 5'end the most distinctive specialized end nucleotide, _____ (iii) _____ is added and a sequence of about 200 ____(iv)_____ is added to the 3' end.

A. (i) Initiator codon (ii) Promotor (iii) Terminator codon (iv) Release factors

B. (i) Promotor (ii) Elongation (iii) Regulation (iv) Termination.

C. (i) Capping (ii) Polyadenylation (iii) $^{m}G_{\mathrm{ppp}}$ (iv) Poly(A).

D. (i) Repressor (ii) Co repressor (iii) Operon (iv) sRelease factors

Answer:

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23. What are minisatellites?

A. 10-40 bp sized small sequences within the genes

B. Short coding repetitive region on the eukaryotic genome

C. Short non-coding repetitive sequence forming large portion of eukaryotic genome

D. Regions of coding strands of the DNA

Answer:

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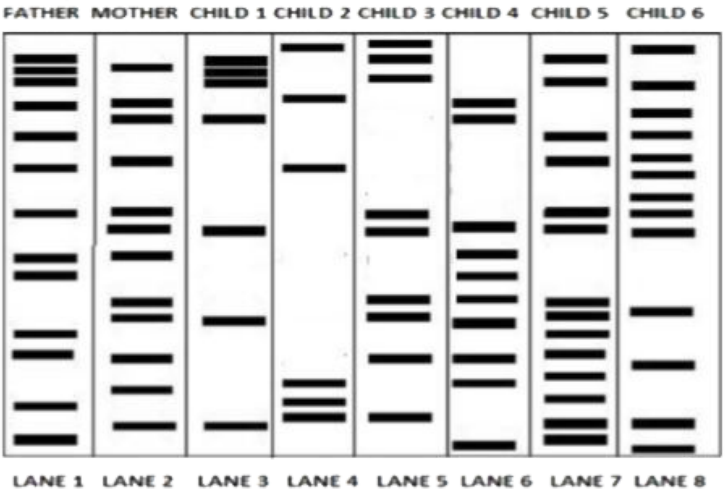
24. There was a mix-up at the hospital after a fire accident in the nursery division. Which of these children belong to the parents?



A. All of the children

B. Children 2, 3 & 6

C. Children 1 & 3

D. Children 2 & 4

Answer:

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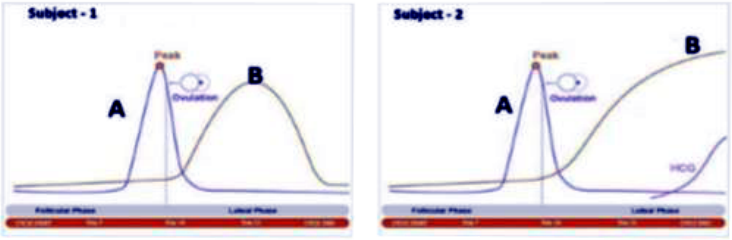
Section C

1. To answer the questions, study the graphs below for Subject 1 and 2 showing differentlevels of certain hormones.



The peak observed in Subject 1 and 2 is due to

A. estrogen

B. progesterone

C. luteinizing hormone

D. follicle stimulating hormone

Answer:

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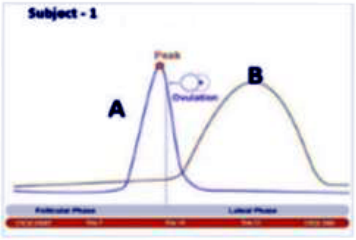
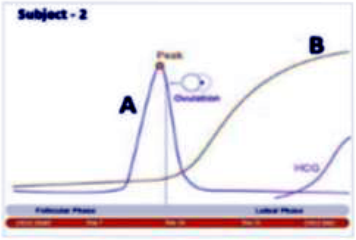
2. To answer the questions, study the graphs below for Subject 1 and 2 showing differentlevels of certain hormones.





Subject 2 has higher level of hormone B, which is

A. estrogen

B. progesterone

C. luteinizing hormone

D. follicle stimulating hormone

Answer:

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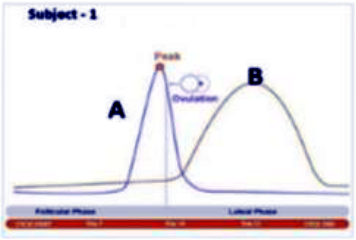
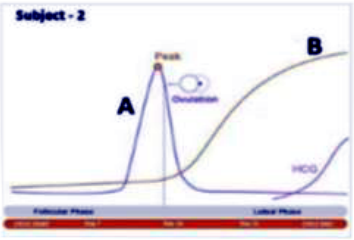
3. To answer the questions, study the graphs below for Subject 1 and 2 showing differentlevels of certain hormones.





If the peak of Hormone A does not appear in the study for Subject 1, which of thefollowing statement is true?

A. Peak of Hormone B will be observed at a higher point in the graph

B. Peak of Hormone B will be observed at a point lower than what is given in the graph

C. There will be no observed data for Hormone B

D. The graph for Hormone B will be a sharp rise followed by a plateau

Answer:

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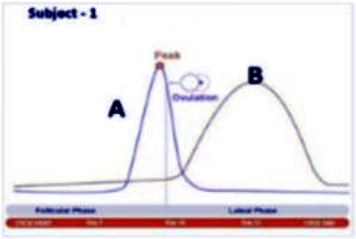
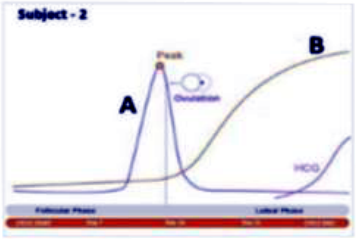
4. To answer the questions, study the graphs below for Subject 1 and 2 showing differentlevels of certain hormones.





Which structure in the ovary will remain functional in subject 2?

A. Corpus Luteum

B. Tertiary follicle

C. Graafian follicle

D. Primary follicle

Answer:

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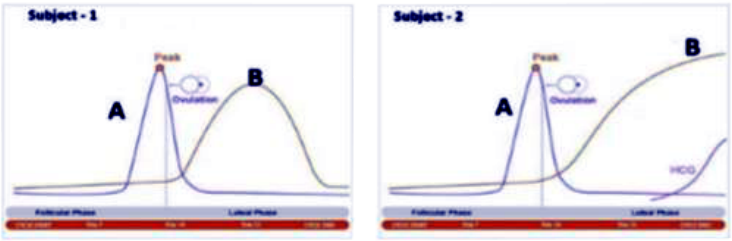
5. To answer the questions, study the graphs below for Subject 1 and 2 showing differentlevels of certain hormones.



For subject 2 it is observed that the peak for hormone B has reached the plateau stage.After approximately how much time will the curve for hormone B descend?

A. 28 days

B. 42 days

C. 180 days

D. 280 days

Answer:

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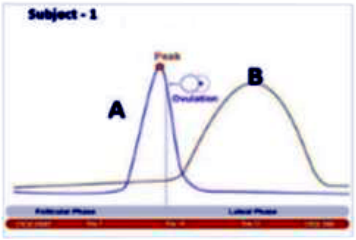
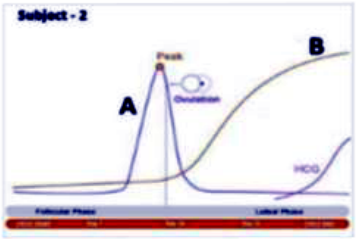
6. To answer the questions, study the graphs below for Subject 1 and 2 showing differentlevels of certain hormones.





Which of the following statements is true about the subjects?

A. Subject 1 is pregnant

B. Subject 2 is pregnant

C. Both subject 1 and 2 are pregnant

D. Both subject 1 and 2 are not pregnant

Answer:

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7. The gene that controls the ABO blood group system in human beings has three alleles $-I^A, I^B$ and i. A child has blood group O. His father has blood group A and mother has blood group B. Genotypes of other off springs can be:

$i. I^B I^B$

$ii. I^A i$

$iii. I^B i$

$iv. I^A I^B$

$v. ii$

A. i, ii, iii, v

B. ii, iii ,iv, v

C. iii, iv, v

D. iv, iii, i

Answer:

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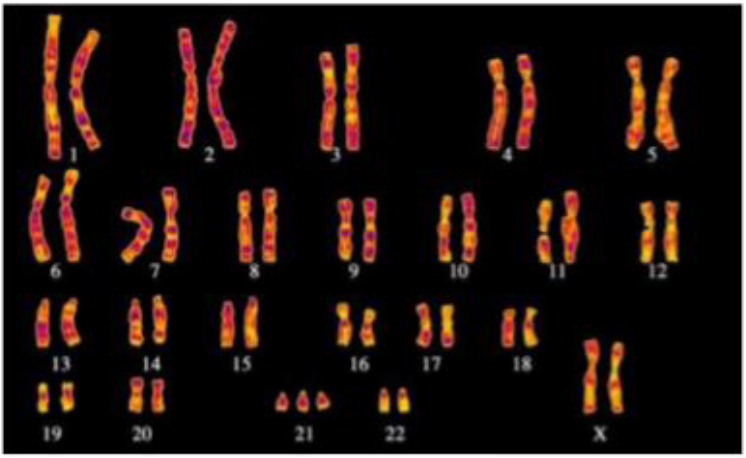
8. Placed below is a karyotype of a human being..



On the basis of this karyotype, which of the following conclusions can be drawn:

A. Normal human female

B. Person is suffering from Colour Blindness

C. Affected individual is a female with Down's syndrome

D. Affected individual is a female with Turner's syndrome

Answer:

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9. Assertion : When yelow bodied, white eyed Drosophila females were hybridised with brown-bodied, red eyeed males , and F_1 progeny was intercrossed, F_2 ratio deviated from $9:3:3:1$

Reason : When two genes in a dihybrid are on same chromosome, the proportion of parental gene combinations are much higher than the non-parental type

A. 1:2:1 because of linkage of genes

B. 9:3:3:1 because of recombination of genes

C. Deviation from 9:3:3:1 ratio because of segregation of genes

D. Deviation from 9:3:3:1 ratio because of linkage of genes

Answer: D

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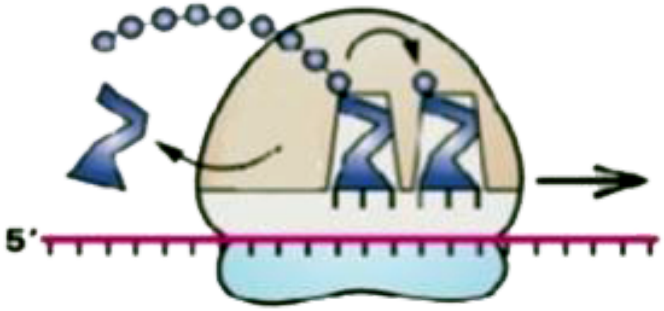
10. Which cellular process is shown below?



A. DNA Replication

B. Translation - Initiation

C. Translation - Elongation

D. Translation – Termination

Answer:

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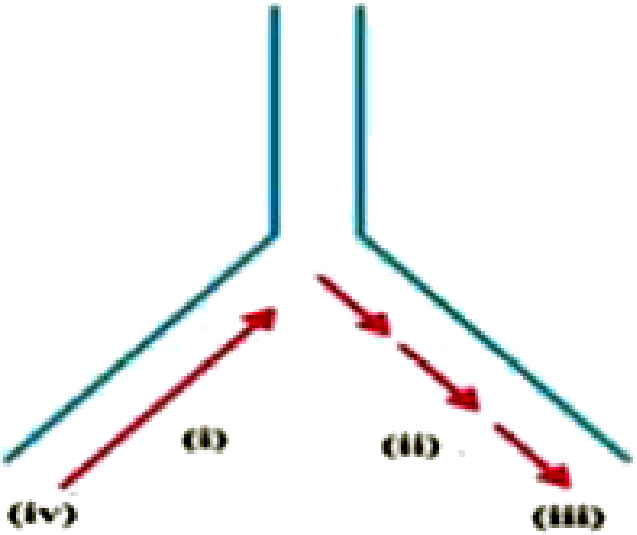
11. Origin of replication of DNA in E. coli is shown below, Identify the labelled parts (i),(ii),

(iii) and (iv)



A. (i)- discontinuous synthesis , (ii)- continuous synthesis (iii) 3’ end (iv) 5’end

B. (i)- continuous synthesis , (ii)- discontinuous synthesis (iii) 5’ end (iv)

3’end

C. (i)- discontinuous synthesis, (ii)- continuous synthesis (iii) 5’ end (iv) 3’end

D. (i)- continuous synthesis , (ii)- discontinuous synthesis (iii) 3’ end (iv) 5’end

Answer:

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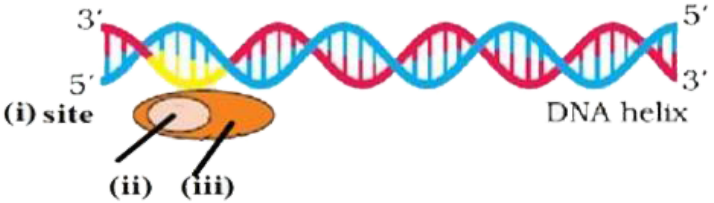
12. Transcription unit is represented in the diagram given below.



Identify site (i), factor (ii) and Enzyme (iii) responsible for carrying out the process.

A. (i) Promoter Site, (ii) Rho factor (iii) RNA polymerase

B. (i) Terminator Site, (ii) Sigma factor (iii) RNA polymerase

C. (i) Promoter Site, (ii) Sigma factor (iii) RNA polymerase

D. (i) Promoter Site, (ii) Sigma factor (iii) DNA polymerase

Answer:

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Questions In Lieu Of Diagram Based Questions For Vi Candidates Section A

1. During megasporogenesis, potential megaspore mother cell undergoes following cell divisions to form gametophyte female

A. two meiotic divisions and three mitotic division

B. one meiotic and one mitotic divisions

C. one meiotic and three mitotic divisions

D. one meiotic and two mitotic divisions

Answer:

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2. Apomictic embryos in Citrus arise from:

A. diploid Egg

B. synergids

C. nucellus

D. antipodal cells

Answer:

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3. Choose the correct option wherein, the correct stages of the development of human embryo takes place.

	Ovary	Fallopian Tube	Uterus
A	Morula	Fertilized egg	Blastocyst
B	Unfertilized egg	Fertilized egg	Morula
C	Unfertilized egg	Fertilized egg	Blastocyst
D	Fertilized egg	Morula	Blastocyst

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4. On observing the pollen grain under the microscope, it was found to be long and

ribbon shaped. The flower bearing these pollen grain will be pollinated by:

A. Insects

B. Water

C. Air

D. Birds

Answer:

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5. Which one of the following is an incorrect statement for a t RNA molecule?

i. It is an adapter molecule

ii. Previously called as sRNA (soluble RNA)

iii. tRNA has a codon loop that has bases complementary to the code,

iv. it also has an amino acid accepter end to which it binds to amino acids.

v. It is non-specific for each amino acid.

A. i , ii and iii

B. ii, iii and iv

C. i, ii, and iv

D. i, iv and v

Answer:

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Questions In Lieu Of Diagram Based Questions For Vi Candidates Section B

1. Which of the following is not a function of placenta?

A. secretes relaxin

B. facilitates removed of Co_2 and waste products

C. secretes oxytocin

D. supplies oxygen and nutrients

Answer:

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2. Which one of the following is an incorrect statement with regard to pedigree analysis?

A. It verifies that DNA is the carrier of genetic information.

B. It helps to understand whether the trait depicted in the chart is dominant or recessive.

C. It confirms that the trait is linked to one of the autosome.

D. It helps to trace the inheritance of a specific trait

Answer:

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3. In order to form a dinucleotide during DNA synthesis which functional group at 3' must be free?

A. Methyl group

B. Phosphate group

C. Carboxylic acid

D. Hydroxyl

Answer:

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4. The DNA fingerprinting pattern of child is

A. Exactly similar to that of both the parents

B. 100% similar to the father's DNA print

C. 100% similar to the mother's DNA print

D. 50% bands similar to father and rest similar to mother

Answer:

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Questions In Lieu Of Diagram Based Questions For Vi Candidates Section C

1. A biology student after studying about the different levels of hormones during the menstrual cycle was comparing 2 subjects (Patients). A table was created after looking at the levels of hormones A and B for Subject 1 and 2. Read the information in the table and answer the questions that follow

	HORMONE A	HORMONE B
Subject 1	Shows a peak on the 14th Day of the menstrual cycle	Falls down during the luteal phase
Subject 2	Shows a peak on the 14th Day of the menstrual cycle	Level is maintained high in the luteal phase

The peak observed in Subject 1 and 2 is due to

A. Estrogen

B. Progesterone

C. Luteinizing Hormone

D. Follicle Stimulating Hormone

Answer:

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2. A biology student after studying about the different levels of hormones during the menstrual cycle was comparing 2 subjects (Patients). A table was created after looking at

the levels of hormones A and B for Subject 1 and 2. Read the information in the table and answer the questions that follow

	HORMONE A	HORMONE B
Subject 1	Shows a peak on the 14th Day of the menstrual cycle	Falls down during the luteal phase
Subject 2	Shows a peak on the 14th Day of the menstrual cycle	Level is maintained high in the luteal phase

The Subject 2 has higher level of hormone B, which is

A. Estrogen

B. Progesterone

C. Luteinizing Hormone

D. Follicle Stimulating Hormone

Answer:

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3. A biology student after studying about the different levels of hormones during the menstrual cycle was comparing 2 subjects (Patients). A table was created after looking at the levels of hormones A and B for Subject 1 and 2. Read the information in the table and answer the questions that follow

	HORMONE A	HORMONE B
Subject 1	Shows a peak on the 14th Day of the menstrual cycle	Falls down during the luteal phase
Subject 2	Shows a peak on the 14th Day of the menstrual cycle	Level is maintained high in the luteal phase

If the peak of Hormone A does not appear in the study for Subject 1, which of the following statement is true

A. Peak of Hormone B will be observed at a higher point in the graph

B. Peak of Hormone B will be observed at a point lower than what is given in the graph

C. There will be no observed data for Hormone B

D. The Hormone B will show a sharp rise followed by a plateau

Answer:

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4. A biology student after studying about the different levels of hormones during the menstrual cycle was comparing 2 subjects

(Patients). A table was created after looking at the levels of hormones A and B for Subject 1 and 2. Read the information in the table and answer the questions that follow

	HORMONE A	HORMONE B
Subject 1	Shows a peak on the 14th Day of the menstrual cycle	Falls down during the luteal phase
Subject 2	Shows a peak on the 14th Day of the menstrual cycle	Level is maintained high in the luteal phase

Which structure in the ovary will remain functional in subject 2?

A. Corpus Luteum

B. Tertiary follicle

C. Graafian follicle

D. Primary follicle

Answer:

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5. A biology student after studying about the different levels of hormones during the menstrual cycle was comparing 2 subjects (Patients). A table was created after looking at the levels of hormones A and B for Subject 1 and 2. Read the information in the table and

answer the questions that follow

	HORMONE A	HORMONE B
Subject 1	Shows a peak on the 14th Day of the menstrual cycle	Falls down during the luteal phase
Subject 2	Shows a peak on the 14th Day of the menstrual cycle	Level is maintained high in the luteal phase

For subject 2 it is observed that the peak for hormone B has reached the plateau stage. After approximately how much time will the curve for hormone B descend?

A. 28 days

B. 42 days

C. 180 days

D. 280 days

Answer:

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6. A biology student after studying about the different levels of hormones during the menstrual cycle was comparing 2 subjects (Patients). A table was created after looking at the levels of hormones A and B for Subject 1 and 2. Read the information in the table and answer the questions that follow

	HORMONE A	HORMONE B
Subject 1	Shows a peak on the 14th Day of the menstrual cycle	Falls down during the luteal phase
Subject 2	Shows a peak on the 14th Day of the menstrual cycle	Level is maintained high in the luteal phase

Which of the following statements is true about the subjects?

A. Subject 1 is pregnant

B. Subject 2 is pregnant

C. Subject 1 and 2 both are pregnant

D. Subject 1 and 2 both are not pregnant

Answer:

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7. Domestic wheat, which has 42 chromosomes, is probably hexaploid (6n), whereas the haploid number in the ancestral ones was 7. Find out the right reason as to how are such plants produced?

A. Due to failure of segregation of chromatids during cell division cycle

B. Due to the gain of extra copy of chromosome

C. Due to failure of cytokinesis after telophase stage of cell division

D. Due to the loss of extra copy of chromosome

Answer:

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8. The following are results of crossing a female fly (AaBb) with a male fly (aabb).

AaBb 1005

aabb 1000

Aabb 200

aaBb 210

Which two genotypes are the recombinant offspring?

A. AaBb & Aabb

B. AaBb & aaBb

C. Aabb & aaBb

D. AaBb & aabb

Answer:

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9. On the ribosome, mRNA binds _____ and two sites in the _____ for subsequent amino acids to bind to be close enough to each other for the formation of a peptide bond.

A. between the subunits, on the large subunit.

B. to the large subunit, on the small subunit.

C. to the small subunit, on the large subunit.

D. to the small subunit, between the subunits.

Answer:

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10. The main reason for the presence of both a leading and a lagging strand during DNA replication is,

A. DNA polymerase can read and synthesize only in the direction of 3'-to-5'

B. DNA polymerase can only synthesize one strand at a time

C. Only one strand is available to be read at any given time

D. There are not enough RNA primers to have both strands be synthesized simultaneously

Answer:

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11. In a cell, DNA transcription is halted when

A. RNA polymerase falls off of the DNA.

B. The end of the DNA is reached.

C. When a rho site is reached.

D. When a stop codon is reached.

Answer:

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Section A

1. Humans have innate immunity for protection against pathogens that may enter the gut along with food. What are the two barriers that protect the body from such pathogens?

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2. A patient admitted in ICU was diagnosed to have suffered from myocardial infarction. The condition of coronary artery is depicted in the image below.

Name two bioactive agents and their mode of action that can improve this condition.

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3. Substantiate by giving two reasons as to why a holistic understanding of the flora and fauna the cropland is required before introducing an appropriate biocontrol method.

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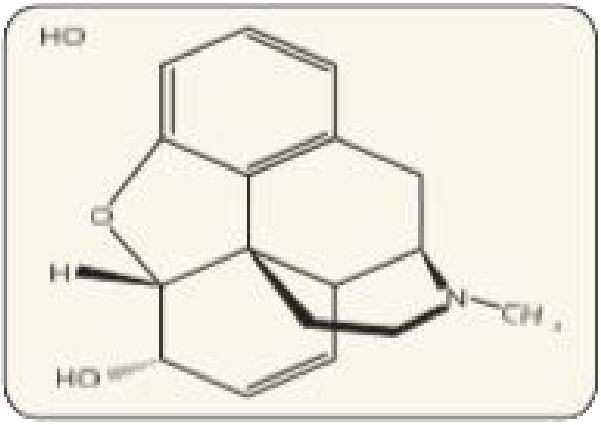
4. Identify the compound chemical structure is shown below. State any three of its physical

properties.



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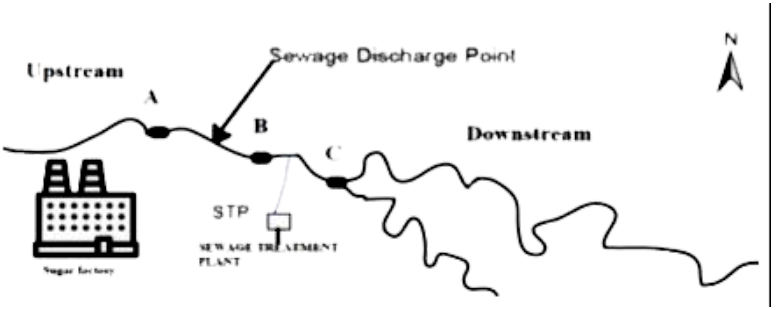
5. Water samples were collected at points A, B and C in a segment of a river near a sugar factory and tested for BOD level. The BOD levels of samples A, B and C were 400 mg/L,

480 mg/L and 8 mg/L respectively. What is this indicative of? Explain why the BOD level gets reduced considerably at the collection point C?



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6. An ecologist study an area with population A, thriving on unlimited resources and

showing exponential growth, introduced population B and C to the same area.

What will be the effect on the growth pattern of the population A, B and C when living together in the same habitat?

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7. With the decline in the population of fig species it was noticed that the population of wasp species also started to decline. What is the relationship between the two and what

could be the possible reason for decline of wasps?

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8. With the increase in the global temperature, the inhabitants of Antarctica are facing fluctuations in the temperature. Out of the regulators and the conformers, which of the two will have better chances of survival? Give two adaptations that support them to survive

in the ambient environment? Give one suitable example.

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Section B

1. How do normal cells get transformed into cancerous neoplastic cells? Elaborate giving three examples of inducing agent

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2. A person is suffering from a high-grade fever. Which symptoms will help to identify if he/she is suffering from Typhoid, Pneumonia or Malaria?

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3. Recognition of an antigenic protein of a pathogen or exposure to a pathogen occurs during many types of immune responses, including active immunity and induced active immunity.

Specify the types of responses elicited when human beings get encountered by a pathogen.

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4. In a pathological lab, a series of steps were undertaken for finding the gene of interest. Describe the steps, or make a flow chart showing the process of amplification of this gene of interest.

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5. ‘The Evil Quartet’ describes the rates of species extinction due to human activities. Explain how the population of organisms is affected by fragmentation the habitats.

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6. Introduction of alien species has led to environmental damage and decline of indigenous species. Give any one example of how it has affected the indigenous species?

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7. Could the extinction of Steller's sea cow and passenger pigeon be saved by man? Give reasons to support your answer.

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8. The image shown below is of a sacred grove found in India. Explain how has human involvement helped in the preservation of

these biodiversity rich regions.

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9. Value of Z (regression coefficient) is considered for measuring the species richness of an area. If the value of Z is 0.7 for area A

,and 0.15 for area B, which area has higher species richness and a steeper slope?

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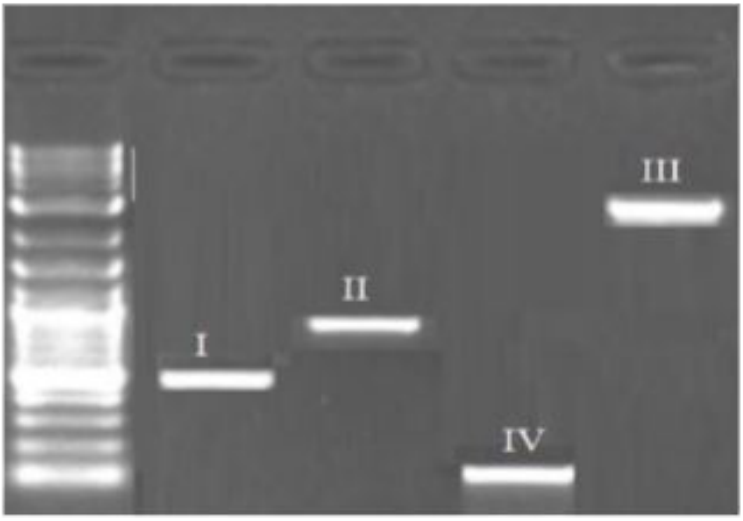
10. The image below depicts the result of gel electrophoresis.



If the ladder represents sequence length upto 3000 base pairs (bp).

a. Which of the bands (I - IV) correspond to 2500 bp and 100 bp respectively?

b. Explain the basis of this kind of separation and also mention the significance of this process.

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Section C

1. Some restriction enzymes break a phosphodiester bond on both the DNA strands, such that only one end of each molecule is cut and these ends have regions of single stranded DNA. BamH1is one such restriction enzyme which binds at the recognition sequence, 5'-GGATCC- 3'and cleaves these sequences just after the 5'-guanine on each strand.

a. What is the objective of this action?

b. Explain how the gene of interest is introduced into a vector.

c. You are given the DNA shown below.

5’ ATTTTGAGGATCCGTAATGTCCT 3

3’ TAAAACTCCTAGGCATTACAGGA 5’

If this DNA was cut with BamHI, how many DNA fragments would you expect? Write the sequence of these double-stranded DNA fragments with their respective polarity.

d.A gene M was introduced into E.coli cloning vector PBR322 at BamH1 site. What will be its impact on the recombinant plamids? Give a possible way by which you could differentiate non recombinant to recombinant plasmids.

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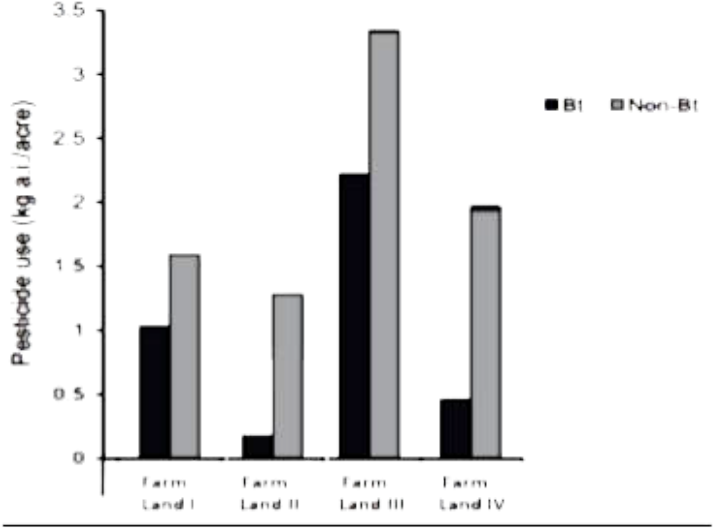
2. GM crops especially Bt crops are known to have higher resistance to pest attacks. To substantiate this an experimental study was conducted in 4 different farmlands growing Bt and non Bt-Cotton crops. The farm lands had the same dimensions, fertility and were under similar climatic conditions. The histogram below shows the usage of pesticides on Bt crops and non Bt crops in these farm lands.



a. Which of the above 4 farm lands has successfully applied the concepts of Biotechnology to show better management practices and use of agrochemicals? If you had to cultivate, which crop would you prefer (Bt or Non- Bt) and why?

b. Cotton Bollworms were introduced in another experimental study on the above farm

lands wherein no pesticide was used. Explain what effect would a Bt and Non Bt crop have on the pest.

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