SECTION: B

Q.No: 2

PART: (i)

ANSWER

Both, Antidiuretic Hormone and Oxytocin are hormones produced by posterior lobe of pituitary gland.

Function of ADH:

The ADH hormone is released by pituitary gland in order to control the water level of body. As blood passes through hypothalamus and it has low water level then hypothalamus stimulates pituitary gland to secrete ADH. This hormone makes distal convuluted tubules and Collecting tubules permeable to water,

as a result water is reabsorbed and water level becomes normal. Opposite of this happens, when water level in the body is high

Function of Oxytocin:

It is secreted by pituitary gland when it is stimulated by hypothalamus. It's function is to initiate strong uterine muscular contractions that help to pass the baby out at the time of birth. It also initiates let down reflex that helps to secrete milk from the alveoli of mammary glands.

It's secreted by posterior pituitary gland.

PART: (II)

ANSWER:

In Vitro Fertilization: (IVF)

It is an external fertilization technique that is adopted in such a case where either the mother's uterine tubes are blocked or the male produces little or few sperm.

Fertilization Outside:

Here the egg is fertilized outside of body by a sperm.

Process:

The female is treated with hormones, as a result she produces many eggs at the same time. These eggs are collected outside of body in a

glass dish. Then Sperm is added to initiate fertilization. After 3-5 days the zygote is implanted in mothers uterus.

PART: (III)

ANSWER:

Mendel chose pea plants for his experiments because of the following reason;

Easy to Grow:

Pea plant was easy to grow in pots and open environment.

Short Life Cycle:

Pea plant also had a short life cycle.

Cross Fertilization:

Pea plant was capable of cross fertilization (cross pollination).

Self Fertilization:

Pea plant was capable of self fertilization (self pollination). It has self pollinating flowers.

Distinct Traits:

Pea plant had distinct traits. It's traits had very sharp differences among them.

7 Traits:

Mendel compared seven traits;

PART: (V)

ANSWER:

Transcription and translation are the two processes involved in central dogma, gene expression or protein synthesis.

Transcription:

It is process that take place in nucleus.

In this process, mRNA is produced from DNA with the help of RNA polymerase enzyme.

The mRNA contains instructions to make specific proteins.

Followed By:

Transcription is followed by post-transcriptional modification method where mRNA is modified before leaving nucleas.

Translation:

It is the process that takes place in cytoplasm of cell. Here mRNA combines with ribosome and tRNA brings the amino acids to build protien according to the instructions on mRNA. It is the process where proteins or polypeptides are formed.

PART (VII)

ANSWER:

Deforestation:

Removal of forests is called deforestation.

OR;

Removal of trees from a region in order to either utilize the land or the wood as an energy source is called deforestion.

Affects on Environment:

Deforestation has very harmful affects on environment.

Destruction of Habitat:

Forest is the habitat of a diverse range of animals. This includes land animals and birds etc. By deforestation, their habitat is destroyed, and they are deprived of it

Low Concentration of O_2:

Trees produce Oxygen which is essential for the survival and continuity of an ecosystem. By decreasing numbers of trees, concentration of oxygen will also decrease.

Soil Erosion:

Trees are known holding the soil together. If a land is deprived of forests, soil erosion is most likely to occur in times of flood.

Less Rain fall:

Forest attract rainfall so if a land is deprived of it then rainfall patterns will change. The amount of rainfall will decrease.

High CO_2 concentration:

Forests convert CO_2 to organic compounds so, CO_2 concentration in environment is kept constant and not let to increase but If forests are cut down reverse happens.

PART: (iv)

ANSWER

Semi-conservative Model:

It is one of the three models presented to explain DNA replication.

Presented By:

It was presented by Watson and Crick.

Model:

It proposes that a parent DNA uncoils and loses its base pairs and two strands are formed. Each strand acts as a template strand for production of daughter DNA. Daughter DNA strands remains with template strand and two daughter DNA molecules are formed where one strand is of parent DNA while the other strand is daughter (newly formed) strand.

The parental DNA is partially conserved in new generation.

This model was also later on proved as well by Messelson and Stahl.

PART: (iX)

ANSWER:

Ribs:

Ribs are apart of axial skeleton.

Total Pairs:

There are total 12 pairs of ribs.

True Ribs:

Out of 12 pairs of ribs, 10 pairs are connected to sternum. Out of these 10, 7 pairs of ribs are connected directly to sternum. These are called true ribs.

False Ribs:

Out of 10 pairs of ribs that connect to sternum, 3 pairs connect indirectly to sternum by a costal arch. These are called

false ribs.

Floating Ribs:

Last two pairs of ribs are only connected to vertebral column and are not connected to sternum. These are called floating ribs

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PART: (X)

3

ANSWER:

Thermoregulation:

The aspect of homeostasis that involves regulation of body temperature around a certain value of some aspect

Skin as Thermoregulatory Organ:

Skin acts as thermoregulatory organ by doing some functions

as explained below;

In case of High Body Temperature:

If the body temperature exceeds optimum temperature (37°C) then body dilates the blood vessels to increase blood flow to skin as a result heat is lost. It also stimulates sweat glands to secrete sweat to reduce body temperature by evaporation.

In case of Low Body Temperature

If body temperature drops below optimum temperature then body constricts blood vessels to reduce blood flow to skin to reduce heat loss. It also stops sweating to reduce evaporation. Fatty layer below skin also reduces heat loss.

PART: (VIII)

ANSWER:

Biotechnology:

The branch of biology that deals with the study and use of organisms and their products for the betterment of humanity

Explanation:

With biotechnology many products are produced which are beneficial to human. Cures of disease have been found due to biotechnology as well

Examples:

Yogurt Production:

Milk is treated with bacteria that produce lactic acid. It coagulates milk protein and sours it. This way yogurt is obtained.

Bacteria Used:

Streptococcus thermophilus.
Lactobacillus bulgaricus.

Cheese Production:

Cheese is milk based product. Milk is treated with bacteria that produces Lactic acid, so milk protein coagulates and becomes sour. Solid part is called curd white liquid is called Whey. Curd is separated and treated to produce cheese. Whey is used as food source for yeast.

Insulin:

Insulin is also produced by biotechnology and its in larger quantity which can be used by patients.

~~PART: (XI)~~

~~ANSWER:~~

Gene Cloning:

In this way many copies of a gene are produced. These are desired genes with no mistakes.

Recombinant DNA Technology

Desired gene is inserted into organism and its producing product according to it. This is shown in insulin production.

Genetic Engineering:

Biotechnology is also used in genetic engineering to produce crops with desired genes.

PART: (Xi)

ANSWER:

Simple Fracture	Compound Fracture:
Definition:	
Type of fracture in which only bone is broken and skin remains intact.	Type of fracture where broken bone ends penetrate the skin.
Wound:	
Wound is not formed here.	Wound is formed here.
Recovery:	
It take 6-8 weeks to repair.	It takes more than 6-8 weeks.
Treatment:	
Here external reduction technique is used to treat it	Here internal reduction technique is used to treat it.

SECTION: "C"

Q.No: 3

ANSWER: (8)

Gene Expression:

The mechanism of expression of gene is called gene expression.

Processes Involved:

It involves the following two processes;

Transcription.

Translation.

Translation:

It is the process where mRNA is used to produce proteins or polypeptides with the help of ribosome and tRNA's.

Phases:

It involves following phases

i) Activation of Amino Acids.
ii) Initiation complex formation.
iii) Elongation phase.
iv) Termination phase.

Activation of Amino Acids:

In this phase, different amino acids in cytoplasm are activated and combine with their specific tRNA to form aminoacyl tRNA complex. This process is catalyzed by aminoacyl tRNA synthase enzyme.

Formation of Initiation Complex:

This is where actually the process of translation begins. Here initiation complex is formed.

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Initiator complex involves tRNA, mRNA and both subunits of ribosome.

First a tRNA carrying modified methionine (Formylmethionine) binds to smaller subunit of ribosome. Here an enzyme called initiation factor is used. Then mRNA combines with the same subunit and requires initiation factor as well. At the end, Large subunit also combines to constitute Initiation complex.

Sites:

First tRNA binds at P-site (peptidal site) two site are also produced called A-site (aminoacyl site) and E-site (exit site).

Elongation Phase:

Now a new tRNA bearing amino acid will bind at A-site by an enzyme called elongation factor. Then P-site will produce peptidal transferase enzyme which will break bond between tRNA and amino acid at P-site and form a bond between this amino acid and amino acid at A-site.

The whole set up will move on mRNA by a process called translocation.

Termination Phase:

Here protein synthesis comes to an end. No tRNA can bind to non-sense codon of mRNA except releasing fact When it binds, whole set up breaks and we get a protein molecule of desired sequence.

Q.No: "5"

ANSWER:

Axial Skeleton:

The part of skeleton that lies in mid part of body is called axial skeleton.

Total Bones:

There are total of 80 bones in this part of skeleton.

It's Parts:

It consists of following parts;

Human Skull:

It is present at top of the body. It is made by intramembranous ossification

of bones, joined together by sutures. It provides protection to the brain and support to face.

Cranium:

It encloses brain and is made up of 8 bones.

Occiptal – 1 bone.
Parietal – 2 bones.
Frontal – 1 bone.
Temporal – 2 bones.
Sphenoid – 1 bone.
Ethmoid – 1 bone.

Facial Bones:

These are a total of 14 bones.

Mandible – 1 bone.
Vomer – 1 bone.
Palatine – 2 bones.
Nasal – 2 bones.
Inferior Nasal Concaea – 2 bones.
Zygomatic – 2 bones.
Laerimal – 2 bones.
Maxillae – 2 bones.

B33

Neck Bone:

There is one neck bone called hyoid bone. It is located at third cervical vertebrae level. It is at base of mandible.

Ear Bones:

There are a total of 6 ear bones; 3 in each ear. These are mallus, incus, Stapes. They are called auditory ossicles.

Vertebrae:

Vertebral column is nearly flexible rod. It is made up of 33 vertebraea.

Cervical vertebraea – 7
Thoracic vertebraea – 12
Lumbar Vertebraea – 5
Saccral vertebraea – 5
Coccyx – 4

Ribs:

These form a cage in which many important organs are present

Total Ribs:

There are 24 ribs in total or we can say there are 12 pairs of ribs.

True Ribs:

Out of 12 pairs, 10 pairs connect to sternum and out of these only 7 pairs are connected directly to sternum. These are called true ribs.

False Ribs:

Out of 10 pairs that connect to sternum three pairs connect to sternum indirectly by a costal arch. These are called false ribs

Floating Ribs:

Last two pairs don't connect to

sternum and are called floating ribs.

Q.No: 4

PART: (a)

ANSWER:

Bombay Phenotype:

It is a rare blood group that is phenotypically O but genotypically may be A, B or AB blood group

Discovered By:

Dr. Bhende.

Discoverd In:

Discovered in Bombay (Mumbai).

7/14 = 8

3/

Explanation:

It is a type of recessive epistasis. The production of antigen on RBC is controlled by another gene called H gene at Chromosome-14. It has two form H and h, H is dominant to h. If a person has H gene he/she will recognize H-substance upon which either A or B enzyme will act which is produced by I^A or I^B to convert it to antigen but if someone has both h alleles he/she cannot make H substances so no antigen will be produced because there is no H substance to act on for A or B enzyme. As a result Blood group is O phenotypically and A, B or AB genotypically.

1C

PART: (b)

PCR:

Stands For:

Polymerase Chain Reaction.

Components:

(i) dNTPs.
(ii) taq polymerase enzyme (special type of DNA polymerase).
(iii) Primer.
(iv) PCR machine.
(v) Template DNA.

Applications:

Production of Desired Gene:

It is useful in making millions of copies of desired gene.

Short TTme:

It requires very short time interval as its a fast process.

Crime Analysis:

It is used to make many copies of DNA found at crime scenes which can be used for DNA analysis.

Effective Mechanism:

It's an effective mechanism because no mistake is made in it.

Millions of copies:

It makes millions of copies.

Gene Therapy:

PCR is used in gene therapy.

Genome Analysis:

It is used in genome analysis.

Genetic Engineering:

It is used in genetic engineering.